Deepwater Port License Application
Blue Marlin Offshore Port (BMOP) Project

Volume I – Appendix C

Submitted to:

Maritime Administration
Office of Deepwater Ports and Offshore Activities
1200 New Jersey Avenue SE, W21-309
Washington, DC 20590

United States Coast Guard
Commandant (CG-OES-2)
Stop 7509
2703 Martin Luther King Jr. Ave. SE
Washington, DC 20593-7509

Submitted by:

Blue Marlin Offshore Port LLC
8111 Westchester Drive
Suite 600
Dallas, Texas 75225

Prepared by:

exp.

September 2020

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Deepwater Port License Application
Blue Marlin Offshore Port (BMOP) Project

Volume I:	**General (Public), including Deepwater Port License Application and Appendices** **(*herein*)**
Volume IIa:	Offshore Project Components Environmental Evaluation (Public) (*under separate cover*)
Volume IIb:	Onshore Project Components, Environmental Evaluation (Public) (*under separate cover*)
Volume III:	Technical Information [*Confidential*] (*under separate cover*)
Volume IV:	Company and Financial Information [*Confidential*] (*under separate cover*)

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APPENDIX C

PERMIT APPLICATIONS

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APPENDIX C-1

U.S. ARMY CORPS OF ENGINEERS SECTION 10/404 PERMIT APPLICATION/COASTAL ZONE CONSISTENCY FORM / LOUISIANA COASTAL USE PERMIT (CUP) APPLICATION; SECTION 408 APPLICATION

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Blue Marlin Offshore Port (BMOP) Project

Joint Permit Application for Work within Louisiana Coastal Zone

Submitted to:

Louisiana Department of Natural Resources-
Office of Coastal Management
625 N 4th St
Baton Rouge, LA 70802

U.S. Army Corps of Engineers – Galveston District
2000 Fort Point Rd
Galveston, TX 77550

U.S. Army Corps of Engineers –New Orleans District
7400 Leake Ave
New Orleans, LA 70118

Submitted by:

Blue Marlin Offshore Port LLC
8111 Westchester Drive
Suite 600
Dallas, Texas 75225

September 2020

Louisiana Department of Natural Resources
Office of Coastal Management (OCM)
Telephone: 1-800-267-4019
Website: http://dnr.louisiana.gov/crm/

U.S. Army Corps of Engineers (COE)
New Orleans District
Telephone: 504-862-2766
Website: www.mvn.usace.army.mil/ops/regulatory

Joint Permit Application

For Work Within the Louisiana Coastal Zone

What is the purpose of the Joint Permit Application?

This Joint Permit Application was developed to facilitate the state and federal permit application process administered by the Louisiana Department of Natural Resources/Office of Coastal Management (OCM) and the U.S. Army Corps of Engineers (COE) for work within the Louisiana Coastal Zone.

To simplify the permit application process, the Joint Permit Application is a multi-purpose application. It may be used to apply for a Coastal Use Permit (CUP) and/or a Department of the Army Permit under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act. This application may also be used to apply for a Solicitation of Views (SOV) or an OCM Request for Determination (RFD). Review the instructions below, then proceed to Step 1.

Instructions

How do I complete the Joint Permit Application?

There are two parts to the Joint Permit Application package:

1. Joint Permit Application, and
2. Maps and Drawings.

An accurate/complete application is required for processing; inaccurate/missing information may delay processing. Follow the instructions below to complete the application. Specific instructions are provided with each step.

- Type or print clearly using black or blue ink;
- Steps 1 through 16 must be completed; write “N/A” if information does not apply to your proposed project. It is not necessary to write “N/A” on the Steps that you have been asked to skip;
- When additional space is needed, include an 8½ x 11 sheet of paper identifying the Step number.

When you have questions or need assistance in completing the application package:

- Refer to the “Glossary of Terms” (See page 10.);
- Refer to “Frequently Asked Questions” (See page 11.);
- Contact the Office of Coastal Management at 1-800-267-4019 or 225-342-7591; or
- Contact your local coastal parish program (See page 11.). (http://dnr.louisiana.gov/CRM/coastmgt/interagencyaff/lcp/lcp.asp)

Step 1 of 16

Who is the applicant for the proposed project?

Note: *Applicants may be either the landowner, person or company that is responsible for the proposed project.*

Complete the following information about the applicant.

Applicant/Company Name: Blue Marlin Offshore Port LLC
Individual Person or Corporation/Company

Mailing Address:
8111 Westchester Drive
Street Address or P.O. Box
Suite 600
Unit/Apartment #
Dallas
City
TX
State
75225
Zip

Contact Information:
Justin Minter
Name of Contact Person *(not the agent)*
JUSTIN.MINTER@energytransfer.c
E-Mail Address
(409) 749-3902
Area Code Daytime Telephone Number
(_______) ________________
Area Code Fax Number

Continue to page 2 for step 2.

Internal Office Use Permit #

Step 2 of 16

Is an agent being used for the proposed project?

***Note**: An agent is not required.*

Is an agent being used for the proposed project?

☐ **NO** (If NO, proceed to Step 3.)
☑ **YES** (If YES, complete the following information.)

Company Name: EXP Energy Services
Corporation/Company

Mailing Address: 1800 West Loop South
Street Address or P.O. Box
Unit/Apartment #:
Houston
City
TX
State
77027
Zip

Contact Information: Michael Aubele
Name of Contact Person
Mike.Aubele@exp.com
E-Mail Address
(713) 985-9914
Area Code Daytime Telephone Number
(______) ________________
Area Code Fax Number

Step 3 of 16

What type of permit or action would you like to request?

***Note:** You may need the approval of other federal, state or local agencies for your project.*

***Note:** For questions concerning the CUP, SOV or RFD, call OCM at:*

- *1-800-267-4019*
  or
- *225-342-7591*

Check ☑ the appropriate box(es) to indicate the type of permit or action that you would like to request.

☑ **Coastal Use Permit (CUP), Clean Water Act Permit (Section 404), Rivers and Harbors Act (Section 10)**

The purpose of the CUP is to ensure that any activity affecting the Coastal Zone is completed in a manner that is consistent with the Louisiana Coastal Resource Program.

The purpose of the Department of the Army permit program under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act is to review and evaluate proposals for dredging, filling, and/or placement of structures in waterways and wetlands in order to determine whether a permit should be granted or denied based on expected impacts to the overall public interest.

☐ **Solicitation of Views (SOV) – OCM only**

If you wish to find out if your project is in the Coastal Zone or if you wish to determine if there are special features of the area that may impact your project design you may request a SOV. No application fee is assessed for SOV requests. The following Steps must be completed to obtain an informal determination.

- Step 1, Step 2, Step 6, Step 14, Step 16; and
- Step 13 - (Vicinity plat showing project location and extent is required; cross section and plan views are useful, if available.)

☐ **Request for Determination (RFD)**

If you wish to obtain a formal determination as to whether or not a CUP would be required for a particular activity, you may submit a RFD. The appropriate application fee will be assessed for RFD requests. The following Steps must be completed to obtain a RFD.

- Step 1, Step 2, Step 5, Step 6, Step 8, Step 10, Step 14, Step 16; and;
- Step 13 - (Vicinity plat showing project location and extent is required; cross section and plan views are useful, if available.)
- If you think that no permit is required, you must provide a statement explaining why you think a permit is not required.

Step 4 of 16

Have you participated in a Pre-Application or Geological Review Meeting or obtained a wetland determination?

***Note:** To schedule a Pre-Application and/or a Geological Review Meeting, call OCM at 1-800-267-4019.*

***Note:** To apply for a wetland determination, call the COE at 504-862-1627.*

a. Have you participated in a Pre-Application or Geological Review Meeting for the proposed project?

☑ **NO** (If NO, proceed to Step 4b.) (If you would like to schedule a pre-application meeting, please call 1-800-267-4019)
☐ **YES** (If YES, complete the following information.)

Date meeting was held: ____/____/______

Attendees: ________________ ________________ ________________
Individual or Company Representative OCM Representative COE Representative

b. Have you obtained an official wetland determination from the COE for the project site?

☑ **NO** (If NO, proceed to Step 4c.)
☐ **YES** (If YES, include a copy with this application.)

JD Number:________________________________

c. Is this application a mitigation plan for another CUP?

☑ **NO** (If NO, proceed to Step 5.)
☐ **YES** (If YES, identify the permit number of the project requiring mitigation.)

OCM Permit Number: _________________________

Continue to page 3 for step 5. ↳

Step 5 of 16

What permits/ certifications have you previously requested for the proposed project?

Note: Additional sheets may be required for agency name, permit number and status information.

a. **Describe the project.**

See Sections 1.0, 1.2, 1.3, and 1.4 of the narrative

b. **Is this application a change to an existing permit?**

☑ **NO** (If NO, proceed to Step 5c.)
☐ **YES** (If YES, identify the existing permit number.)

OCM Permit Number: ____________

↘ Please explain

c. **Have you previously applied for a permit or emergency authorization for all or any part of the proposed project?**

☐ **NO** (If NO, proceed to Step 6.)
☐ **YES** (If YES, complete the following information for the proposed project.)

Agency Name	Permit Number	Decision Status Approved	Decision Status Denied	Decision Status Pending	Decision Date
OCM	P20200451	☐	☐	☐	
COE		☐	☐	☐	
Other		☐	☐	☐	

Step 6 of 16

Where will the proposed project be located?

Note: The following websites may provide assistance in completing the latitude/longitude and directions:

- *Sonris on OCM website*
- *MapQuest.com*
- *Topozone.com.*

Note: Directions may include the following:

- *Nearest town/city*
- *Highways*
- *Intersections*
- *Street names*
- *Landmarks*
- *Start/end point*

Complete the following information to identify the exact location of the proposed project.

a. **Physical Location:**

Parish: See Figure 1-1 in the narrative
City:
Zip:
Street Address (If known):
Water Body (if known):

b. **Latitude and Longitude:**

⚠ Must be included in all applications.

	Degrees	Minutes	Seconds
Latitude:	30	0	7.830
Longitude:	93	59	42.870

c. **Section, Township, Range:** *(if available)*

Section #(s)	Township # (Specify North or South)	Range # (Specify East or West)
N/A		

d. **Lot #, Tract #, Parcel # or Subdivision Name:** *(if known)*

Lot #: N/A
Parcel #:
Tract #:
Subdivision Name:

e. **Site Directions:** Directions to the proposed project site must be identified in order to process the application.

Example: **START - I-10 toward Baton Rouge. Exit #153 toward Port Allen. US-190 West/LA-1 North ramp. RIGHT onto LA-987 1/Bridge Side Road. RIGHT onto LA-986/North River Road to Popular Grove Plantation directly behind guest parking lot in rear. –END**

Start - From Baton Rouge, take I10 west towards Texas. Take Exit 873 and follow TX-73 West towards Nederland, Take right on Pure Atlantic Road (FM 366). Continue to follow FM 366, as the road name will change from Pure Atlantic Road to Magnolia Avenue. Turn right into the Nederland Terminal facility. The driveway to the facility is directly across from Spring Street in Nederland, Texas. - End

Continue to page 4 for step 7. ↳

Step 7 of 16

Who are the adjacent landowners?

Note: Adjacent landowner information is usually available through the office of the tax assessor in the parish where the project is to be developed.

Note: Additional information may be included in the area provided on page12. Also, extra sheets may be required if there are more than eight adjacent landowners.

Complete the following information to notify adjacent landowners whose property adjoins the proposed project site.

Adjacent Landowner #1: See Appendix C - Adjoining Property Owners
Name of Adjacent Landowner

Mailing Address:
Address
Unit/Apartment #
City
Parish
State
Zip

Adjacent Landowner #2:
Name of Adjacent Landowner

Mailing Address:
Address
Unit/Apartment #
City
Parish
State
Zip

Adjacent Landowner #3:
Name of Adjacent Landowner

Mailing Address:
Address
Unit/Apartment #
City
Parish
State
Zip

Adjacent Landowner #4:
Name of Adjacent Landowner

Mailing Address:
Address
Unit/Apartment #
City
Parish
State
Zip

Step 8 of 16

What is the purpose of the proposed project?

Note: We are required to review the justifications and needs for your project. Providing detailed information at the time of application may expedite processing of your proposal.

Note: Additional sheets may be required to explain why the proposed project is needed.

Complete the following information to identify the purpose and need for the proposed project.

a. Project Name and/or Title: Blue Marlin Offshore Port (BMOP) Project

b. Project Type: *(Check ☑ the appropriate box. See the "Glossary" on page 10 for the definitions of terms.)*
☐ **Non-Residential**
☐ **Residential**

c. Source of Funding ☐ ***Federal*** ☐ ***State*** ☐ ***Local*** ☑ ***Private***

d. Check ☑ the appropriate box(es) to identify what will be done for the proposed project.

☑ Bridge/Road
☐ Bulkhead/Backfill
☐ Drainage Improvements
☑ Dredging
☑ Drill Barge/Structure
☐ Other
↘ (Please specify)

☐ Drill site
☑ Fill
☐ Home Site/Driveway
☐ Levee Construction
☑ Major Industrial Commercial
☐ Marina

☐ Pilings
☑ Pipeline/Flow line
☐ Plug/Abandon
☐ Production Barge/Structure
☐ Prop Washing
☐ Remove Structures

☑ Riprap/Erosion Control
☑ Site Clearance
☐ Subdivision
☐ Vegetative Plantings
☐ Wharf/Pier/Boathouse

e. Why is the proposed project needed?

See Section 1.1 of the Narrative

Continue to page 5 for step 9. ↳

Step 9 of 16

What is the status of the proposed project?

Note: Show and identify planned, in progress, completed work and dimensions for excavations and fill on the Plan View and Cross Section Drawings.

Complete the following information to indicate the start/end dates and the current status of the proposed project.

a. Proposed project start date: 8 / 1 / 2022 **Proposed project completion date:** 3 / 1 / 2023

b. Is any of the project work in progress?

☑ **NO** (If NO, proceed to Step 9c.)

☐ **YES** (If YES, show and identify the work in progress on the Plan View and Cross Section Drawings.)

➘ Please explain

c. Is any of the project work complete?

☑ **NO** (If NO, proceed to Step 10.)

☐ **YES** (If YES, show and identify the work completed on the Plan View and Cross Section Drawings.)

➘ Please explain

Step 10 of 16

How would you describe the proposed project?

Note: To apply for a wetland determination, call the COE at 504-862-1627.

Note: Information provided in this Step must be consistent with Maps and Drawings.

Note: For any equipment used, show the access route and construction right of way on the Maps and Drawings.

Complete the following information to describe structures, materials and methods for the proposed project.

Cubic yards are determined by using this formula. *(Length (ft.)* ***X*** *Width (ft.)* ***X*** *Depth (ft.) divided by 27 = Cubic Yards)*

Example: **25 ft. X 25 ft. X 5 ft. divided by 27 = 115.7 Cubic Yards**

Acres are determined by using this formula. *(Length (ft.)* ***X*** *Width (ft.) divided by 43,560 = Acres)*

Example: **250 ft. X 250 ft. divided by 43,560 = 1.43 Acres**

a. Excavation: 1,707,775.50 **Cubic Yards** 223.13 **Acres**

b. Fill: 1,710,143.40 **Cubic Yards** 223.13 **Acres**

c. What fill materials will be used for the proposed project?

(Check ☑ the appropriate box(es) and indicate the cubic yards for each type of fill material.)

☑ Concrete	1,085.70 Cubic Yards	☑ Rock (rip/rap)	934.50 Cubic Yards
☑ Crushed Stone or Gravel	1,048.80 Cubic Yards	☐ Sand	Cubic Yards
☑ Excavated & Placed on site	1,695,264. Cubic Yards	☑ Hauled in Topsoil/Dirt	11,809.90 Cubic Yards
☑ Excavated & Hauled off site	6,511.00 Cubic Yards		
☐ Other *(Please specify)*:			Cubic Yards

d. What equipment will be used for the proposed project? *(Check ☑ the appropriate box(es).)*

☑ Airboat

☑ Backhoe

☑ Barge Mounted Bucket Dredge

☐ Barge Mounted Drilling Rig

☑ Bulldozer/Grader

☐ Dragline/Excavator

☐ Handjet

☐ Land Based Drilling Rig

☑ Marsh Buggy

☑ Other Tracked or Wheeled Vehicles

☐ Self Propelled Pipe Laying Barge

☑ Tugboat

☐ Other (Please specify.)

Continue to page 6 for step 11. ➩

Step 11 of 16

What impact will the proposed project have?

Note: *You will be notified by OCM if a field investigation is required to determine if the proposed project will impact wetlands.*

Note: *Additional sheets may be required to adequately respond to 11b, 11c, 11d and/or 11e.*

Note: *Providing detailed information at the time of application may expedite processing of your proposal.*

a. Total acres of wetlands and/or waterbottoms filled and/or excavated: Perm. 2.22 acres
Temp 779.5 acres

b. What alternative locations, methods and access routes were considered to avoid impact to wetlands and/or waterbottoms?

See Section Section 2.0 of the narrative

c. What efforts were made to minimize impact to wetlands and/or waterbottoms?

See Sections 1.5, 3.0, and 4.0 of the narrative.

d. How are unavoidable impacts to vegetated wetlands to be mitigated? (Please note that a willingness to perform mitigation does not relieve the applicant from adequately addressing justification for (step 8e) and alternatives to (step 11b & 11c) the proposed activity)

A Compensatory Mitigation Plan has been completed for the Project. See Attachment J.

Landowner Rights

- The affected landowner(s) whose property may be impacted by the proposed project has (have) the option of requesting that compensatory mitigation be done on their property.
- Once OCM determines that mitigation is required, they will notify the applicant and all affected landowners of the extent and type of habitat impacted. The landowner(s) will be given thirty (30) days to formally request or waive their mitigation option. (This can cause substantial delays in processing of the application.)

Applicant Responsibilities

- Coordinate with the affected landowner(s) to develop a conceptual compensatory mitigation plan. This plan should be designed to offset the adverse impacts to vegetated wetlands which will occur from the proposed project. (This can also cause substantial delays in processing of the application.)
- To avoid delays, it is recommended that, prior to sending the application to OCM, you contact affected landowner(s) to:

  – Inform them of possible wetland impacts and discuss their compensatory mitigation rights; and
  –Ask them to indicate their intentions regarding compensatory mitigation on the form.
- Submit the Landowner Compensatory Mitigation Request/Waiver form along with your application.

Continue to page 7 for step 12. ⮡

Step 12 of 16

What are the requirements for notification of landowners and oyster lease holders of the proposed project site?

Note: OCM and COE both have mitigation requirements under different laws, rules and regulations; therefore, specific agency requirements may vary.

Note: If a property has multiple owners with undivided interest in the property, each person owning an interest is considered to be a landowner and must be notified.

Note: Additional sheets may be required if there are more than two landowners.

Note: Compensatory mitigation is not a monetary settlement to be used at the discretion of the landowner(s).

Note: A copy of the "Landowner Compensatory Mitigation Request/ Waiver" form is included with this application. To obtain additional copies, visit the OCM website or call:
- *1-800-267-4019*
  Or
- *225-342-7591*

a. Are you applying for a Coastal Use Permit?

☐ **NO** (If NO, proceed to Step 12b.)
☑ **YES** (If YES, read the following information.)

Requirements for Notification of Landowners

It is the responsibility of the applicant to notify the landowner(s) of the property about this proposed project. Notification must include providing each impacted landowner with a copy of the permit application (form and plats) at the time the application is submitted to the Office of Coastal Management.

Requirements for Notification to Oyster Lease Holders

It is the responsibility of the applicant to notify all affected oyster lease holders about this proposed project. Notification must include providing each affected oyster lease holder with a copy of the permit application (form and plats) at the time the application is submitted to the Office of Coastal Management. The location of leases, and the name and contact information of the lessee can be obtained by contacting the LDWF Oyster Lease Survey Section at 504-284-5279. You also can use the OCM GIS interactive map on our website at http://sonris-www.dnr.state.la.us/www_root/sonris_portal_1.htm. Please note that copies of the lease holder notification letters must be included with your application packet at the time of submittal. For more information regarding notification requirements please contact the Oyster Lease Survey Section or visit our website at http://dnr.louisiana.gov/crm/coastmgt/permitsmitigation/oyster.asp.

While these are legal requirements to ensure that property owners/oyster lease holders are aware of proposals which might impact their land/oyster lease, it also serves as a proactive measure to initiate communication between the applicant and the landowner(s)/lease holders, especially when mitigation might be necessary. Since mitigation can be a lengthy process, taking proactive steps early in the process may significantly reduce the time necessary to receive an authorization.

b. Are you the sole owner of the property on which the proposed activity is to occur?

☐ **YES** (If YES, proceed to Step 12c.)
☑ **NO** (If NO, follow the instructions below.)

Check ☑ the appropriate box(es) and complete the landowner information to attest to OCM that a copy of this application has been sent to all landowners whose property will be impacted by the project.

☐ The applicant is an owner of the property on which the proposed described activity is to occur.
☑ The applicant has made every reasonable effort to determine the identity and current address of the owner(s) of the land on which the proposed described activity is to occur, which included, if necessary, a search of the public records of the parish in which the proposed activity is to occur.
☐ The applicant hereby attests that a copy of the application has been distributed to the following landowners.

Landowner/Lease Holder #1: ______________________
Name of Landowner / Lease Holder

Mailing Address: ______________________ ________
Street Address or P.O. Box — Unit/Apartment #

________ ________ ____ ________
City — Parish — State — Zip Code

Landowner/Lease Holder #2: ______________________
Name of Landowner / Lease Holder

Mailing Address: ______________________ ________
Street Address or P.O. Box — Unit/Apartment #

________ ________ ____ ________
City — Parish — State — Zip Code

Note: See our FAQ for a list of regulations that may be applicable. Be aware that this list is for example proposes and does not purport to be complete or indicate applicability in any particular situation or project. It is the applicant's responsibility to be fully aware of all regulatory requirements, to list those requirements and certify that thy will be in compliance.

c. Does the project involve drilling, production, and/or storage of oil and gas?

☑ **NO** (If NO, proceed to Step 13.)
☐ **YES** (If YES, review and complete the certification below. You must attach a list of all state and federal laws and rules and regulations dealing with spill prevention and containment. Your signature on step 14 certifies that you are aware of the terms and conditions of each requirement and that you will remain in compliance at all times.)

I, ______________________ hereby certify that I am the ______________________ of
(Name of officer) *(Name of Office)*

______________________, hereinafter referred to as the Applicant and that I have authority to
(Full legal name of the entity seeking a permit)

act on behalf of and bind that legal entity, and by my signature below I certify that the information in the application is true and correct to the best of my knowledge, that Applicant has provided a complete list of the requirements for protection of health, safety and the environment, and that Applicant is in full compliance with all applicable safety and environmental regulations as listed on the attached sheet, specifically including when applicable, LAC 43:XIX.111 Diverter Systems and Blowout Preventers.

Continue to page 8 for step 13. ↳

Step 13 of 16

Why are Maps and Drawings required to obtain a permit?

Note: The following websites may provide assistance in completing the Vicinity Map:
•Sonris on OCM website
•MapQuest.com
•Topozone.com

Note:
For additional assistance with specific requirements, refer to the samples provided in this application package.

Quality Maps and Drawings are required to process the Joint Permit Application and for Public Notice. They must visually reflect what will be done in the proposed project and are key to the overall evaluation.

The following Maps and Drawings must be submitted with the Joint Permit Application and must show both existing and proposed conditions.

- **Vicinity Map** - Illustrates access to and the location of the proposed project relative to surrounding areas;
- **Plan View Drawing** - Illustrates an overhead view of the proposed project; and
- **Cross Section Drawing** - Illustrates a side view of the proposed project.

In general, all Maps and Drawings should be:

- Legible and clearly labeled on single sided 8½ x 11 size paper; (large drawings that are reduced in size to fit the 8½ x 11 format are not acceptable if the scale is no longer accurate and if the dimensions and details are not clear and easy to read after reproduction in the Public Notice);
- Drawn to scale with the scale identified graphically on each drawing; (if you cannot provide Maps and Drawings to scale, you may submit the dimensions of the proposed and existing features of the work area displayed);
- Black and white **ONLY** (Colored Maps and Drawings will **NOT** be accepted);
- Accurate and reproducible;
- Placement of the north arrow, title, legend and scale bar must be consistent on Maps and Drawings; and
- Information provided in Steps 1 through 12 must be consistent with the Maps and Drawings.

Inadequate or poor Maps and Drawings are the primary reason for delays in the permitting process.
Sample Maps and Drawings are provided with this Joint Permit Application package for your assistance.
Link to sample plats:
http://dnr.louisiana.gov/crm/coastmgt/cup/sampleplats.asp

Step 14 of 16

Who needs to certify and sign this application?

Note:
The application must be signed and dated by the applicant who desires to undertake the proposed activity.

Read the following information. Print your name, sign and date to certify this application for processing.

- Application is hereby made for a permit or permits to authorize the work described in this application.
- To the best of my knowledge the proposed activity described in this permit application complies with and will be conducted in a manner that is consistent with the Louisiana Coastal Resources Program.
- I certify that the information in this application is complete and accurate.
- If applicable, I also certify that the declarations in Step 12, notification to landowner(s), are complete and accurate.
- If applicable, I also certify that the declarations in Step 12c, oil spill response, are complete and accurate.
- I will abide by the conditions of the permit or license if issued and will not begin work without the appropriate authorization.
- Permission is granted to the agencies responsible for authorization of this work, or their duly authorized representative, to enter the property site during working hours for inspection purposes.
- If applicable, I authorize the agent identified in Step 2 to act in my behalf as agent for this application and the agent will furnish, upon request, information in support of this application.

Justin Minter
Clearly Print Name of Applicant

Justin Minter Digitally signed by Justin Minter Date: 2020.09.17 15:32:55 -05'00'
Applicant Signature

9 / 17 / 20
Date

Note: If an agent is being used, the applicant and agent must sign and date this application.

- As the agent, I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Michael Aubele
Clearly Print Name of Authorized Agent

Michael Aubele Digitally signed by Michael Aubele DN: C=US, E=Mike.Aubele@exp.com, CN=Michael Aubele Date: 2020.09.17 16:10:56-04'00'
Authorized Agent Signature

9 / 17 / 20
Date

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

Continue to page 9 for step 15.

Step 13 of 16

Why are Maps and Drawings required to obtain a permit?

Note: *The following websites may provide assistance in completing the Vicinity Map:*
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•MapQuest.com
•Topozone.com

Note:
For additional assistance with specific requirements, refer to the samples provided in this application package.

⚠ **Quality Maps and Drawings are required to process the Joint Permit Application and for Public Notice. They must visually reflect what will be done in the proposed project and are key to the overall evaluation.**

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- **Cross Section Drawing** - Illustrates a side view of the proposed project.

In general, all Maps and Drawings should be:

- Legible and clearly labeled on single sided 8½ x 11 size paper; (large drawings that are reduced in size to fit the 8½ x 11 format are not acceptable if the scale is no longer accurate and if the dimensions and details are not clear and easy to read after reproduction in the Public Notice);
- Drawn to scale with the scale identified graphically on each drawing; (if you cannot provide Maps and Drawings to scale, you may submit the dimensions of the proposed and existing features of the work area displayed);
- Black and white **ONLY** (Colored Maps and Drawings will **NOT** be accepted);
- Accurate and reproducible;
- Placement of the north arrow, title, legend and scale bar must be consistent on Maps and Drawings; and
- Information provided in Steps 1 through 12 must be consistent with the Maps and Drawings.

Inadequate or poor Maps and Drawings are the primary reason for delays in the permitting process.
Sample Maps and Drawings are provided with this Joint Permit Application package for your assistance.
Link to sample plats:
http://dnr.louisiana.gov/crm/coastmgt/cup/sampleplats.asp

Step 14 of 16

Who needs to certify and sign this application?

Note:
The application must be signed and dated by the applicant who desires to undertake the proposed activity.

Read the following information. Print your name, sign and date to certify this application for processing.

- Application is hereby made for a permit or permits to authorize the work described in this application.
- To the best of my knowledge the proposed activity described in this permit application complies with and will be conducted in a manner that is consistent with the Louisiana Coastal Resources Program.
- I certify that the information in this application is complete and accurate.
- If applicable, I also certify that the declarations in Step 12, notification to landowner(s), are complete and accurate.
- If applicable, I also certify that the declarations in Step 12c, oil spill response, are complete and accurate.
- I will abide by the conditions of the permit or license if issued and will not begin work without the appropriate authorization.
- Permission is granted to the agencies responsible for authorization of this work, or their duly authorized representative, to enter the property site during working hours for inspection purposes.
- If applicable, I authorize the agent identified in Step 2 to act in my behalf as agent for this application and the agent will furnish, upon request, information in support of this application.

Justin Minter	Justin Minter Digitally signed by Justin Minter Date: 2020.09.17 15:32:55 -05'00'	9 / 17 / 20
Clearly Print Name of Applicant	Applicant Signature	Date

Note: *If an agent is being used, the applicant and agent must sign and date this application.*

- As the agent, I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Michael Aubele	Michael Aubele Digitally signed by Michael Aubele DN: C=US, E=Mike.Aubele@exp.com, CN=Michael Aubele Date: 2020.09.17 16:10:56-04'00'	9 / 17 / 20
Clearly Print Name of Authorized Agent	Authorized Agent Signature	Date

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

Continue to page 9 for step 15. ➥

Step 15 of 16

What fees are required for permit processing and what methods are available for payment?

COE and Local Parish Program fees will be assessed separately at the end of the process.

The following fees apply and must be received in order to process the application.

a. Check ☑ the appropriate box to indicate the fee type: *(See the "Glossary" on page 10 for the definitions of terms.)*

☐ **$100.00 - Non-Residential**
☐ **$ 20.00 - Residential**

- If your activity involves dredging or filling, OCM will bill you on the basis of $.04 per cubic yards for residential uses and $.05 per cubic yards for all other uses.
- Fees may not apply if the Joint Permit Application is being processed by the local Parish.
- Additional fees may be assessed for mitigation processing.

b. Check ☑ the appropriate box to indicate payment method:

☑ **Check/Money Order** ☐ **Electronic Transfer**
☐ **Credit Card (Visa or MasterCard only)** ☐ **Escrow Account**

- Make Check/Money Order payable to the Office of Coastal Management.
- To pay by Credit Card, Electronic Transfer or Escrow Account, call OCM at 1-800-267-4019 to provide specific account information or provide account information on a separate sheet of paper and include with application.
- Cash is not accepted.

Step 16 of 16

How do I submit the Joint Permit Application and Maps and Drawings for processing?

If your project is in the Galveston or Vicksburg District of the Corps of Engineers, please see page 12.

Note: *Please keep a copy of the completed application for your records.*

To submit this permit application, Maps and Drawings and all supporting documentation, select an option below.

MAIL:

Office of Coastal Management
P.O. Box 44487
Baton Rouge, LA 70804-4487

If you select the MAIL option, submit the original Joint Permit Application, Maps and Drawings and supporting documentation.

EXPRESS MAIL:

Office of Coastal Management
617 North 3rd Street,
Suite 1078
Baton Rouge, LA 70802
Phone: 225-342-7591

If you select the EXPRESS MAIL option, submit the original copies of the Joint Permit Application, Maps and Drawings and supporting documentation.

FAX:

225-342-6760
Attention: Office of Coastal Management, Joint Permit Application Processing

- Include a cover sheet with the total number of pages; and
- If you select the FAX option, follow-up with one of the mail options to prevent delay if the fax is not legible.
- Payment arrangements should be made prior to faxing your application by calling OCM at 1-800-267-4019.

Continue to page 10 for "Glossary of Terms".

Glossary of Terms

The following information may provide a better understanding of terms that are used throughout this application.
If the terms defined in this section do not help you, please contact OCM at one of the following, 1-800-267-4019 or 225-342-7591.

Adjacent Landowner
Property owners or lessees whose property is contiguous or shares a common border with that being developed.

Affected Landowner
The owner of the land on which a proposed activity will occur. If a property has multiple owners with undivided interest, each person owning an interest is considered to be an affected landowner.

Coastal Use Permit
A permit required by 214.30 of the SLCRMA. The term does not mean or refer to, and is in addition to, any other permit or approval required or established pursuant to any other constitutional provision or statute.

Compensatory Mitigation
As defined by OCM, replacement, substitution, enhancement, or protection of ecological values to offset anticipated losses of ecological values caused by a permitted activity.
As defined by the COE, compensating for unavoidable adverse impacts to wetlands by restoring areas to wetlands, creating wetlands, or enhancement of wetlands. Most compensatory mitigation involves purchase of mitigation credits in a private mitigation bank. The amount of credits purchased is dependent on the amount of wetland values that would be lost because of the permitted project.

Cross Section
A side view of a project area illustrating elevations of features such as natural ground; buildings; bulkheads; piers; and depressions such as waterways, ditches, ponds, etc. Cross sections also show side views of proposed work such as dredging and filling.

Discharge
The placement or movement of fill or excavated material using methods including, but not limited to dragline or backhoe buckets, bulldozers, front loaders, dump trucks, hydraulic dredge pipes, wheel-washing or prop-washing, jetting, etc.

Dredged Material (Spoil)
Material that is excavated as part of a specific project.

Ecological Value
The ability of an area to support vegetation, fish and wildlife populations.

Excavate
To dig out, remove or move earthen material, or to form a cavity or hole including linear features. Methods include, but are not limited to, draglines, backhoes, bulldozers, front loaders, hydraulic dredges, wheel-washing or prop-washing, jetting, etc.

Fastlands
Lands surrounded by publicly-owned, maintained, or otherwise validly existing levees or natural formations as of January 1, 1979, or as may be lawfully constructed in the future, which levees or natural formations would normally prevent activities, not to include the pumping of water for drainage purposes, within the surrounded area from having direct and significant impacts on coastal waters.

Fill Material
Any material including, but not limited to, soil, rocks, sand, clay, construction debris, trees, wood chips, broken concrete and asphalt, etc., whose placement replaces any portion of a waterbottom or wetland with dry land or changes the elevation of wetlands or waterbottoms. This material may come from on-site or be imported from an off-site source.

Mean High Water
The average position (elevation) of the high water mark.

Mean Low Water
The average position (elevation) of the low water mark.

Mitigation
All actions taken by a permittee to avoid, minimize, restore, and compensate for ecological values lost due to a permitted activity.

Non-Residential
Includes all actions that do not meet the requirements for the Residential category.

Non-Vegetated Waterbottoms
Waterbottoms that lack the presence of rooted vegetation.

Non-Wet Areas
Any area that has sufficiently dry conditions that indicate hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking.

Off-site
Not within or adjoining the area directly modified by the permitted activity and not directly related to implementation of the permitted activity.

On-site
Within or adjoining the area directly modified by the permitted activity or directly related to implementation of the permitted activity.

Residential
Any coastal use associated with the construction or modification of one single-family, duplex, or triplex residence or camp. It shall also include the construction or modification to any outbuilding, bulkhead, pier, or appurtenance on a lot on which there exists a single-family, duplex, or triplex residence or camp or on a water body which is immediately adjacent to such lot. Uses which do not fit this definition are non-residential. The Coastal Use Permit application fee for residential projects is $20.

Unavoidable Net Loss of Ecological Values
The net loss of ecological value that is anticipated to occur as the result of a permitted/authorized activity, despite all efforts, required by the guidelines, to avoid, minimize, and restore the permitted/authorized impacts.

Vegetated Waterbottoms
Waterbottoms that exhibit the presence of rooted vegetation.

Wetlands
For the purposes of §724 (as defined in R.S. 49:21.41), Open water areas or areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Continue to page 10 for “Frequently Asked Questions”.

Frequently Asked Questions

The following questions and answers may assist you during the application process. For an expanded version of frequently asked questions, visit our website at http://dnr.louisiana.gov/CRM/faq.asp

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What gives the Office of Coastal Management (OCM) the right to regulate private property?

OCM does not regulate private property. OCM regulates activities that have a direct and significant impact on state public resources. OCM's authority derives from Louisiana Revised Statute 49:214.21 et seq. Visit the legislative website for additional information at http://www.legis.state.la.us/lss/tsrssearch.htm.

How does the Joint Permit Application process work?

In general, an application is submitted which details the location and scope of the proposed work. OCM – Permits & Mitigation Division, which serves as a central collection point for the applications, distributes the applications to interested parties for their review and comment. OCM - Permits & Mitigation Division and the commenting agencies review the application for conformance with programmatic requirements and look for ways of minimizing impacts to coastal resources (e.g., vegetated wetlands, bird rookeries, endangered species, etc.). If necessary, negotiations are entered into to find locations, technologies or methods of implementing the project which will accommodate the needs of the permit applicant while conforming with the mandates of the various state and federal agencies. Once consensus is reached an appropriately conditioned permit is issued.

Who receives a copy of my Joint Permit Application?

The following agencies/offices receive a copy of your application:

- OCM Permit Section;
- Local Programs Section, (if necessary);
- OCM Support Services Staff;
- OCM Field Investigator;
- The Army Corps of Engineers; and
- State Land Office.

How long does it take to obtain a permit?

The following schedules are offered with the assumption that all of the information required by OCM is included in the application and the plats are adequate, clear and legible. For activities that are exempt from permit requirements, the determination is normally issued in under seven days. Projects that are determined to have no direct or significant impacts to coastal resources are issued in 4 to 10 days depending on location. Authorizations for activities that qualify for a General Permit are issued in 10 to 15 days. For those activities that require full public notice, a minimum of 45 days is required. During review of the permit application, for more complex activities, additional information may be requested. The more promptly the applicant can furnish this information the less time it will require to issue the authorization. The requirement for mitigation of wetland impacts is one of the factors that increases the time required for permit application review, as does coordination with other State agencies for activities affecting resources of concern to that agency

How do I check the status of a submitted Joint Permit Application?

Information regarding submitted permits may usually be obtained on the OCM website: http://sonris.com/direct.asp?server=sonris-www&path=/sonris/cmdPermit.jsp%3Fsid%3DPROD.

How does OCM protect the information that I provide throughout this application?

Information provided on the application is used to evaluate the activity that is proposed for permitting, and this information is generally available for inspection and copying by the public, pursuant to the Louisiana Public Records act. There are some limited exceptions to the public records laws to protect certain types of records or information from public inspection. Please contact our office, **before** you submit any records or information that you would prefer not be available for public inspection or copying. In any case, simply marking a document "CBI" or "confidential business information" will not guarantee that the records or information will be protected from public inspection and copying.

May I submit a Joint Permit Application to the Parish instead of OCM?

Yes, if your project is located in a parish with an approved Local Coastal Program (Calcasieu, Cameron, Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. James, St. Tammany or Terrebonne) then you may submit your application to either the approved local program or the state office. If you submit the application to the state office, it will be input into the system and reviewed at that time. If you submit your application to the local parish office, then that office will forward the application to the state office to be input into the system and reviewed. Please allow additional time to receive a response if you choose the latter option.

What other permits may be required?

If your project involves dredging or filling of wetlands you may need a Water Quality Certification from the Department of Environmental Quality.
Other approvals may be required but are not limited to the following:

- State Land Office;
- Department of Wildlife and Fisheries;
- Department of Culture, Recreation and Tourism;
- Department of Transportation and Development; and/or
- Department of Health and Hospitals.

These agencies will notify you of their requirements as part of the Joint Public Notice process.

When I receive my permit from OCM, may I begin work?

Following the determination from OCM, work may begin only after obtaining any necessary permit(s) from the COE, including any required mitigation, and any approvals or permits required any local authority or agency or by any state or federal agency, as may be required by law for said activity or the construction of the referenced project.

How may I receive an extension for a permit?

If you have not begun work on your project within two years of the date of permit issuance, the initiation period can be extended for an additional two years if you submit a request to OCM no less than sixty days and no more than one-hundred and eighty days before the initial two year period expires. The expiration date can be extended. Follow the same rules. There is an $80.00 extension fee.

If I began my project without a permit, what will happen?

OCM processing of any pending Joint Permit Application for the project will be suspended until the violation is resolved. You may be required to remove any structures installed and restore any impacted habitat. You may be subject to fines of up to $12,000and may be jailed up to six months. The penalties assessed by the Army Corps of Engineers may be significantly more expensive and more complicated.

Did I break the law if I have already done some clearing?

A representative from LDNR will perform a field investigation and project evaluation in order to determine the extent of any impacts and if you have violated any laws.
Contact OCM at 1-800-267-4019 for assistance.

What is Section 10 of the Rivers and Harbors Act?

Section 10 of the Rivers and Harbors Act of 1899 prohibits the obstruction or alteration of navigable water of the United States without a permit from the U.S. Army Corps of Engineers.

What is Section 404 of the Clean Water Act?

Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the U.S. Army Corps of Engineers.

How do I receive additional information on the Joint Permit Application process?

For additional information regarding the Joint Application Process, contact OCM at 1-800-267-4019 or visit the website at: http://dnr.louisiana.gov/crm/. You may also contact the Army Corps of Engineers at 504-862-2766 or visit the website at: www.mvn.usace.army.mil/ops/regulatory.

Continue to page 12 for "Contacts and Additional Landowner Information" .

Contacts and Additional Landowner Information

If your project is in the Galveston or Vicksburg COE District, submit your application directly to them. See addresses listed below.

COE District Contact Information:

U.S. Army Corps of Engineers
Galveston District
Attention: CESWG-PE-R
P.O. Box 1229
Galveston, TX 77553-1229
Phone:409-766-3930
Fax:409-766-3931

U.S. Army Corps of Engineers
Vicksburg District
Attention: CEMVK-OD-F
4155 Clay Street
Vicksburg, MS 39183-3435
Phone:601-631-5276
Fax:601-631-5459

Additional Landowner Information (if necessary):

Adjacent Landowner #5: ______________________________
Name of Adjacent Landowner

Mailing Address: ______________________________
Street Address or P.O. Box Unit/Apartment #

______________ ______________ ______ ______
City Parish State Zip

Adjacent Landowner #6: ______________________________
Name of Adjacent Landowner

Mailing Address: ______________________________
Street Address or P.O. Box Unit/Apartment #

______________ ______________ ______ ______
City Parish State Zip

Adjacent Landowner #7: ______________________________
Name of Adjacent Landowner

Mailing Address: ______________________________
Street Address or P.O. Box Unit/Apartment #

______________ ______________ ______ ______
City Parish State Zip

Adjacent Landowner #8: ______________________________
Name of Adjacent Landowner

Mailing Address: ______________________________
Street Address or P.O. Box Unit/Apartment #

______________ ______________ ______ ______
City Parish State Zip

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
Applicant	Blue Marlin Offshore Port LLC
APE	Area of Potential Effect
ATWS	additional temporary workspace
BMOP	Blue Marlin Offshore Port
BMPs	best management practices
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
bpd	barrels per day
CALM	Catenary Anchor Leg Mooring
CUP	Coastal Use Permit
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DWP	Deepwater Port
DWPA	Deepwater Port Act
E2EM	estuarine emergent
EC	East Cameron Lease Block
EFH	Essential Fish Habitat
EIA	U.S. Energy Information Administration
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FMP	fishery management plan
GIWW	Gulf Intercoastal Waterway
GMFMC	Gulf of Mexico Fishery Management Council
GOM	Gulf of Mexico
HDD	horizontal direction drill
HUC	Hydrologic Unit Code
IPaC	USFWS Environmental Conservation Online System Information, Planning, and Conservation
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LNHP	Louisiana Natural Heritage Program
LOCD	Louisiana Office of Cultural Development
m	meter
MARAD	U.S. Maritime Administration
MLV	mainline valve
MMPA	Marine Mammal Protection Act
MP	milepost
NEPA	National Environmental Policy Act
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NMSA	National Marine Sanctuary Act
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
NT	Nederland Terminal

NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Land Act
OD	outer diameter
PAC	permanent access canal
PAR	permanent access road
PEM	palustrine emergent
PFO	palustrine forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLEM	pipeline end manifolds
Project	Blue Marlin Offshore Port Project
PSS	palustrine scrub-shrub
RHA	Rivers and Harbors Appropriation Act
RRC	Railroad Commission of Texas
ROW	right-of-way
SH	Texas State Highway
SHPO	State Historic Preservation Office
SNWW	Sabine Neches Waterway
SPAR	Spill Prevention and Response
TAC	temporary access canal
TAR	temporary access road
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TWS	temporary workspace
TX DOT	Texas Department of Transportation
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VLCC	very large crude carrier
WC	Western Cameron Lease Block
WMA	Wildlife Management Area

1.0 INTRODUCTION

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM) to provide crude oil transportation and loading services for crude oil produced in the continental United States (U.S.). The Project will consist of both onshore supply components and water dependent offshore/marine components, as depicted in **Figure 1-1**. Oil for export will be transported via pipeline from the existing Sunoco Partners Marketing and Terminals, L.P., a terminal and storage facility in Jefferson County, Texas referred to as the Nederland Terminal (NT). This terminal is connected to production from across the U.S. The Deepwater Port (DWP) will be approximately 99 statute miles off the coast of Cameron Parish, Louisiana, within approximate water depth of 162 feet. Crude oil will be routed from storage via pumps at Nederland, through a new 37.02 mile, 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at Station 501 (see Section 1.2.1) in Cameron Parish, Louisiana, and from there through the existing Stingray Mainline to the DWP. A Project overview map of the onshore Project components is provided in **Figure 1-2**.

Issuing permits for construction of the proposed Project would qualify as a major federal action and, therefore, require a National Environmental Policy Act (NEPA) analysis. The Applicant is filing an application for a license to construct, own, and operate the Project pursuant to the Deepwater Port Act (DWPA) of 1974, as amended, and in accordance with implementing regulations. The initiation of the NEPA under the DWPA will be carried out by the U.S. Coast Guard (USCG) and U.S. Maritime Administration (MARAD) as these agencies have federal jurisdiction over the entire Project. The USCG and MARAD have made the determination that an Environmental Impact Statement (EIS) will be prepared for the proposed Project. Once MARAD deems the Application complete, they will start the NEPA process. Their regulations require that their decision-making process, including the EIS, is completed in 356-days. As part of the NEPA process, the U.S. Army Corps of Engineers (USACE), Louisiana Department of Natural Resources (LDNR), Railroad Commission of Texas (RRC), and other federal and state agencies will be given the opportunity to participate as cooperating agencies for the preparation and development of the EIS.

The Project crosses both the USACE Galveston District and the New Orleans District as shown in **Figure 1-2**. The onshore pipeline and associated facilities from milepost (MP) 0.0 to 34.03 are located within the Galveston District and remaining portion of the onshore pipeline and associated facilities (MP 34.03 to 37.02) and the existing pipeline system to the DWP is located within the New Orleans District.

Based on discussions with Galveston and New Orleans USACE Districts, LDNR, and RRC, it was recommended that the Applicant file LDNR's Joint Permit Application for Work within Louisiana Coastal Zone for the Project's impacts to waters of the U.S. With this Joint Permit Application, the Applicant is seeking approval under Section 404 of the Clean Water Act (CWA), Section 10 of the Rivers and Harbors Appropriation Act (RHA), and Louisiana Coastal Use Permit. This permit application will cover the requirements of LDNR's Joint Permit Application and USACE Form 4345. This application will also be distributed by LDNR to the Louisiana Department of Environmental Quality to initiate review pursuant to Section 401 of the CWA for Louisiana. The Applicant will provide a copy of this application to the RRC to initiate review pursuant to Section 401 of the CWA and for compliance with the Coastal Management Program for Texas.

The construction of the Project will result in both temporary and permanent impacts to waters of the U.S. Impacts to waters of the U.S. that fall under the jurisdiction of Section 404 of the CWA only apply to impacts associated with the installation of the onshore pipeline and its associated facilities as described in Section 1.3. Impacts to waters of the U.S. due to the construction of the Project fall under the jurisdiction of both the Galveston and New Orleans USACE Districts as discussed in Sections 3.0 and 4.0 of this application.

Section 10 of the RHA applies to portions of the onshore pipeline and all of the proposed new offshore facilities for the Project as described in Section 1.2. These structures and impacts, subject to Section 10 of the RHA, are located within both the Galveston and New Orleans District jurisdictions, but all structures associated with the DWP in federal waters are within the jurisdiction of the New Orleans District. Impacts to Section 10 waters are described in Section 4.2 of this application.

To identify the waters of the U.S. within the onshore pipeline footprint, the Applicant conducted field surveys of wetlands and waterbodies within the entire onshore pipeline project area, including those areas on the existing Stingray Mainline between existing Stations 501 and 701, during March, May, and June of 2020. Field delineations followed guidelines from the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region (Version 2.0). During the surveys, an approximate 300-foot survey corridor centered along the proposed pipeline centerline (150 feet from each side of the centerline) was evaluated in March, May, and June of 2020. In addition, the entire footprint of the proposed workspace for the existing and proposed stations, and access roads which require improvement was surveyed. The wetland and waterbody field survey report is provided in **Appendix A.** To note, the development of the BMOP Pump Station will be within the operational limits of the existing NT site. Impacts to waters of the U.S. associated with the development of the NT site is being permitted as part of the "Nederland Terminal Buildout Project" which is anticipated to commence construction in January 2021 and is being permitted under a separate USACE permit currently under review by the Galveston District and therefore not addressed in this application. Impacts to convert the existing Stingray Mainline to oil service will entail impacts to existing stations in Cameron Parish, LA (Station 501 and 701) and conversion of existing platforms in federal waters in West Cameron Lease Block (WC) 148 and WC 509.

FIGURE 1-1 Project Overview Map

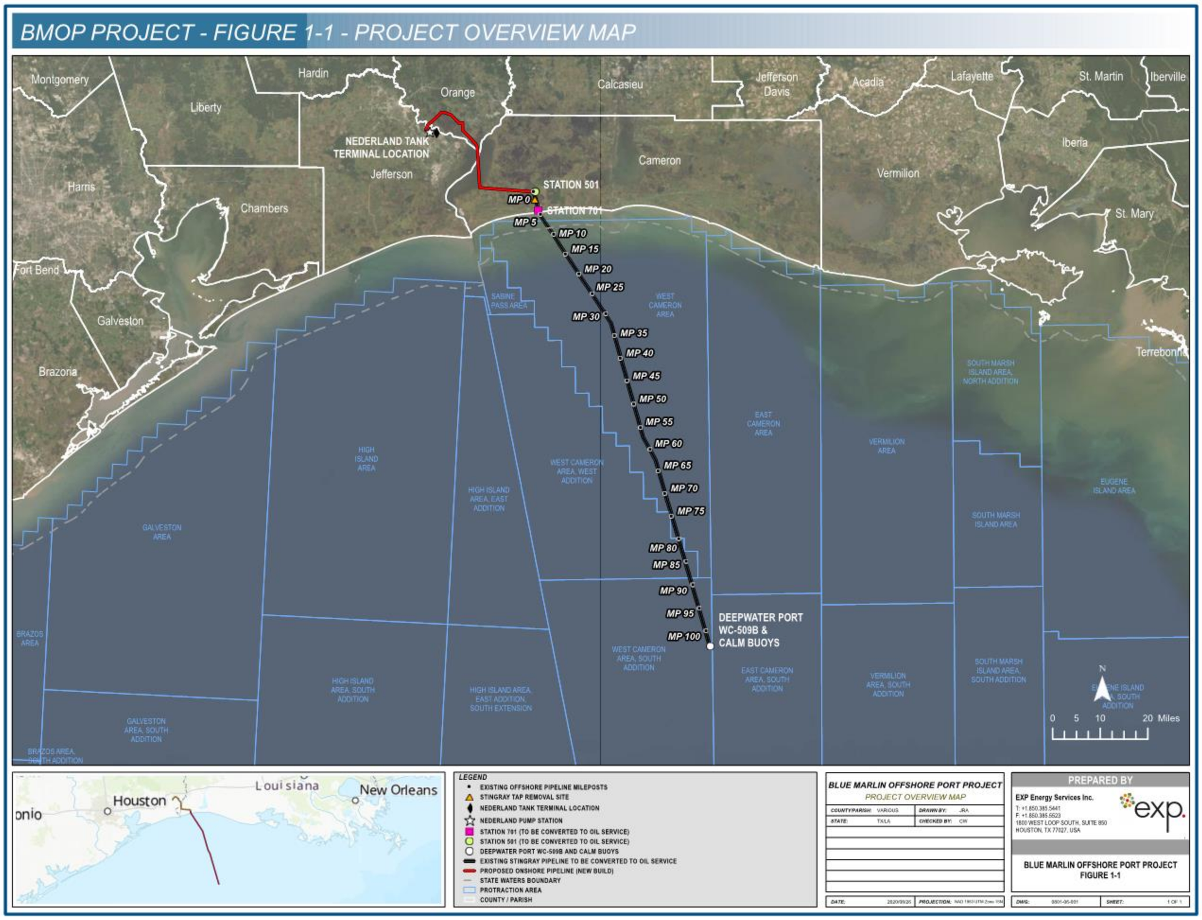
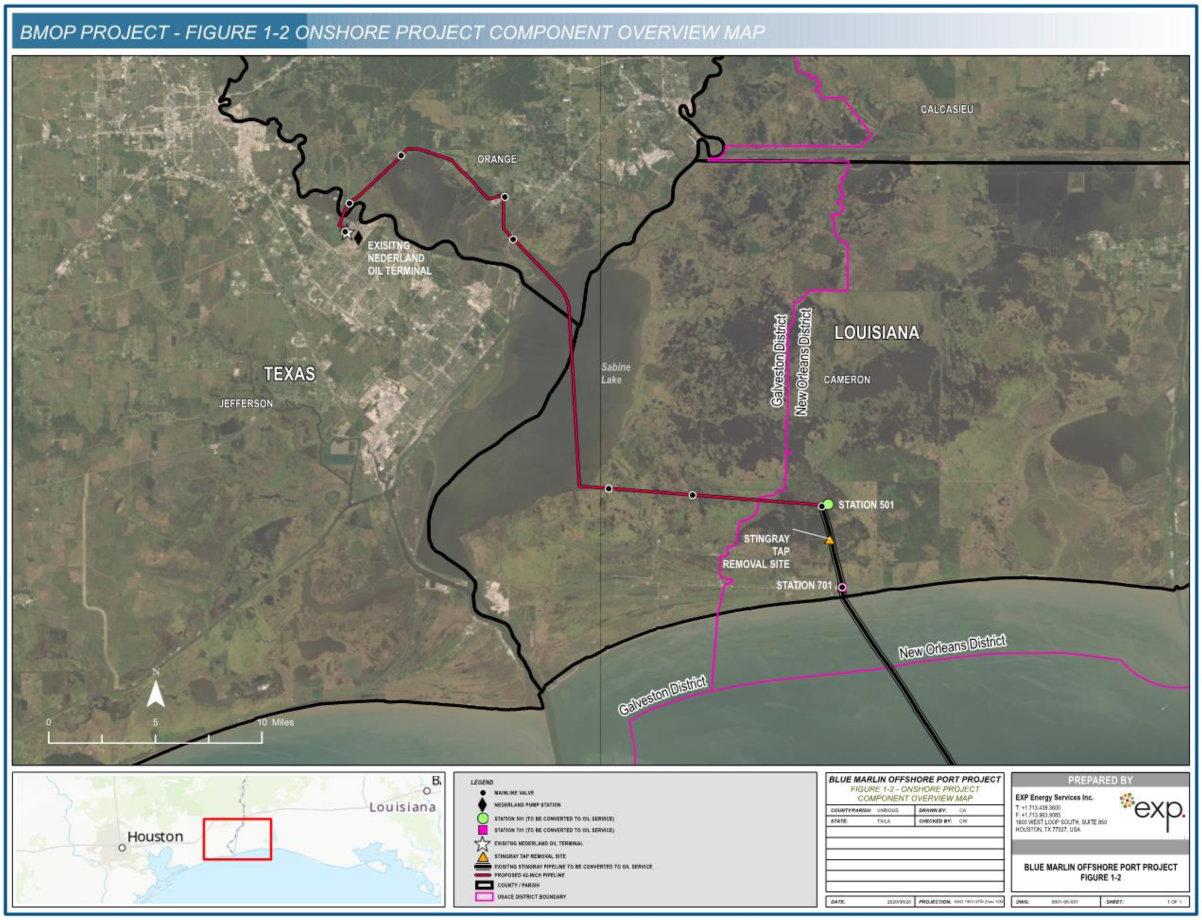


FIGURE 1-2 Onshore Project Component Overview Map



1.1 PURPOSE AND NEED

The Applicant proposes to construct, own, operate, and eventually decommission a DWP in the northern GOM off of the Louisiana coast to be able to fully load very large crude carriers (VLCCs) without the need for ship-to-ship transfers, expansion of already congested GOM ports, and to enable export of domestically produced light to heavy grade crude oil to foreign global markets.

The Applicant has examined the current market and projected condition in the northern GOM and has determined that there are insufficient outlets for U.S. oil production. Based on the businesses that the Applicant's parent and affiliate entities are engaged in (oil and gas transportation, storage, and port facilities) and the increasing volume of oil being produced in the U.S., there are limited shipping options available in the GOM. Most ports are constrained in one or more ways. Access to onshore ports in the northern GOM is constrained due to navigation channel access not being deep enough to handle VLCC-sized oil carriers; insufficient dock space for either additional smaller carriers or larger oil carriers; and existing storage capacity to allow product to wait for refinery space, or ability to be exported.

Fully loaded VLCCs have drafts of approximately 71 feet, which would preclude the use of coastal loading facilities. Although the inland waterways (navigation channels and rivers) are regularly dredged to maintain depth (approximately 45 feet) and enable safe navigation for most ships, they are not deep enough for deep-draft vessels such as fully loaded VLCCs. To circumvent depth restrictions, VLCCs transporting crude oil to or from the GOM coast have typically used partial loadings and ship-to-ship transfers. The ship-to-ship transfer process, known as lightering, requires the use of multiple smaller vessels to ferry oil from ports to offshore VLCCs to fully load/unload a larger vessel (EIA, 2018; MARAD and USCG, 2020).

The Applicant, and affiliate companies, examined existing infrastructure as well as building a new purpose-built system to facilitate export of oil from the U.S. Because of the myriad of abandoned, or under-utilized pipeline systems in the northern GOM, the Applicant has focused on developing a solution that would avoid the impacts of building a completely new export facility in the GOM. The Project is designed to provide a DWP, at a distance from shore and current shipping congestion, to facilitate U.S. producer access to international shipping interests with the capability for full loading of VLCCs. By providing for full loading of VLCCs, the proposed DWP will reduce the need for lightering offshore. In addition, it will reduce the number of required oil carriers as each VLCC is designed to carry approximately two million barrels of crude oil. By comparison, four Aframax vessels or two Suezmax vessels (both of which are used in port or for lightering) would be needed to carry the same amount of crude oil as a single VLCC (EIA, 2018; MARAD and USCG, 2020). With the conversion of an underutilized natural gas pipeline and offshore platform to oil service, the Applicant can meet the objectives of the need for oil export capacity while minimizing impacts to the environment.

U.S. refineries can process a wide range of crude oil qualities; however, there are optimum qualities for each refinery based on its current design. In addition, refinery acquisition costs of a particular crude oil quality can differ for domestic versus imported oil. With U.S crude oil production growing significantly, U.S. refineries cannot accommodate the additional large volumes that are being produced. Therefore, crude oil exports have continued to increase since the restrictions on exporting domestically produced crude were lifted in December 2015, increasing from 591,000 barrels per day (bpd) in 2016 to 3.0 million bpd in 2019 (EIA, 2020a).

According to the U.S. Energy Information Administration (EIA), in May 2020, the U.S. exported and imported nearly equal amounts of energy. However, the U.S. had been a net exporter of energy in several months previously in 2020. The reduction in export is due to changes in domestic production and declines in global demand for energy since mid-March of 2020 in response to the 2019 Novel Coronavirus (COVID-

19) which shifted energy trade balances back in the direction of net imports, especially for U.S. crude oil and petroleum products (EIA, 2020b). Prior to the COVID-19 response, the EIA's 2020 Annual Energy Outlook reference case projected production of U.S. crude oil to grow with production reaching 14.0 million bpd by 2022, remaining near that level until 2045. With such strong production growth, and decreasing domestic demand, the U.S. was projected to continue to export high volumes of crude oil, resulting in increased export from 2020 to 2033 (EIA, 2020c). COVID-19 and its mitigation efforts are significantly affecting energy demand in the short term and EIA projects that it could continue to do so in the medium and even long term which will be addressed in the upcoming 2021 Annual Energy Outlook (EIA, 2020d).

In accordance with the U.S.'s energy outlook, U.S. production increases, combined with refinery capacities for specific oil types, crude oil production will need to be shipped or shut in. In addition to reducing the need for lightering, the proposed DWP Project will provide a safe, efficient, and reliable facility for the export of crude oil excess to satisfy global market demands at competitive prices.

1.2 PROJECT OVERVIEW

The DWP will be located in federal waters within and adjacent to the WC 509, WC 508, and East Cameron Lease Block (EC) 263 (see **Figure 1-3**).

The following is a description of the primary components of both the offshore and onshore portions of the Project. The Project will include both the construction of new facilities and the repurposing and abandonment of existing facilities.

1.2.1 New Offshore Facilities

The following are the new facilities that will be constructed to support the offshore portion of the Project.

- Two new Catenary Anchor Leg Mooring (CALM) Buoys installed, one in WC 508 (CALM Buoy No. 1) and the other in EC 263 (CALM Buoy No. 2). The CALM Buoys will be anchored to the seafloor via an engineered mooring system capable of accommodating mooring forces exerted by a VLCC or other large seafaring vessels during loading operations. Two 24-inch diameter floating hoses will be connected to each CALM Buoy. They will be approximately 1,500 feet long and used for loading operations.
- Two new pipeline end manifolds (PLEMs) installed and anchored on the seafloor under the CALM Buoys. Two 24-inch undersea flexible hoses will be connected to each PLEM and associated CALM Buoy.
- Two Crude Oil Loading Pipelines, approximately 4,710 feet long to PLEM / CALM Buoy No. 1 and 6,085 feet long to PLEM / CALM Buoy No. 2, installed from the WC 509 Platform Complex to the PLEM and CALM locations, one for each PLEM and CALM Buoy. The pipelines will be installed with the top of pipe at least three feet below the natural seafloor.
- New mainline valve (MLV) at WC 148 Platform;
- Two new 36-inch risers connected to the Crude Oil Loading Pipelines on WC 509B Platform;
- New control room on WC 509B Platform;
- Three new pig barrels, one on WC 509A Platform and two on WC 509B Platform;
- Meter station for crude oil on WC 509B Platform;
- New living quarters and heliport on WC 509C Platform;

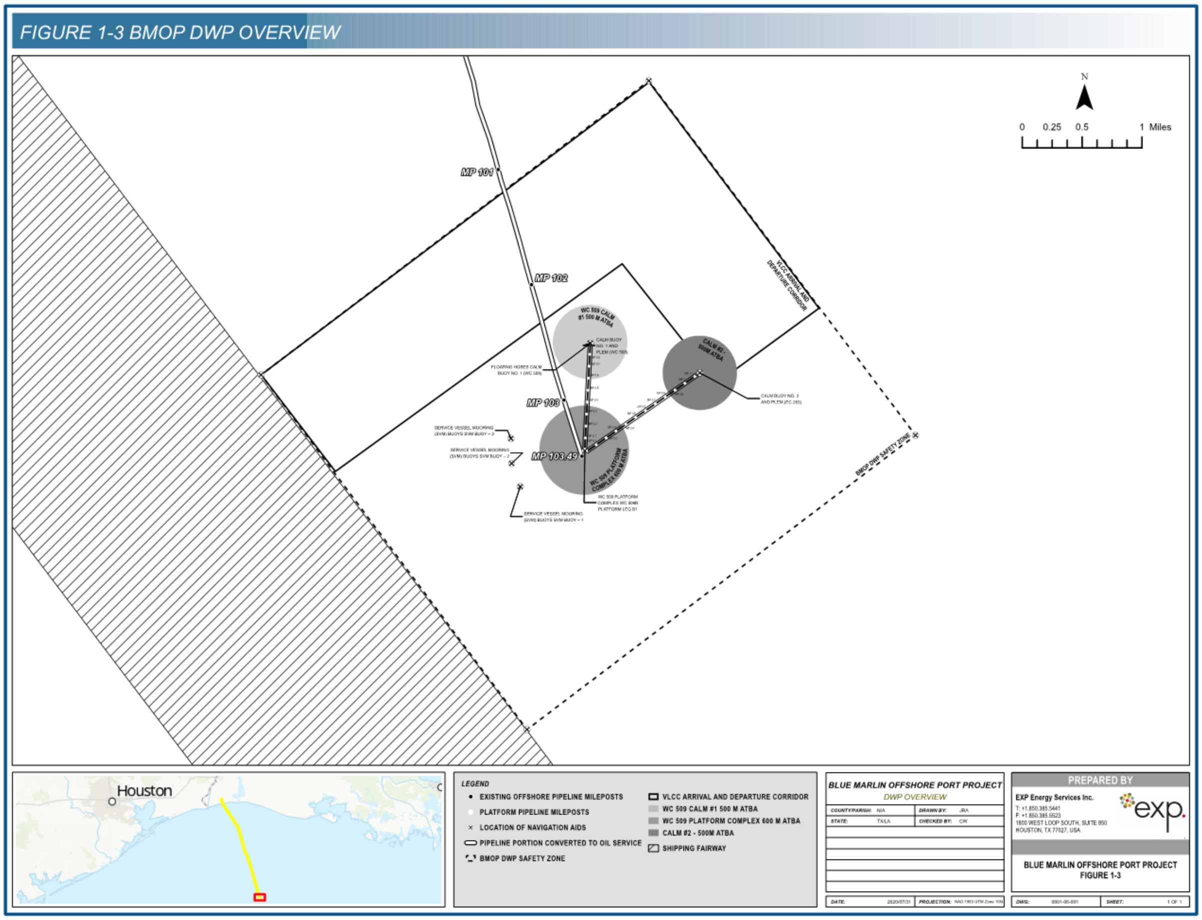
- Surge valves and tank on WC 509B Platform; and
- New ancillary equipment for the WC 509 Platform Complex (e.g., power generators, instrument/utility air system, fuel tanks, ac units, freshwater makers, firewater system, seawater and freshwater system, sewage treatment unit, fuel gas system, diesel system, closed drain system, open drain system, hydraulic power unit, hypochlorite system, cranes, communications tower and system, radar) to support operation of the offshore facilities.

1.2.2 New Onshore Facilities

The following are the new facilities that will be constructed to support the onshore portion of the Project.

- A new, approximate 37.02-mile, 42-inch OD pipeline connecting the existing NT to the existing 36-inch OD Stingray Mainline at Station 501 in Cameron Parish, Louisiana.
- A new pump station (BMOP Pump Station) will be located in Jefferson County, Texas, adjacent to the existing NT in Jefferson County, Texas at MP 0.0. The land where the BMOP Pump Station site is located is to be filled as part of the “Nederland Terminal Buildout Project,” which is anticipated to commence construction in January 2021, prior to construction of the BMOP Project.
- Six new MLVs will be installed within the permanent pipeline right-of-way (ROW) of the new build pipeline. MLVs will also be installed at the BMOP Pump Station, Station 501, and Station 701. These valves will be used for isolation and spill control purposes.

FIGURE 1-3 DWP Overview Map



1.2.3 Conversion of Existing Onshore and Offshore Facilities

The following are the existing facilities that will be repurposed to support the offshore and onshore portions of the Project.

- The existing Station 501 is located at approximate MP 37 of the new 42-inch OD pipeline in Cameron Parish, Louisiana. All existing natural gas-related equipment owned by BMOP will be removed from the Station and new pipeline facilities will be installed. The new 42-inch OD pipeline will tie into the existing 36-inch OD Stingray Mainline at the site. The converted Station 501 will be expanded to include new pig receiver for the new 42-inch OD pipeline termination, new pig launcher for existing 36-inch OD Stingray Mainline, and a new MLV. [*onshore facility*]
- The existing compressor Station 701 in Cameron Parish, Louisiana, will be demolished. All existing natural gas equipment will be removed from the Station except for two large 10,000-barrel storage tanks. The new facility will maintain office space, a natural gas interconnect, and surge tanks. Approximately 1,000 feet of new pipe, surge tanks, surge valves, and a new MLV will be installed. The existing 10,000-barrel tanks located at Station 701 will be converted to surge relief tanks. [*onshore facility*]
- The existing Stingray Mainline from Station 501 to the WC 509 Platform Complex will be converted to crude oil service. [*onshore and offshore facilities*]
- The existing ANR Tap (Stingray Tap Removal Site) is located at approximately MP 1.61 on the Stingray Mainline in Cameron Parish, Louisiana (approximate MP 38.6 on the BMOP pipeline system). BMOP will install a 36-inch OD pipe segment following removal of the tap. [*onshore facility*]
- The WC 148 Platform will be converted to crude oil service and a new MLV installed. [*offshore facility*]
- The existing WC 509 Platform Complex will be converted from a gas transmission facility to a dual-purpose gas transmission and crude oil export facility. The existing equipment that will remain at the Converted Complex will include the following. [*offshore facility*]
  - Existing natural gas piping and risers on WC 509A Platform;
  - Natural gas Vent Boom on WC 509 Vent Bridge Tripods;
  - Natural gas separation facilities on WC 509B Platform; and
  - Heliport and helicopter fuel tank on WC 509A Platform.

1.2.4 Offshore Support Facilities

Support facilities for the offshore portion of the Project will include:

- Anchorage area – Established USCG-designated anchorage areas will be utilized for VLCCs (or other crude carriers) awaiting mooring at a CALM Buoy or if they must disconnect from the CALM Buoys for safety reasons.
- Support vessel mooring area – A designated Service Vessel Mooring Area will be established in proximity to the offshore WC 509 facilities.
- Temporary pre-fabrication yards – Component fabrication will occur at multiple existing fabrication facilities within the GOM coastal region.

- Support facilities – Facilities within the GOM coastal region providing support for offshore operations and maintenance activities (e.g., helicopters, supply vessels, work boats, equipment suppliers, and maintenance workers).

1.2.5 Onshore Support Facilities

Support facilities for the onshore portion of the Project will include temporary use of existing pipe and contractor yards as well as use of existing access roads and canals.

1.2.6 Abandonment and Conversion of Existing Facilities

The Stingray Pipeline system is currently comprised of multiple lateral pipelines from various suppliers and producers that feed natural gas into the Stingray Mainline. Stingray transports natural gas and liquids on this 36-inch OD pipeline from the offshore WC 509 Platform Complex to the onshore compressor station facility (Station 701) near Holly Beach in Cameron, Louisiana, and northward approximately four additional miles to the Natural Gas Pipeline Co./Stingray interconnect (Station 501). The Stingray facilities from the WC 509 Platform Complex to Station 501 will be abandoned through a Federal Energy Regulatory Commission (FERC) 7(b) Order and converted to use as DWP facilities. The Applicant intends to use all existing records and inspection data and perform additional engineering studies to obtain the appropriate agency approvals for converting all existing, reusable facilities. This includes updating the facilities to meet current regulations and guidelines where appropriate. Abandonment under FERC 7(b) will be considered complete when the Stingray Mainline is completely isolated from all-natural gas sources and all-natural gas and produced liquids have been removed from the pipeline. The Applicant intends to operate the new facilities under 49 Code of Federal Regulations (CFR) Part 195.

Conversion of the Stingray facilities involves converting service to crude oil and changing flow direction in the Mainline; converting the platform at WC 148, herein referred to as the WC 148 Platform, to crude oil service from natural gas service; and converting the platform complex at WC 509, herein referred to as the WC 509 Platform Complex, to crude oil and natural gas service.

1.3 OFFSHORE FACILITIES

The existing WC 509 Platform Complex will be converted to a dual-purpose gas transmission and oil export facility. The WC 509A Platform will continue its purpose as a gas transmission platform after being reconfigured to redirect the gas to the Sea Robin Pipeline. The majority of the natural gas pipeline facilities on the WC 509B Platform (compressor station and auxiliary equipment) will be removed and new oil export facilities installed. The new facilities will consist of 36-inch piping, oil metering facility, new control room, new workshop, new electrical building, lab for custody transfer analysis, pig traps, cranes, surge tank, and other auxiliary equipment that support the operation. Natural gas pipeline facilities on the WC 509A Platform will be reconfigured and redirected to another pipeline system and will remain under the jurisdiction of the FERC.

The Stingray Mainline that is being converted from natural gas to crude oil comes up from the seafloor onto the WC 509A Platform and will be routed above the waterline to the WC 509B Platform. Piping and liquid separation facilities, related to planned and unplanned natural gas venting, will remain on the WC 509A and WC 509B Platforms with the natural gas releases occurring at the end of the Vent Bridge Tripod located approximately 660 feet south and east of the WC 509B Platform. On the WC 509B Platform, crude oil will be metered and then piped to two CALM Buoys located approximately 4,710 feet and 6,085 feet from the Platform.

The Applicant has designed the Project with two, anchored CALM Buoys to which VLCCs (or other crude oil carriers) will moor for loading. A mooring hawser will be used to moor the vessel to the CALM Buoy. The intent is for only one CALM Buoy to be used for loading at any one time but there could be a possibility that both CALM Buoys could be used at the same time.

The CALM Buoys will be moored with chains to the seafloor where driven pile anchors (or an engineered equivalent for the sedimentary conditions at the site) will provide the necessary holding ability for mooring of up to a VLCC class tanker. Anchors and associated anchor chain will be installed to provide the mooring for each of the CALM Buoys. Conservatively, for each CALM mooring system there will be eight 36-inch OD pin piles driven to 150 feet below the seafloor, using an underwater piling hammer (Menck 150 kilojoules or similar), and associated anchor chain installed to provide the mooring for each of the CALM Buoys. Final anchor locations, the size of the chains, pile diameter, and piling depth will be determined by the CALM Buoy provider during detailed design.

Each CALM Buoy system will have a PLEM. Each PLEM will be connected to their respective CALM Buoy with flexible underwater hoses. Two Crude Oil Loading Pipelines, approximately 4,710 and 6,085 feet in length, will be installed from the WC 509B Platform to the PLEM locations, one pipeline to each PLEM. The pipe will have a corrosion resistant outer coating and a Concrete Weight Coating. Each PLEM system will have pigging capabilities between the WC 509B Platform and the PLEM. The PLEMs will be installed on foundation piles or mudmats to distribute the weight of the PLEM to the seafloor. Details will be developed by the CALM Buoy provider during the Project's detailed engineering phase, including piling diameter and depth or mudmat design.

Floating and flexible 24-inch diameter hoses approximately 1,500 feet long will be installed for loading from the CALM Buoy to the VLCC (or other large seafaring crude carrier). During loading, the floating hoses will be recovered by one of the DWP support vessels, lifted to the VLCC (or other crude carrier) loading manifold, and connected to the receiving flange. The floating hoses will simply float on the surface of the water and will weathervane dependent on the current when not being used for loading. The floating hoses will contain a butterfly valve on the end that will be utilized to isolate the hose after loading is complete and prior to placing the hoses back in the water. Additionally, a blind flange will be installed to further prevent any potential contamination or leakage while the hose is floating and waiting for the next VLCC (or other large seafaring crude carrier) to be loaded.

The construction of the offshore facilities will not result in impacts to waters of the U.S., but will be structures within Section 10 waters and are described in Section 4.0 of this application.

1.4 ONSHORE FACILITIES

1.4.1 Onshore Pipeline

The Project will consist of a new build approximately 37-mile, 42-inch OD pipeline connecting the existing NT in Jefferson County, Texas, to the existing Stingray Mainline at Station 501 in Cameron Parish, Louisiana. The new build pipeline route begins at the proposed BMOP Pump Station and proceeds north across the Neches River continuing almost to Bridge City, Texas, before turning east/southeast and crossing Sabine Lake. After leaving Sabine Lake in Cameron Parish, Louisiana, the route proceeds east for approximately 11 miles to Station 501 where it ties into the existing Stingray Mainline.

The Applicant proposes to use a 150-foot-wide construction ROW in upland and wetland areas and a 300-foot-wide ROW for in-water construction in Sabine Lake to provide a safe work site and promote effective implementation of erosion control measures. In wetlands, the use of a 150-foot-wide ROW is necessary to avoid the potential safety hazards associated with saturated and/or granular soils, including shifting soils and trench wall collapse. Additionally, excavated spoil material typically will not stack and a wider area of temporary workspace (TWS) is required for spoil placement to avoid off-ROW areas. Following construction, the Applicant will retain a 50-foot-wide permanent ROW over the pipeline. The existing 36-inch OD pipeline maintains a 50-foot-wide permanent ROW.

The Project will utilize nine horizontal directional drills (HDDs) along the pipeline route to cross selected existing foreign pipelines, major roadways, federal channels, and major waterbodies, and also as a mitigating measure to avoid impacts to wetlands and/or sensitive resources. A description of the HDD method and the location of each HDD is included in Section 3.0 and **Table 1-2** and of this application.

Collocation of the new build pipeline will minimize impacts on vegetation communities during construction and operation of the pipeline system. Approximately 11.86 miles (32 percent) of the pipeline route is collocated with existing powerline, road, canal and/or foreign utility ROW. In addition, conversion of the approximate 103.4 miles of Stingray Mainline from natural gas to oil service will minimize impacts to onshore and offshore communities.

The construction of the onshore pipeline will result in temporary and permanent fill of waters of the U.S. Impacts to wetlands and waterbodies due to the construction of the onshore pipeline are discussed in Sections 3.1 and 4.1, respectively.

TABLE 1-1
Location of Proposed Onshore Project Facilities

Facility	Location (County/Parish, State)	Approximate Milepost	Approximate Length (miles)
Pipeline			
Onshore Pipeline	Jefferson and Orange County, TX Cameron Parish, LA	0.00 – 37.02	37.02
Aboveground Facilities			
BMOP Pump Station	Jefferson County, TX	0.00	N/A
Mainline Valves (MLVs)[a]			
MLV-1	Orange County, TX	1.65	N/A
MLV-2		4.97	N/A
MLV-3		10.84	N/A
MLV-4		13.01	N/A
MLV-5	Cameron Parish, LA	26.98	N/A
MLV-6		30.92	N/A
Converted Existing Facilities			
Station 501	Cameron Parish, LA	37.02	N/A
Stingray Tap Removal Site	Cameron Parish, LA	1.61 (Stingray Mainline Milepost)	N/A
Station 701	Cameron Parish, LA	3.94 (Stingray Mainline Milepost)	N/A
Access Roads			
TAR-01	Jefferson County, TX	0.5	0.02
PAR-03[b]	Orange County, TX	1.68	2.76

TABLE 1-1
Location of Proposed Onshore Project Facilities

Facility	Location (County/Parish, State)	Approximate Milepost	Approximate Length (miles)
TAR-03-A	Orange County, TX	1.73	0.17
PAR-05[b]	Orange County, TX	4.98	1.25
TAR-05-A[c]	Orange County, TX	5.36	0.90
TAR-06	Orange County, TX	5.69	1.45
TAR-06-A	Orange County, TX	6.10	8.36
TAR-07	Orange County, TX	6.74	0.05
TAR-08	Orange County, TX	7.28	0.05
TAR-09	Orange County, TX	7.67	0.01
TAR-10	Orange County, TX	8.23	0.07
TAR-11	Orange County, TX	9.46	0.71
TAR-12	Orange County, TX	10.28	0.95
TAR-12-A	Orange County, TX	10.40	0.66
PAR-13[b]	Orange County, TX	10.76	0.89
TAR-14	Orange County, TX	10.78	0.81
PAR-15[b]	Orange County, TX	12.84	0.33
PAR-19	Cameron Parish, LA	31.00	2.67
TAR-20-A	Cameron Parish, LA	36.21	0.47
PAR-20	Cameron Parish, LA	37.00	4.58
TAR-20-B	Cameron Parish, LA	37.02	1.06
Access Canals			
TAC-02	Orange County, TX	1.68	0.66
TAC-04	Orange County, TX	2.73	1.45
TAC-15-B	Orange County, TX	12.2	0.50
TAC-15-C	Orange County, TX	12.87	0.87
PAC-16	Cameron Parish, LA	27.0	1.50
TAC-17	Cameron Parish, LA	28.18	2.13

Key:
LA – Louisiana
N/A – not applicable
PAC – permanent access canal
PAR – permanent access road
TAC – temporary access canal
TAR – temporary access road
TX – Texas

Notes:

[a] MLV-1 through MLV-6 are located along the pipeline permanent ROW. MLVs will also be installed within the facility boundaries of the BMOP Pump Station (MP 0.00), Station 501 (MP 37.02), and Station 701. Offshore, there will be one MLV at WC 148 and WC 509 as discussed in Topic Report 1 of Volume IIa of the Project's DWP Application.

[b] The four new permanent access roads (i.e., PAR-03, PAR-05, PAR-13, and PAR-15) will be required to extend existing roads to MLV sites.

[c] One new temporary access road (TAR-05-A) will be required to access the construction ROW in Orange County, TX. This temporary access road will be returned to pre-construction conditions following construction.

1.4.2 Aboveground Facilities

1.4.2.1 *BMOP Pump Station*

The BMOP Pump Station is located on approximately 8.2 acres in Jefferson County, Texas, adjacent to the existing NT on land that is currently being permitted for development in Jefferson County, Texas. The BMOP Pump Station site is proposed to be filled and developed as part of the "Nederland Terminal Buildout Project," which is anticipated to commence in January 2021, prior to construction of the BMOP Project. Therefore, the site will consist of developed land and will not result in wetland impacts. The pump station will include:

- 42-inch OD pipeline header;
- MLV;
- 48-inch OD pig launcher;
- Six 9,000 horsepower mainline electrical pumps;
- Metering equipment;
- Two electrical transformers in existing electrical substation (An existing substation owned by Entergy is located at NT that will supply the electrical power source for the BMOP Pump Station); and
- Permanent access road.

There will be no new temporary or permanent fill of waters of the U.S. for construction of BMOP Pump Station.

1.4.2.2 *Station 501*

The existing Station 501 is located at approximate MP 37 of the new 42-inch OD pipeline on approximately 0.5 acre in Cameron Parish, Louisiana. The new 42-inch OD onshore pipeline will tie into the existing 36-inch OD Stingray Mainline at this site. Station 501 will be expanded 1.6 acres to include a new pig receiver for the 42-inch OD pipeline termination, a new pig launcher for the existing 36-inch OD Stingray Mainline, and a new MLV. Approximately 0.8 acre of ATWS will be required outside of the existing facility during construction. All of Stingray's owned existing natural gas-related equipment will be removed from the Station and new crude oil pipeline facilities will be installed. The new 42-inch OD pipeline will tie into the existing 36-inch OD Stingray Mainline at the site.

The expansion of Station 501 will result in temporary and permanent fill of waters of the U.S. Impacts to wetlands and waterbodies due to the conversion of the existing facilities and installation of new facilities at Station 501 are discussed in Sections 3.1 and 4.1, respectively.

1.4.2.3 *Station 701*

The existing 32.1-acre Compressor Station 701 is located at MP 3.9 of the existing 36-inch OD Stingray Mainline in Cameron Parish, Louisiana. All of the existing natural gas equipment will be removed from the site except for two 10,000-barrel storage tanks. BMOP will maintain the office space, a natural gas interconnect (owned by others), and surge tanks. Approximately 1,000 feet of new 36-inch OD pipe will be installed across the Station to connect the 36-inch onshore pipeline segment from Station 501 to the 36-inch OD Mainline going to WC 509. Surge tanks, surge valves, and a new MLV will also be installed. The existing 10,000-barrel storage tanks located at Station 701 will be utilized as the surge relief tanks. Approximately 0.9 acre of ATWS will be required along the existing Mainline on the north side of the station for installation of the 36-inch OD pipe. Following construction, ATWS areas will be restored, as closely as practical, to pre-construction contours and allowed to naturally revegetate.

The conversion of the existing pipeline and installation of new facilities at Station 701 will result in temporary fill in waters of the U.S., but no permanent fill of waters of the U.S. Temporary impacts to wetlands due to conversion of Station 701 are discussed in Section 3.1.

1.4.2.4 *Stingray Tap Removal Site*

The existing ANR Tap (Stingray Tap Removal Site) is located at approximately MP 1.6 on the existing Stingray Mainline between Stations 501 and 701 in Cameron Parish, Louisiana. BMOP will install a new 36-inch OD pipeline segment following removal of the tap.

The construction activities for the Stingray Tap Removal will result in temporary fill in waters of the U.S., but no permanent fill of waters of the U.S. Temporary impacts to wetlands and waterbodies due to the construction activities for the Stingray Tap Removal are discussed in Sections 3.1 and 4.0, respectively.

1.4.2.5 *Mainline Valves*

MLVs are designed to divide a pipeline into segments for safety reasons, including shutting down product flow and allowing access to the pipeline from the surface. Six new MLVs will be installed within the permanent pipeline ROW of the new build pipeline. MLVs will also be installed at the BMOP Pump Station, Station 501, and Station 701. The sites for MLV-1 through MLV-4 in Orange County, Texas will be graded with gravel and/or shell. MLV-5 and MLV-6 in Cameron Parish, Louisiana will be installed on platforms due to the inundated and saturated conditions within the marsh. These valves will be used for isolation and spill control purposes and will be Emergency Flow Restricting Device valves.

MLVs will be installed in locations along the pipeline system that are accessible to authorized employees and that are protected from damage and tampering in accordance with U.S. Department of Transportation (USDOT) standards described in 49 CFR Part 195. The MLVs will also be installed in locations along the pipeline system that will minimize damage or pollution from accidental hazardous liquid discharges in accordance USDOT standards. The MLVs will be located in fenced sites and will have electric motor operators installed for operation either locally or remotely.

The construction of the MLVs will result in temporary and permanent fill of waters of the U.S. Impacts to wetlands and waterbodies due to the construction of the MLVs are discussed in Sections 3.1 and 4.1, respectively.

1.4.3 Temporary Facilities

1.4.3.1 *Staging Areas*

The Applicant is proposing to use staging areas during onshore construction to support HDD operations and equipment off-loading. The locations of the temporary staging areas are depicted on the mapping provided in **Appendix G**. Use of these staging areas will result in temporary impacts and will be restored to preconstruction conditions following construction.

The construction of temporary staging will result in temporary fill in waters of the U.S., but no permanent fill of waters of the U.S. Impacts to wetlands and waterbodies due to the construction of the temporary staging areas are discussed in Sections 3.0 and 4.0, respectively.

1.4.3.2 *Contractor and Pipe Storage Yards*

The Applicant plans to utilize existing pipe and contractor yards in the Project area that have been used on previous projects. Locations will be finalized once construction contractors are under contract.

It is anticipated that there will be no temporary or permanent fill of waters of the U.S. as a result of using the existing pipe and contractor yards.

1.4.4 Access Roads and Canals

The Applicant intends to utilize existing public roads, highways, and canals to access the sites during construction. Details of the planned temporary access roads and canals are provided in **Table 1-1**. Limited improvements (i.e., grading and gravel refresh) are planned for some existing private roads to support Project construction; however, widening of access roads is not anticipated to be required. One new temporary access road (i.e., TAR-05-A) will be required to access the construction ROW in Orange County, Texas. Access roads that will not be used for facility operations will be returned to pre-construction conditions or per landowner agreement following construction.

The construction of temporary road TAR-05-A will result in temporary fill in waters of the U.S., but no permanent fill of waters of the U.S. Temporary impacts to wetlands due to the construction of the TAR-05-A are discussed in Section 3.1.

Four new permanent access roads will be required to extend existing roads to MLV 1 through MLV 4 (i.e., PAR-03, PAR-05, PAR-13, and PAR-15). The existing facility sites have permanent gravel/paved access roads leading to the facilities as shown on the mapping provided in **Appendix G**.

The construction of permanent access roads will result in temporary fill and permanent fill of waters of the U.S. Impacts to wetlands due to the construction of the temporary staging areas are discussed in Section 3.1.

Existing canals to be used for construction equipment are necessary for HDD equipment, mats, and other materials necessary for pipeline construction to be brought to the work site. The access canals will not require improvements (i.e., dredging) for channel deepening or widening.

1.5 AVOIDANCE AND MINIMIZATION

1.5.1 Onshore Pipeline

Construction, operation, and maintenance of the Project facilities will be in accordance with all applicable rules and regulations, permits, and approvals.

In the development of the pipeline route the Applicant integrated the following Project designs to minimize and avoid potential impacts to wetlands and waterbodies:

- Minimized the footprint by using the existing NT site for the construction of the BMOP Pump Station;
- Conversion of existing facilities (Stingray Mainline, Station 501, and Station 701) to minimize footprint of new disturbance;
- Collocated the onshore pipeline to the extent possible (approximately 32 percent) with existing ROW to minimize impacts on vegetation communities during construction pipeline system;

- Conversion of the approximate 103.4 miles of Stingray Mainline from natural gas to oil service will minimize impacts to onshore and offshore communities;
- Crossed sensitive environmental land (i.e., Lower Neches Wildlife Management Area Nelda Stark Unit) and wetlands and waterbodies (i.e., Neches River) by using the HDD construction method. See **Table 1-2** for list of the nine proposed HDD crossings. The HDD crossings will avoid impacts to 10.6 acres of wetlands and 2.7 acres of waterbodies;
- Use "push/pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow; and
- Use of existing roads and canals for Project access during construction.

To minimize and avoid potential impacts to wetlands and waterbodies during construction, the Applicant would adhere to measures in the Onshore Construction Best Management Practice (BMP) Plan (Onshore Construction BMP Plan [**Appendix B**]), Revegetation Plan (Appendix C-2 of Volume IIb of the Project's DWP Application), Spill Prevention and Response Plan (SPAR Plan [Appendix C-3 of Volume IIb of the Project's DWP Application]), and HDD Contingency Plan (Appendix C-5 of Volume IIb of the Project's DWP Application). During construction, the following best management practices (BMPs) will be implemented to minimize and avoid impacts to wetlands and waterbodies.

- Minimized the footprint of the proposed work activities and the duration of disturbances to the extent practicable to reduce impacts on wildlife resources and habitat;
- Equipment on the construction ROW will be minimized and, when used, would be of the type having the least environmental impact in saturated ground conditions. This equipment includes mats, marsh buggies, airboats, amphibious equipment, tracked equipment, and barges. The contractor will use discretion in choosing the equipment that would create the least ground pressure for the specific application; and
- ATWS areas are to be limited to the minimum needed to construct wetland and waterbody crossings.
- Installation and maintenance of erosion and sediment controls during construction in accordance with the Onshore Construction BMP Plan.
- Wetland and waterbody buffers (e.g., extra work area setbacks, refueling restrictions) are to be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

During and after construction, erosion and sediment control measures will be installed and maintained until stabilization/revegetation of the Project. Temporary equipment or materials installed to provide access (e.g., timber mats or timber rip-rap) will be removed from wetlands and waterbodies at the completion of construction. Disturbances associated with temporary equipment access methods will be restored and stabilized after the bridging equipment and access materials are removed. Wetlands and waterbodies that are temporarily disturbed during construction will be restored to pre-construction conditions in accordance with the Onshore Construction BMP Plan (**Appendix B**) and Revegetation Plan (Appendix C-2 of Volume IIb of the Project's DWP Application).

TABLE 1-2
Listing of HDD Crossings to Minimize Impacts to Wetlands and Waterbodies

HDD ID Number	Start MP – End MP	Approximate Length (feet)	Feature Crossed[a]
HDD-01	1.60 – 1.25	3,457	Neches River
HDD-02	2.50 – 2.89	2,052	Foreign Pipelines and Canal
HDD-03	8.17 – 8.81	3,394	TPWD Lower Neches WMA Nelda Stark Unit
HDD-04	9.43 – 9.86	2,272	Foreign Pipeline
HDD-05	10.13 – 10.52	2,101	Gulf State Utilities Road, Powerhouse Road and Canal
HDD-06	12.35 – 12.99	3,384	SH 73/87
HDD-07	13.64 – 14.10	2,460	Sabine Lake North Shoreline
HDD-08	14.85 – 15.75	4,766	Gulf Intracoastal Waterway
HDD-09	20.41 – 20.81	2,109	Pipeline Crossing in Sabine Lake

Key:
HDD – horizontal direction drill
MP – milepost
SH – Texas State Highway
TPWD – Texas Parks and Wildlife Department
WMA – Wildlife Management Area

Notes:
[a] Waters of the U.S. will be avoided by all HDD crossing

1.6 CONSTRUCTION SCHEDULE

Construction of the Project is planned to begin in November 2021 for onshore fabrication and August 2022 for offshore installation with Project completion and commissioning scheduled for July 2023. Procurement of major platform equipment is expected to take 10 months. Deck fabrication, outfitting, and onshore pre-commissioning are expected to take 11 months with delivery to the offshore sites staggered to accommodate the tasks of the primary installation vessels. Loadout, transport, and installation will take approximately three months. Conversion of the Mainline to oil service, which will occur concurrently with prefabrication and construction of the other DWP components, will take approximately six months. Final offshore commissioning and startup activities will take approximately two months. Onshore pipeline construction, including the BMOP Pump Station, is planned to begin March 2022 and be complete by April 2023.

1.7 ADJOINING PROPERTY OWNERS

The onshore pipeline traverses the property of numerous property owners. A complete list of property owners adjoining the footprint of the onshore pipeline is provided in **Appendix C**.

1.8 ADDITIONAL FEDERAL, STATE, AND LOCAL CERTIFICATES AND APPROVALS

In addition to this Joint Permit Application, the Applicant is still seeking a number of additional federal, state, and local authorizations, certifications, and approvals for the Project. A complete list of permits and authorizations for the Project are included in **Appendix D**.

2.0 ALTERNATIVE ANALYSIS

In accordance with the DWPA of 1974, as amended and as implemented by 33 U.S. Code (USC) §§ 1503(c) and 1505 and 33 CFR Part 148, Subpart G, the Applicant conducted a robust alternate analysis of the Project. Included in this analysis, the Applicant evaluated the No Action Alternative, System Alternatives, and siting and routing alternatives for the DWP and onshore pipeline. This analysis will be used by USGS and MARAD as part of NEPA review of the Project. The complete Alternative Analysis can be found in Topic Report 2 “Alternative Analysis” in Volume IIa of the DWP Application for the Project. The bulk of text in that Topic Report is provided below.

2.1 DWP ALTERNATIVE ANALYSIS

As part of the analysis the Applicant completed a siting and alternative analysis that used a tiered approach to screen alternative locations for the proposed Project’s facilities. An overview of the Tier I, Tier II, and Tier III siting criteria used for the Project is provided in **Table 2-1**. The Tier I siting criteria were used to identify alternatives that could potentially satisfy the primary objectives of the proposed Project.

TABLE 2-1
Siting Criteria for the BMOP Project

Siting Criteria	Description
Tier I Siting Criteria	
Existing Facilities	To meet the needs for the proposed Project, oil loading, storage, and handling facilities are required. Existing crude oil loading, storage, and handling facilities, or existing facilities, which could be reconfigured were given preference to minimize the need for construction of new infrastructure.
Existing and Currently Underutilized Pipelines	To meet the capacity needs for the proposed Project, pipelines equal to or greater than 36 inches OD and that extend from onshore to offshore are required. Existing and currently underutilized pipelines were given preference so that construction of new pipelines would be avoided or minimized to the extent practicable.
Available for Lease	Located within a lease block that does not have a current active lease, as the operations of the DWP would not be compatible with other uses of a lease block.
Suitable Water Depth for the DWP	A minimum water depth of 75 feet is required to accommodate full loading of VLCCs[a] consistent with the Project’s purpose and need. Avoids the need for dredging.
Designated Shipping Fairway Access	Located within 2 to 8 miles of a designated shipping fairway to allow for the safe transit of VLCCs to the associated DWP without vessel interference (i.e., would also not otherwise impede or interfere with other commercial shipping operations).
Avoids Areas that would Preclude Permitting, Construction, and Operation of a DWP	Avoids locating the DWP within an area where it would not be possible to feasibly permit, construct, and/or operate a DWP (e.g., within an existing, anchorage area, fairway, marine sanctuary, National Wildlife Refuge, dredge disposal area, Significant Outer Continental Shelf (OCS) Sediment Resources, etc.).
Tier II Siting Criteria	
Proximity to Existing Facilities	Avoids existing infrastructure (e.g., platforms) that would preclude safe operation of the DWP or interfere with existing operations.

TABLE 2-1
Siting Criteria for the BMOP Project

Siting Criteria	Description
	Where proximity to existing infrastructure would not preclude safe operations or cause interference, it was given preference, avoiding and minimizing the need for greenfield construction to the extent practicable.
	Collocation with existing infrastructure where feasible and that does not impact third-party operations.
Suitable Area	Large enough contiguous area to accommodate the DWP facilities without geohazards or other obstructions. Does not include VLCC anchorage area.
Tier III Siting Criteria	
Proximity to Existing Marine Infrastructure	The DWP should be located in an area where it would not interfere with existing marine infrastructure (e.g., existing platforms) that is not being converted for the Project.
Proximity to Designated Anchorage Areas	Located outside of designated anchorage areas and at a distance away that would not impede or interfere with other commercial shipping operations.
Proximity to Designated Lightering Areas	Located outside of designated lightering areas and at a distance away that would not impede or interfere with lightering operations.
Proximity to Designated Ocean Dredged Material Disposal Areas	Located outside of designated Ocean Dredged Material Disposal areas and at a distance away that would not impede or interfere with lightering operations.
Proximity to National Marine Sanctuaries or National Wildlife Refuges	Located outside of a designated National Marine Sanctuary or National Wildlife Refuge and at a distance away that would avoid and minimize any potential impacts to sensitive resources.
Proximity to Bureau of Ocean Energy Management (BOEM) Topographic Feature Stipulation Blocks, Artificial Reefs	Located outside of designated BOEM Topographic Feature Stipulation Blocks and at a distance away that would avoid and minimize any potential impacts to sensitive hard-bottom resources.
Proximity to Shore-Based Support Facilities	Proximity to an established Louisiana or Texas shore-based port in order to facilitate transport of crew and supplies from shore-based operations needed for the operation of the DWP. In addition, the proximity of the DWP to established shore-based ports would facilitate any evacuations in the event of a storm, emergency, or rescue operation.
Proximity to Significant OCS Sediment Resources	Located outside of designated Significant OCS Sediment Resources areas and at a distance away that would not impede or interfere with sand resource operations.
Avoids Cultural Sites and Shipwrecks	Avoids and minimizes the potential for impacts to known cultural resource sites and shipwrecks.
Avoids Ordinance Disposal Areas	Avoids areas identified as ordinance disposal areas.
Avoids and Minimizes Disturbance to and Permanent Loss of Waters of the U.S.	Avoids and minimize the permanent loss of wetlands, waterbody, and seafloor habitat.
Avoids and Minimizes Disturbance to USFWS Designated Critical Habitat	Avoids and minimizes impacts to listed species and listed species habitat, including U.S. Fish and Wildlife Service (USFWS) designated critical habitat.

TABLE 2-1
Siting Criteria for the BMOP Project

Siting Criteria	Description
Avoids and Minimizes Disturbance to and Permanent Loss of Sensitive Coastal Resources	Avoids and minimizes disturbance to seagrasses and oysters.

Notes:
[a] MARAD and USCG, 2020.

2.2 ONSHORE PIPELINE ROUTE ALTERNATIVE ANALYSIS

For the alternative analysis of onshore pipeline route, five alternative onshore pipeline route alternatives between the existing NT storage facility (Jefferson County, Texas) and Station 501 (Cameron Parish, Louisiana) or Station 701 (Cameron Parish, Louisiana) were identified. A description of the alternatives is provided in **Table 2-2**.

TABLE 2-2
New Build Onshore Pipeline Route Alternatives

Alternative	Description	General Rationale
No. 1 (Preferred Alternative)	The route proceeds north out of the existing NT storage facility and crosses the Neches River continuing almost to Bridge City, Texas, before turning east/southeast and crossing Sabine Lake. After leaving Sabine Lake in Cameron Parish, Louisiana, the route parallels the Sabine National Wildlife Refuge (NWR) boundary to the south, proceeding directly east to Station 501.	The route avoids the Sabine NWR and congested areas south of Nederland (e.g., Port Arthur, Texas State Highway [SH]- 87).
No. 2	The route proceeds southeast out of the existing NT storage facility continuing along the western edge of Port Arthur, Texas. The route continues south/southeast paralleling at times existing pipelines and SH-87. Near Sabine, Texas, the route turns east crossing the Sabine Neches Waterway (SNWW) and into Louisiana. Within Louisiana, the route proceeds first northeast to meet up with Gulf Beach Highway and then east parallel to Gulf Beach Highway to Station 701.	The route avoids the Sabine NWR and crosses into Louisiana within the SNWW, avoiding Sabine Lake.
No. 3	The route proceeds north out of the existing NT storage facility and crosses the Neches River continuing north of Bridge City, Texas, before heading east and crossing into Cameron Parish, Louisiana. Once in Louisiana, the route turns south/southeast and crosses the Sabine NWR before reaching Station 501.	The route avoids Sabine Lake and congested areas south of Nederland (e.g., Port Arthur, SH-87).
No. 4	The route proceeds north out of the existing NT storage facility and crosses the Neches River before turning east/southeast. Heading east/southeast the route crosses south of the Bessie-Height Oil and Gas Field within open water. The route continues east/southeast through primarily open water areas and then crosses Sabine Lake. After leaving Sabine Lake in in Cameron Parish, Louisiana, the route parallels the Sabine NWR boundary to the south, proceeding directly east to Station 501.	The route avoids the Sabine NWR and congested areas south of Nederland (e.g., Port Arthur, SH-87) while maximizing the crossing of open water areas.
No. 5	The route proceeds north out of the existing NT storage facility and crosses the Neches River continuing almost to Bridge City, Texas, before turning east/southeast and crossing Sabine Lake. Within	The route avoids the Sabine NWR and congested areas south of

TABLE 2-2
New Build Onshore Pipeline Route Alternatives

Alternative	Description	General Rationale
	Sabine Lake the route continues south remaining west of the Texas/Louisiana border until reaching the SNWW. After leaving the SNWW in Cameron Parish, Louisiana, the route proceeds east/northeast to Station 501.	Nederland (e.g., Port Arthur, SH-87) and also avoids crossing into Louisiana until within the SNWW south of Sabine Lake.

Of the route alternatives considered, the Preferred Alternative is Route No. 1, which was found to be a relatively direct (i.e., shorter length) route with the least amount of environmental impacts when taking into consideration construction constraints (e.g., existing pipeline, congested areas, oil field crossings). Although Route No. 4, which maximizes the crossing of open water areas, would minimize potential impacts to noise sensitive areas and reduce the number of infrastructure crossings (e.g., highways), due to potential land use constraints and constructability considerations, it was not determined to be the preferred route. Route No. 4 would cross several areas that have been identified by the USACE as federal placement areas. Based on discussion with the USACE, due to planned widening of the Neches River Channel, these areas may be used considerably in the future. Further, Route No. 4 would cross the Bessie-Height Oil and Gas Field with its associated submerged infrastructure. Therefore, the Preferred Alternative is Route No. 1. **Table 2-3** provides a comparison of the route alternatives based on the pipeline siting criteria.

TABLE 2-3
Summary of Onshore Pipeline Alternatives

Criteria		Alternatives				
		No. 1 (Preferred Route)	**No. 2**	**No. 3**	**No. 4**	**No. 5**
Length (miles)	Total	37.0	46.0	37.4	34.6	50.7
	Collocation (percent)[a]	21.6	78.3	33.7	2.7	19.1
	Sabine Lake Crossing (north of the SNWW)	12.1	0.0	0.0	12.4	20.1
Public Land (miles)	Total	1.8	0.1	8.4	1.9	1.8
	Sabine NWR	0.0	0.0	8.4	0.0	0.0
	Wildlife Management Areas	1.8	0.1	0.0	1.9	1.8
Land Cover [b] (miles)	Agriculture	2.0	13.3	6.5	<0.1	2.0
	Forest[c]	2.6	0.9	2.6	0.6	2.5
	Shrub/Scrub/ Herbaceous[d]	17.1	16.2	18.8	14.5	22.5
	Open Land/Barren Land	0.0	0.8	0.1	0.0	<0.1
	Open Water[e]	14.4	1.0	5.9	19.1	21.7
	Developed[f]	0.9	13.9	3.5	0.4	2.2
Wetlands [g] (miles)	Total	31.7	20.1	10.1	33.3	44.2
	Palustrine Emergent (PEM)	3.0	10.2	2.1	1.9	3.3
	Palustrine Scrub-Shrub (PSS)	0.0	0.0	1.0	0.9	1.1
	Palustrine Forested (PFO)	1.6	0.7	0.8	0.0	0.2
	Estuarine and Marine Wetland	12.4	8.1	3.4	11.2	18.3
	Estuarine and Marine Deepwater	14.4	1.2	2.8	19.3	21.3
Waterbody Crossings [h] (number)	Total	29	30	29	4	8
	Ephemeral/Intermittent Stream/River/Canal/Ditch	29	30	18	4	8
	Perennial Stream/River/Canal/Ditch	0	0	6	3	0

TABLE 2-3
Summary of Onshore Pipeline Alternatives

Criteria		Alternatives: No. 1 (Preferred Route)	No. 2	No. 3	No. 4	No. 5
	Lake/Ponds[h]	4	0	5	5	3
Pipelines Crossings (number)		51	183	78	48	70
Electrical Transmission Line Crossings (number)		10	14	16	6	14
Road Crossings (number)	All	21	58	33	8	30
	Highways	16	1	5	4	4
Oyster Areas (miles)	Oyster Leases			0.0	0.0	0.0
	Public Oyster Grounds (open)[i]	0.0	0.0	0.0	0.0	0.0
	Public Oyster Seed Grounds	6.3	0.0	0.0	6.3	0.2
USFWS Designated Critical Habitat (miles)		0.0	0.0	0.0	0.0	0.0
National Register of Historic Properties (number within 0.25-mile)	Structure, Object, or Building	0	0	0	0	0
	Districts	0	0	0	0	0
Prime Farmland Soils (includes farmland of statewide importance, "if drained" and prime farmland classification) (miles)		4.1	4.7	8.4	0.0	4.3
Noise Sensitive Areas[j] (Number within 0.5-mile)		86	466	240	0	87

TABLE 2-3
Summary of Onshore Pipeline Alternatives

Criteria	Alternatives No. 1 (Preferred Route)	No. 2	No. 3	No. 4	No. 5
Constructability Assessment	No significant issues identified and parallels existing corridors to the maximum extent practicable	Significant ROW constraints in the Nederland and Port Arthur, TX areas due to existing infrastructure	Significant ROW constraints in the Bridge City and Orange, TX areas due to existing infrastructure and requires construction within a National Wildlife Refuge	Similar to the preferred alternative, but requires avoiding impacts to the Bessie-Height Oil and Gas Field infrastructure	Similar to the preferred alternative, but is longer in length and requires more construction within Sabine Lake

Notes:

[a] Collocation includes linear infrastructure within 200 feet of the route based on centerline-to-centerline measurement for a minimum length of 100 feet.

[b] Based on National Land Cover Database (USGS, 2016).

[c] Includes evergreen, deciduous, mixed forested land, and woody wetlands.

[d] Includes herbaceous wetlands

[e] Includes rivers/streams, ponds, and lakes.

[f] Includes low, medium, and high intensity land cover, as well as developed, open space (e.g., right-of-way).

[g] Based on the National Wetlands Inventory dataset

[h] Based on National Hydrography Dataset. Includes Sabine Lake.

[i] Sabine Lake Public Oyster Area remained closed for the entire 2019-20 oyster season.

[j] Based on aerial interpretation.

2.3 ABOVEGROUND FACILITIES ALTERNATIVES ANALYSIS

Other than MLVs, there will be three onshore aboveground pipeline facilities: Station 501, Station 701, and the BMOP Pump Station. Station 501 and Station 701 are existing facilities that are being converted for the Project. Even with TWS and expansion of Station 501, any alternative would require constructing a new facility or converting a different existing facility. Construction of a new facility or use of a different existing facility would result in similar and likely greater environmental impacts. In addition, new piping would be required to connect these facilities with the existing Stingray Mainline. Therefore, alternatives to the converting of Station 501 and Station 701 were not further evaluated.

The location of the new BMOP Pump Station was developed as part of a prior expansion of the existing NT facility where oil storage already exists. A planned expansion of the NT facility will provide suitable land to build the new pump station and metering facilities without new impacts.

The immediate area surrounding the NT storage facility consists of wetland complexes. Siting of the new pump station in an adjacent, undeveloped location would result in greater environmental impacts (i.e., wetland habitat loss). Similarly, siting of the facility in an offsite location, distant from the existing storage facility, would likely require the need for additional infrastructure, such as new pipelines, power supply lines, and access, and would result in similar and likely greater environmental impacts. Thus, alternative locations for the BMOP Pump Station were not further evaluated.

2.4 SECTION 404(B)(1) COMPLIANCE

The Applicant presents the following Section 404(B)(1) compliance evaluation due to expected impacts to waters of the U.S.

2.4.1 Finding of Practicable Alternatives

The Applicant conducted a robust alternatives analysis as part of the DWP Application. The alternative analysis is one of nine criteria used to determine a final decision for the issuance of a license under the DWPA of 1974, as amended, and as implemented by 33 USC §§ 1503(c) and 1505 and 33 CFR Part 148, Subpart G (Environmental Review Criteria for Deepwater Ports). Section 2.2 and 2.3 of this application provide a summary of the alternative analysis of the onshore pipeline and its associated aboveground facilities. A detailed alternative analysis of the entire Project can be found in Topic Report 2 “Alternative Analysis” in Volume IIa of the DWP Application for the Project. The results of alternatives analysis conducted concluded that there are no practicable alternatives to the proposed Project that would meet the site selection criteria necessary to meet the purpose and need of the Project.

2.4.2 Restrictions on Discharge

The onshore pipeline will result in the permanent fill of 0.59 acres of PEM wetlands for installation of three MLVs and four permanent access roads, the permanent fill of 1.62 acres of estuarine intertidal emergent (E2EM) wetlands and 0.005 acres of permanent fill of waterbodies for the conversion of the existing facilities and installation of new facilities at Station 501. The construction of the pipeline ROW, temporary and pipe storage yards roads, permanent and temporary canals, pump station, staging areas, temporary contractor yard and pipe storage yards will not result in the permanent fill of waters of the U.S. The Applicant will not discharge any temporary fill material that would:

- Cause or contribute, after consideration of disposal site dilution and dispersion, to violations of any applicable state water quality standards;

- Violate any applicable toxic effluent standard or prohibition under Section 307 of the CWA;
- Jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act (ESA), as amended, or results in the likelihood of the destruction or adverse modification of a habitat that is determined by the Secretary of Interior or Commerce, as appropriate, to be a critical habitat under the ESA , as amended; or
- Violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

The Applicant will follow the Project's Onshore Construction BMP Plan (**Appendix B**), and SPAR Plan (Appendix C-3 of Volume IIb of the Project's DWP Application) to prevent impacts to waters of the U.S. due to stormwater runoff or inadvertent releases during construction of the onshore pipeline. The Applicant will also secure Section 401 Water Quality Certification and all other applicable state permits related to water withdrawal or water discharge permits, as applicable, prior to the start of construction within waters of U.S. See **Appendix D** for a list of environmental permits and authorizations required in each state and the status of the permit or authorization.

Additionally, the Applicant is currently conducting consultation with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) to assess, avoid, minimize, and mitigate any impacts to federally listed endangered and threatened species and will continue consultation throughout the permitting process to identify adequate avoidance, minimization, and mitigation measures for any potential Project impacts to ensure these impacts do not jeopardize the continued existence of any federally listed species.

2.4.3 Findings of Significant Degradation

The Applicant will take steps necessary to ensure no effects contributing to significant degradation would occur, including:

- Significantly adverse effects of the discharge of pollutants on human health or welfare, including, but not limited to, effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites;
- Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;
- Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability (Note: Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of a wetland to assimilate nutrients, purify water, or reduce wave energy.); or
- Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economical values.

During construction, the Applicant will follow the Project's Onshore Construction BMP Plan (**Appendix B**) and SPAR Plan (Appendix C-3 of Volume IIb of the Project's DWP Application) to minimize, to the extent maximum extent practicable, migration of sediment from work areas into waters of the U.S. and to prevent contaminants associated with construction materials from entering waters of the U.S.

2.4.4 Findings of Appropriate and Practicable Minimization

As detailed in Section 2 , "Alternatives Analysis," Section 3.1, "Wetland Impacts," and Section 4.1, "Surface Waters Impacts," of this application, the Applicant has evaluated impacts to wetlands and waterbodies, as well as other environmental impacts, throughout the route selection process. Project design incorporated routing selection and construction techniques to avoid and minimize impacts to wetlands, to the maximum extent practicable. Route alternatives along the proposed route were evaluated to minimize impacts to wetlands and other sensitive environmental resources. Conversion of the existing Stingray Mainline avoids impacts over 5 miles of ROW. The Applicant has also added HDD crossing to avoid impacts to wetlands and waterbodies, by avoiding 10.6 acres of wetlands and 2.7 acres of waterbodies. The use of existing facilities (i.e., NT, Station 501, Station 701) for the location of some of the onshore pipeline's aboveground facilities has minimized temporary and permanent impacts to wetlands and waterbodies. Additional measures the Applicant will implement to minimize impacts to water of the U.S. can be found in Section 1.5 of this application.

2.4.5 Factual Determination

2.4.5.1 *Physical Substrate Determinations*

The onshore pipeline will traverse a wide variety of substrates. A detailed description and analysis of the soils within the footprint of the onshore pipeline can be found in Topic Report 7 "Soil and Geologic Resources" of Volume IIb of the DWP Application for the Project. Fill material in wetlands during installation of the pipeline will be native material and will generally be restricted to spoil removed from the pipeline trench and, if unsaturated, segregated topsoil. The presence/absence of saturated soils within a wetland feature will depend on the field conditions present during the time of construction. Based on field condition of the wetland as determined by the Environmental Inspector, any portion of the topsoil up to 12 inches that is stackable will be segregated. Topsoil segregation will not occur if the soil is inundated or saturated and the topsoil and subsoil will not stack. Therefore, the Applicant will strip and store the topsoil down to the point of saturation, depending on topsoil depth and site-specific water table conditions. The maximum depth that topsoil will be segregated is 12 inches, even in a scenario where more than 12 inches is present. Environmental Inspectors will provide guidance to the construction contractor when and how much topsoil should be segregated within a wetland based on the conditions observed in the field. Once installation is complete, the trench spoil will be placed back into the trench. Excess material will be deposited in nearby uplands. Contours will be restored to match pre-construction contours. The construction of the onshore pipeline will result in the permanent fill of 0.59 acres of PEM wetlands for installation of three MLVs and four permanent access roads, the permanent fill of 1.62 acres into E2EM and 0.005 acres of permanent fill of waterbodies for the conversion of the existing facilities and installation of new facilities at Station 501.

The Applicant will follow the Onshore Construction BMP Plan (**Appendix B**) and the Project's Revegetation Plan (Appendix C-2 of Volume IIb of the Project's DWP Application) to minimize soil layer mixing and compaction within wetlands. The Applicant does not anticipate a significant impact to the composition of the substrates within waters of the U.S. that are traversed by the onshore pipeline.

2.4.5.2 *Water Circulation, Fluctuation, and Salinity Determinations*

The onshore pipeline has the potential to impact water circulation and fluctuation of wetlands and waterbodies within the construction footprint. However, these impacts will be temporary in nature and limited to construction of the onshore pipeline. The Applicant will follow the Project's Onshore Construction BMP Plan (**Appendix B**) during construction. The measures outlined in the plan are designed to minimize impacts to wetlands and waterbodies. Operation of the onshore pipeline will not affect the water circulation, fluctuation, or salinity of the wetlands and waterbodies within the construction footprint.

2.4.5.3 *Suspended Particulate/Turbidity Determinations*

Construction of the Project has the potential to temporarily increase the suspended particulates in wetlands and waterbodies traversed by the onshore pipeline, as well as in adjacent wetlands and waterbodies; however, these impacts will be temporary in nature. Temporary increases in turbidity due to construction activities will be minimized, to the maximum extent practicable, by following the Onshore Construction BMP Plan (**Appendix B**). Once construction is finished and restoration is complete, impacts due to suspended particulates/turbidity within wetlands and waterbodies traversed by and waterbodies adjacent to the onshore pipeline will be insignificant.

2.4.5.4 *Contaminant Determinations*

The onshore pipeline is not anticipated to cross or impact any potentially contaminated sites. In the event that substances that could potentially be considered waste and/or contaminated soils, as defined in applicable federal, state, and local regulations and guidelines are encountered during construction of the onshore pipeline, the Applicant will implement the measures in the Project’s Unanticipated Discovery of Contamination Plan (see Appendix C-4 of Volume IIb of the Project’s DWP Application) to prevent the spread of contamination.

2.4.5.5 *Aquatic Ecosystem and Organism Determinations*

Direct impacts to the aquatic ecosystems and organisms will occur during construction and operation of the Project. Impacts resulting from construction within wetlands and waterbodies will be localized, and construction activities will be largely temporary. Impacts to waterbodies and wetlands will be minimized through the use the HDD method (to cross the Neches River, canal to Neches River, ICWW, and the northern Sabine Lake shoreline approach), the lay barge method (to cross parts of Sabine Lake).

Open-cut construction in Sabine Lake has the potential to impact water quality due to the resuspension of sediment into the water column. Dredging and excavation operations necessary to install the pipeline through Sabine Lake may suspend sediment and affect water quality and aquatic resources. Sediments may be resuspended during trench excavation and from spoil pile erosion due to wind and wave forces. These lake processes could result in additional impacts on water quality and aquatic resources. The suspended solids and turbidity levels will decline to ambient levels following completion of construction. Turbidity resulting from trenching could reduce light penetration and the corresponding primary production of aquatic plants, algae, and phytoplankton. Additionally, the potential resuspension of organic materials and sediments could cause an increase in biological and chemical oxygen demand along the construction ROW. Lower dissolved oxygen concentrations could cause a temporary displacement of motile organisms and may stress or kill sessile or sedentary benthic organisms within the construction ROW. With the implementation of the Project’s Onshore Construction BMP Plan (**Appendix B**), SPAR Plan (Appendix C-3 of Volume IIb of the Project’s DWP Application), and HDD Contingency Plan (Appendix C-5 of Volume IIb of the Project’s DWP Application) it is anticipated that potential construction impacts to Sabine Lake will be short-term, and negligible (i.e., HDD method) to moderate (i.e., lay barge open cut method).

Indirect impacts could result from erosion and sedimentation, as well as impacts due to increased activity associated with construction. These impacts will be temporary and of only a very short duration. To minimize these impacts, Applicant will follow the Project's Onshore Construction BMP Plan and SPAR Plan.

Additionally, true seagrasses are not found in Sabine Lake (or the Neches River). Wigeon grass (*Ruppia maritima*) a submerged aquatic is sometimes considered a seagrass and does occur in Sabine Lake where it is found in bays and offshore of brackish marshes (USFWS, 2013; Guillen, et al., 2015). Its distribution and abundance within the lake has apparently not been mapped or quantified (Radloff et al., 2013). Benthic habitat surveys have been conducted for the onshore pipeline. No wigeon grass or other submerged aquatic vegetation was found within the onshore pipeline ROW or within 500 feet of the workspace. Details of the survey methods and the survey results are provided in Appendix D-3 of Volume IIb of the Project's DWP Application.

2.4.5.6 *Proposed Disposal Site Determinations*

Dredging will be required for pipeline construction across Sabine Lake for the location of open-cut construction using a lay barge. Dredging of the pipeline trench will be required for achieving the 4-foot minimum depth from lake bottom to top of pipe and within the floatation channels for the operation of the lay barges. Sediments excavated to install the pipeline will be temporarily sidecast in the lake adjacent to the pipeline trench. After the pipeline installation is complete, the pipe trench will be backfilled, and the lake bottom contours returned to preconstruction contours to the maximum extent practicable.

2.4.5.7 *Determination of Cumulative Effects on the Aquatic Ecosystem*

A summary of the cumulative effects analysis for wetland resources and surface waters is presented in Appendix C "Framework for Cumulative Impacts Analysis," of Volume IIa of the Project's DWP Application. The analysis concluded that the Applicant would employ a number of BMPs to minimize impacts on aquatic resources (see Section 1.5 of this application). As a result, the proposed Project, in combination with other past, present, and reasonably foreseeable projects and based on the extent of resources in the area of influence, would have short-term, minor cumulative impacts on water quality during construction.

2.4.5.8 *Determination of Secondary Effects on the Aquatic Ecosystem*

Secondary effects will include impacts as a result of stormwater runoff, wind erosion, and impacts to wildlife due to increased activity from construction and operation of the Project. During construction, the Applicant will implement BMPs measures outlined in the Project's Onshore Construction BMP Plan (**Appendix B**) and SPAR Plan to minimize impacts to adjacent aquatic resources as a result of stormwater runoff and wind erosion. Impacts to wildlife are addressed in the Topic Report 5 "Wildlife and Protected Species", Volume IIb of the Project's DWP Application and will be addressed during the Project's Section 7 consultation process with USFWS and NOAA Fisheries.

3.0 WETLAND RESOURCES

Wetland and aquatic habitats identified along the Pipeline System are comprised of two major systems (estuarine and palustrine) in the Cowardin classification system (Cowardin et al,. 1979). Estuarine habitats are semi-enclosed but have at least sporadic access to open water and are at least occasionally diluted to brackish salinities by freshwater inflow. Palustrine habitats include non-tidal wetlands as well as tidal wetlands with salinities below 0.5 parts per thousand that are situated shoreward of lakes, rivers, or estuaries

(Cowardin et al., 1979). The Project traverses several wetland types in Texas and Louisiana, including herbaceous wetlands, marshes, scrub-shrub wetlands, and forested wetlands. Wetland systems within the Project area are defined in **Table 3-1**. **Appendix E** contains a table of the wetlands that were evaluated, and the finding of the analysis and **Appendix G** contains maps depicting the location of the wetlands within the footprint of the onshore pipeline.

TABLE 3-1
Wetland Types in the Project Area

Wetland Type	Wetland Code	Description
Estuarine intertidal emergent wetland	E2EM	Estuarine emergent wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens that are present for most growing season in most years. These plants may be temporarily to permanently flooded at the base but do not tolerate prolonged inundation of the entire plant. **Dominant Vegetation**: smooth cordgrass (*Spartina alterniflora*), common reed (*Phragmites australis*), saltmeadow cordgrass (*Spartina patens*), sturdy bulrush (*Bolboschoenus robustus*)
Palustrine emergent wetland	PEM	Palustrine emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except those irregularly exposed. In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance year after year. **Dominant Vegetation**: alligator weed (*Alternanthera philoxeroides*), green flatsedge (*Cyperus virens*), Gulf Coast spikerush (*Eleocharis cellulose*), sand spikerush (*Eleocharis montevidensis*), longtom (*Paspalum denticulatum*), southern cattail (*Typha domingensis*), and giant cutgrass (*Zizaniopsis miliacea*)
	PEMx	**Dominant Vegetation:** broadleaf cattail (*Typha latifolia*) and sand spikerush
Palustrine scrub-shrub wetland	PSS	Scrub-shrub wetlands include areas dominated by woody vegetation less than 6 meters tall. Vegetation forms found in this wetland type include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable communities. **Dominant Vegetation:** Chinese tallow (*Triadica sebifera*) and broadleaf arrowhead (*Sagittaria latifolia*)
Palustrine forested wetland	PFO	Forested wetlands are characterized by woody vegetation that is 6 meters tall or taller. Forested wetlands are most common in the eastern U.S. and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. Forested wetlands normally possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. **Dominant Vegetation:** black willow (*Salix nigra*), Chinese tallow, sweet gum (*Liquidambar styraciflua*), sender woodoats (*Chasmanthium laxum*), sand spikerush, alligator weed

Pipeline construction will cross wetlands with one of the following crossing methods:

- Open Cut Method
- Push/Pull Method
- HDD

Open Cut Method

At open cut wetland crossings, a 150-foot-wide construction ROW will be required to avoid the potential safety hazards associated with saturated and/or granular soils, including shifting soils and trench wall collapse. Typical saturated and unsaturated construction ROW configuration drawings are provided in **Appendix H**. The Applicant will implement the mitigation measures outlined in its Project's Onshore Construction BMP Plan (**Appendix B**) to minimize potential impacts to wetlands and adjacent vegetation during construction.

For standard open cut pipeline construction method, the clearing of vegetation in wetlands will be limited to trees and shrubs, which will be cut flush with the surface of the ground and removed from the wetland. Stump removal, grading, topsoil segregation, and excavation will be limited to the area immediately over the trenchline. A limited amount of stump removal and grading may be conducted in other areas to ensure a safe working environment.

In unsaturated wetlands where soils are stackable, up to 12 inches of topsoil from the trenchline will be stripped and stored separately from the subsoil. Implementation of proper topsoil segregation, where necessary, will help ensure post-construction revegetation success, thereby minimizing the potential for erosion due to lack of vegetative cover. Topsoil will be segregated along the working side of the construction workspace. The travel side of the workspace will be matted as needed to avoid rutting and mixing of topsoil and subsoils. Topsoil segregation generally will not be possible in saturated soils. Subsoil will be stockpiled separately from topsoil. The segregated topsoil and subsoil stockpiles will be replaced in the proper order during backfilling and final grading.

Prior to backfilling, trench breakers will be installed where necessary to prevent the subsurface drainage of water from wetlands. Where topsoil has been segregated from subsoil, the subsoil will be backfilled first followed by the topsoil. Equipment mats, terra mats, and timber riprap will be removed from wetlands following backfilling. Once revegetation is successful, sediment barriers will be removed from the ROW and disposed of properly.

Areas temporarily disturbed during construction will be restored to their pre-existing contours, to the maximum extent practicable, and allowed to naturally revegetate. Revegetation measures will be implemented in accordance with the Project's Revegetation Plan (Appendix C-2 of Volume IIb of the Project's DWP Application).

Push/Pull Method

The push/pull method will be utilized in inundated or excessively wet areas along the pipeline route where soils are not stackable or segregate easily. For the push/pull method, a 150-foot-wide construction ROW will be required to avoid the potential safety hazards associated with excavation of the pipeline flotation ditch and temporary storage of spoil. A typical ROW configuration drawing for the push/pull method is provided in **Appendix H**. The increased width of the construction ROW will reduce storage pile height and prevent material from extending beyond the limits of permitted impacts and reentering the trench prior to placement of the concrete-coated pipe.

The push/pull technique involves stringing and welding the pipeline outside of the wetland and excavating the trench through the wetland using tracked excavator suited for working in saturated or inundated conditions. The water that seeps into the trench is used as the vehicle to “float” the pipeline into place together with a winch and flotation devices that will be attached to the pipe. After the pipeline is floated into place, the floats are removed, allowing the pipeline to sink into the trench. Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. After the pipeline sinks to the bottom of the trench, a tracked excavator suited for working in saturated or inundated conditions will backfill the trench and complete cleanup. Topsoil segregation generally will not be possible in inundated wetland soils.

Push sites in open-water areas will consist of several shallow-draft spud barges connected together to provide a working platform. At the push site, various pipeline operations will take place, including pipe make-up, welding, non-destructive testing, joint coating and coating repairs, and installation of flotation apparatus. Where there is standing water, only enough clearing and trenching will be done to accommodate installation of the pipe. Each excavator used will have a lateral reach sufficient to place spoil within the 300-foot-wide construction ROW. Pipe stringing and lowering in the push lay method will be similar to that described in the conventional lay method.

Equipment on the construction ROW will be minimized and, when used, would be of the type having the least environmental impact in saturated ground conditions. This equipment includes mats, marsh buggies, airboats, amphibious equipment, tracked equipment, and barges. The contractor will use discretion in choosing the equipment that would create the least ground pressure for the specific application. Construction of the Project will comply with applicable permit requirements.

Horizontal Directional Drill (HDD)

An HDD is a trenchless crossing method that involves drilling a hole under the waterbody (or other sensitive features) and pulling a pre-fabricated pipe segment through the hole. The HDD construction method will be used at nine locations onshore, including wetland or waterbody features, major roads and utilities (i.e., foreign pipelines), and sensitive environmental land. Some TWSs will be used in between the HDD entry and exit points for travel lanes to minimize construction equipment move-arounds and to monitor and survey the drill path during construction. Site specific HDD crossings drawings are in **Appendix I** and typical construction configuration drawings for the HDD crossing are provided in **Appendix H**.

The HDD method involves establishing land-based staging areas along both sides of the proposed crossing in order to avoid trenching in sensitive areas. The process commences with the boring of a pilot hole beneath the waterbody or other feature to be avoided, then enlarging the hole with one or more passes of a reamer until the hole is the necessary diameter to facilitate the pull-back (installation) of the pipeline. Once the remaining cleaning passes (swabs) are complete, a prefabricated pipe segment is pulled through the hole to complete the crossing.

Throughout the drilling process, a slurry of non-toxic, bentonite clay and water will be pressurized and pumped through the drilling head to lubricate the drill bit, remove drill cuttings and hold the hole open. This slurry, referred to as drilling mud or drilling fluid, has the potential to be inadvertently released to the surface through fractures, fissures, or during the drilling of the pilot hole when the pressurized drilling mud is seeking the path of least resistance. The path of least resistance is typically the path back along the drilled pilot hole. However, if the drill path becomes temporarily blocked or large fractures or fissures that lead to the surface are crossed, an inadvertent release could occur at the fracture or fissure location.

The drilling construction contractor will monitor the pipeline route and the circulation of drilling mud throughout the HDD operation for indications of an inadvertent drilling mud release and will immediately implement corrective actions if a release is observed or suspected. The Applicant has prepared an HDD Contingency Plan (Appendix C-5 of Volume IIb of the Project's DWP Application) that describes the methods that will be used to avoid or minimize the risk of drilling mud release, as well as the mitigative procedures that will be followed if an inadvertent release does occur.

Depending on the exact soil conditions at each HDD location, an additive to the bentonite mixture may be needed. For example, if the soil at a particular site contains reactive clay, sand, or cobble, a polymer additive may be needed.

3.1 WETLAND IMPACTS

Wetland impacts resulting from construction may vary based on construction techniques, and may include temporary ground disturbance, removal of wetland vegetation, temporary storage of dredged and/or excavated material, and rutting or compaction. Construction-related impacts will occur within the 150-foot-wide construction ROW as a result of proposed pipeline installation activities. The construction of the onshore pipeline will result in temporary impacts to 154.2 acres of E2EM and 60.8 acres of PEM.

The construction of the onshore pipeline will result in the permanent loss of 0.59 acres of PEM wetlands. The construction of MLV 1, MLV 2, and MLV 3 will result in 0.070 acres, 0.115 acres and 0.115 acres of permanent impact, respectively. The remaining permanent impacts to PEM wetlands are from the construction of PAR-03 (0.021 acres), PAR-05 (0.016 acres) PAR-13 (0.019) and PAR-15 (0.229). The permanent loss of 0.59 acres of PEM wetlands is within the USACE Galveston District

The construction of the onshore pipeline will also result in the permanent loss of 1.62 acres of E2EM wetlands due to the expansion of Station 501. The wetlands impacted at Station 501 are located within the USACE New Orleans District.

The construction of the onshore pipeline will result in impacts to 16.64 acres of PFO wetlands and 0.23 acres of PSS wetlands. For impacts to PFO wetlands along the pipeline construction ROW, 10.92 acres of the impacted PFO wetlands will occur in the TWS and 5.54 acres of impact will occur within the permanent ROW. The 10.92 acres of PFO wetlands within the temporary ROW will be allowed to revegetate to pre-construction conditions following construction and restoration. Due to maintenance and safety requirements for the permanent ROW, construction of the onshore pipeline will result in the permanent functional conversion of the 5.54 acres of PFO wetlands to PEM wetlands. Table 3-2 shows that 0.18 acre of PFO wetlands will be impacted by the construction of staging areas. This 0.18 acre of PFO wetlands in the staging area will be avoided during construction and therefore will not be impacted. The 0.23 acres of PSS is located in the TWS and ATWS. Following construction activities, all TWS and ATWS will be allowed to revegetate to pre-construction conditions. The dominant woody species within PSS wetlands (Wetland H-10) is Chinese tallow (*Triadica sebifera*), an invasive tree species. All of the temporary and permanent impacts to PFO and PSS wetlands are under the jurisdiction of the USACE Galveston District.

The Applicant has developed a compensatory mitigation plan for the Project that proposes mitigation to offset the permanent impacts to, and the permanent conversion of, waters of the U.S. due to the construction of the Project. See **Appendix J** for the Project's compensatory mitigation plan.

TABLE 3-2
Summary of Wetlands Affected by the Project

Facility	**County/ Parish (USACE District)**	**Construction[a] (acres)**					**Operation[b] (acres)**					**Total Temporary Wetland Impacts (acres)**	**Total Permanent Loss of Wetlands[c] (acres)**
		E2EM	**PEM**	**PSS**	**PFO**	**Total**	**E2EM**	**PEM**	**PSS**	**PFO**	**Total**		
Pipeline													
Onshore Pipeline	Jefferson (Galv)	0.00	0.32	0.00	0.43	**0.75**	0.00	0.42	0.00	0.04[d]	**0.46**	**1.21**	**0.00**
	Orange (Galv)	15.49	40.44	0.23	10.49	**66.65**	6.73	16.98	0.00	5.50[d]	**29.21**	**95.86**	**0.00**
	Cameron (Galv)	65.93	0.00	0.00	0.00	65.93	31.98	0.00	0.00	0.00	**31.98**	**97.91**	**0.00**
	Cameron (N.O.)	20.15	0.00	0.00	0.00	20.15	9.86	0.00	0.00	0.00	**9.86**	**30.01**	**0.00**
Staging Areas													
Staging Areas	Jefferson (Galv)	0.00	1.88	0.00	0.07[e]	**1.95**	0.00	0.00	0.00	0.00	**0.00**	**1.95**	**0.00**
	Orange (Galv)	0.00	0.67	0.00	0.11[e]	**0.78**	0.00	0.00	0.00	0.00	**0.00**	**0.78**	**0.00**
	Cameron (Galv and N.O.)	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Aboveground Facilities													
MLVs 1-4	Orange (Galv)	0.00	0.00	0.00	0.00	**0.00**	0.00	0.30	0.00	0.00	**0.30**	**0.00**	**0.30**

TABLE 3-2
Summary of Wetlands Affected by the Project

Facility	**County/ Parish (USACE District)**	**Construction[a] (acres)**					**Operation[b] (acres)**					**Total Temporary Wetland Impacts (acres)**	**Total Permanent Loss of Wetlands[c] (acres)**
		E2EM	**PEM**	**PSS**	**PFO**	**Total**	**E2EM**	**PEM**	**PSS**	**PFO**	**Total**		
MLVs 5-6	Cameron (Galv)	0.09	0.00	0.00	0.00	**0.09**	0.00	0.00	0.00	0.00	**0.00**	**0.09**	**0.00**
BMOP Pump Station	Jefferson (Galv)	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Station 501	Cameron (N.O.)	0.69	0.00	0.00	0.00	**0.69**	1.62	0.00	0.00	0.00	**1.62**	**0.69**	**1.62**
Station 701	Cameron (N.O.)	0.90	0.00	0.00	0.00	**0.90**	0.46[f]	0.00	0.00	0.00	**0.46[f]**	**1.36**	**0.00**
Stingray Tap Removal	Cameron (N.O.)	1.29	0.00	0.00	0.00	**1.29**	0.63[f]	0.00	0.00	0.00	**0.63[f]**	**1.92**	**0.00**
Access Roads													
Access Roads	Jefferson (Galv)	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
	Orange (Galv)	0.00	0.09	0.00	0.00	**0.09**	0.00	0.29	0.00	0.00	**0.29**	**0.09**	**0.29**
	Cameron (Galv and N.O.)	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Project Summary													
Project Total[g]		**104.54**	**43.40**	**0.23**	**11.09**	**159.26**	**51.28**	**17.99**	**0.00**	**5.54**	**74.81**	**234.07**	**2.21**
Galveston District Total		**81.51**	**43.40**	**0.23**	**11.09**	**136.23**	**38.71**	**17.99**	**0.00**	**5.54**	**62.24**	**200.09**	**0.59**

TABLE 3-2
Summary of Wetlands Affected by the Project

Facility	County/ Parish (USACE District)	Construction[a] (acres)					Operation[b] (acres)					Total Temporary Wetland Impacts (acres)	Total Permanent Loss of Wetlands[c] (acres)
		E2EM	PEM	PSS	PFO	Total	E2EM	PEM	PSS	PFO	Total		
New Orleans District Total		**23.03**	**0.00**	**0.00**	**0.00**	**23.03**	**12.57**	**0.00**	**0.00**	**0.00**	**12.57**	**33.98**	**1.62**

Key:
E2EM - estuarine intertidal emergent
Galv – Galveston District
N.O. – New Orleans District
PEM - palustrine emergent
PSS - palustrine scrub-shrub
PFO - palustrine forested
ROW - right-of-way

Notes:
[a] Construction Acreage reflects wetlands in workspace affected during construction activities (TWS and ATWS; excludes operational ROW); Wetlands disturbed will be allowed to natural revegetate and return to preconstruction conditions.
[b] Operational acreage reflects wetlands in new 50-foot wide permanent ROW to be acquired, except in areas which wetlands will be avoided by HDD, as listed in **Appendix E** of this application. E2EM and PEM wetland types will be allowed to revert to pre-construction vegetation conditions. PFO wetlands within the permanent ROW will be converted to PEM wetlands; however, there will be no permanent loss of wetlands.
[c] Permanent loss of wetlands will result in aboveground facility expansion areas at Station 501, MLV sites, and new permanent access roads. The BMOP Pump Station site is proposed to be developed as part of the NT Buildout Project, which is anticipated to commence in January 2021, prior to construction of the BMOP Project. Therefore, the site will consist of developed land and will not result in wetland impacts.
[d] The maintenance of the permanent ROW will result in the permanent function conversion of 5.54 acres of PFO wetlands to PEM wetlands
[e] The 0.18 acre of PFO wetlands within the staging areas will be avoided during construction
[f] Mainline work at the Stingray Tap Removal Site and Station 701 will include ATWS (construction impact) and Stingray Mainline permanent ROW (i.e., temporary impacts in the operational ROW). These wetland areas will be restored to preconstruction conditions.
[g] Totals may not match sum of addends due to rounding.

4.0 SURFACE WATERS

The construction of the onshore and offshore portions of the Project will result in impacts to waters of the U.S., which also include some Section 10 waters.

The offshore facilities are located in Louisiana state waters and federal waters. State waters extend three nautical miles from the coastline, which is at approximately at MP 8 of the existing Stingray Mainline that extends from Station 501 to WC 509. The Applicant is not proposing any construction within state waters that would result in impacts to coastal resources or waters of the U.S. The remainder of the offshore facilities are in federal waters, approximately 99 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.

The onshore Project area is located within the Sabine Lake watershed (Hydrologic Unit Code [HUC] 12040201), Lower Neches watershed (HUC 12010005), and lower Calcasieu watershed (HUC 08080206) (USGS, 2019).

4.1 WATERBODY IMPACTS

4.1.1 Onshore Facilities

During the biological field surveys, waterbodies in the survey area were classified by the following NWI classifications:

- Estuarine, Subtidal, Unconsolidated Bottom – Unvegetated tidal habitats with continuously submerged substrate (unvegetated);
- Palustrine, Unconsolidated Bottom – Unvegetated natural drainage feature or pond;
- Palustrine, Unconsolidated Bottom, Excavated – Unvegetated excavated drainage feature; and
- Riverine, Lower Perennial Unconsolidated Bottom – Unvegetated natural drainage feature.

Appendix G contains a mapbook that shows the location of all of the waterbodies crossed by the onshore pipeline.

Appendix F contains a detailed table of all waterbody crossings by the Project and the proposed crossing method and subsequent impact total for each waterbody. The construction of the onshore pipeline will not result in permit fill in waterbodies.

Construction of the pipeline will result in temporary impacts to waterbodies from vegetation clearing, grading, excavation, and filling. To install pipelines under waterbodies, the Applicant will adopt the standard open-cut crossing method, lay barge method, push/pull technique, or the HDD crossing method. **Table F-1** identifies the crossing method for every waterbody crossed by the pipeline. **Table 1-2** identifies the location of the proposed HDD crossing of waterbodies by the pipeline.

Use of trenchless crossing methods including HDD will not involve any permanent dredge or fill impacts to waters of the U.S. Open-cut and push/pull crossings of waterbodies will be implemented using the same methodology as described in Section 3.0 of this application.

Sabine Lake is the largest waterbody crossed by the pipeline, as approximately 12 miles of the route is located within the Sabine Lake. True seagrasses are not found in Sabine Lake (or the Neches River). Wigeon grass a submerged aquatic is sometimes considered a seagrass and does occur in Sabine Lake where it is found in bays and offshore of brackish marshes (USFWS, 2013; Guillen, et al., 2015). Its distribution and abundance within the lake has apparently not been mapped or quantified (Radloff et al., 2013). Benthic habitat surveys have been conducted for the onshore pipeline. No wigeon grass or other submerged aquatic vegetation was found within the onshore pipeline ROW or within 500 feet of the workspace. Details of the survey methods and the survey results are provided in Appendix D-3 of Volume IIb of the Project's DWP Application.

The installation of pipeline across Sabine Lake will use a variety of construction methods including barge lay method (to cross open water), HDD method (to cross the Gulf Intracoastal Waterway (GIWW), northern shoreline, and a foreign pipeline), and the push/pull technique at the southern enter and exit shoreline of Sabine Lake. As depicted in the typical Sabine Lake construction corridor configuration drawing in **Appendix H**, the construction ROW will be 300 feet wide and the permanent ROW will be 50 feet wide. The pipeline will enter the lake along its northern shoreline via an HDD and will exit the lake along its southern shoreline via the push/pull crossing technique. With the exception of the northern shoreline, GIWW, and an existing foreign pipeline crossing which will be crossed via HDD, the remaining pipeline will be trenched into the Sabine Lake bottom using the barge lay method with a minimum depth of cover of four feet.

The barge lay method will be required for pipeline sections located in open water in Sabine Lake as it eliminates the need for land-based equipment and fill. In open water construction at Sabine Lake, the pipeline trench will be excavated using a barge-mounted clam-bucket (or equal) dredge and spoil materials will be sidecast and stored temporarily alongside the trench. Pipe segments will be coated with concrete and then loaded onto pipe barges and transported via tugboat to the lay barges positioned above the trench. Pipe will be offloaded to the lay barges where it will be stored until it can be welded onto the end of the pipeline string. While on the lay barge, pipe segments will be welded, coated, and non-destructively tested then the pipeline will be filled with water and sunk into the trench. The trench will be backfilled with spoil as the lay barges move down the line. Following backfill, the construction ROW will be restored to pre-construction condition and contours.

The existing foreign pipeline on the bottom of Sabine Lake will be crossed using the HDD method. A spud barge with an HDD rig and drilling fluid tanks will install the pipeline to a depth of at least 20 feet below the foreign pipeline. Support barges, one storing water for the drilling fluid tanks and the other bringing water from a freshwater source, will accompany the spud barge. Similar to the procedure described above for land-based HDDs, a lay barge will assemble the pipeline for pullback, coat and test the pipeline, fill it with water, and sink it into place. Once pulled through the bore hole, the pipeline on each side of the HDD will be brought to the surface for tie-in, coating, and testing.

The Project's push sites will be both land-based and water-based. Push sites in open-water areas will consist of several shallow-draft spud barges connected together to provide a working platform. At the push site, various pipeline operations will take place, including pipe make-up, welding, non-destructive testing, joint coating and coating repairs, and installation of flotation apparatus. Where there is standing water, only enough clearing and trenching will be done to accommodate installation of the pipe. Each excavator used will have a lateral reach sufficient to place spoil within the 300-foot-wide construction ROW. Pipe stringing and lowering in the push lay method will be similar to that described in the conventional lay method.

4.1.2 Section 10 Waters

The Project will cross four waterbodies regulated under Section 10: the Neches River, GIWW, Sabine Lake, and the GOM. The onshore pipeline will cross the Neches River, GIWW, and Sabine Lake and impacts to these waterbodies are discussed above in Section 4.1.

The construction of the offshore portion of the Project will result in temporary and permanent impacts to the Section 10 waters (i.e., GOM) due to the installation of the new structures in support of the DWP as described in Section 1.2.2.

The two Crude Oil Loading Pipelines, approximately 4,710 and 6,085 feet long that will be installed from the WC 509 Platform Complex to the PLEM and CALM locations, one for each PLEM and CALM Buoy. The pipelines will be laid on the seafloor using a typical pipelay barge using anchors then will be buried to a minimum of three feet below the natural seafloor from the top of the pipe using a jet sled. Installation of the two pipelines will result in temporary impacts and backfilling of the trench will occur via natural wave action.

The two CALM Buoys will be installed at separate locations in proximity to the PLEMs and will result in minor permanent impacts. The two CALM Buoys will be secured in location by an anchor and associated anchor chain. The PLEMs will be installed on foundation piles or mudmats to distribute the weight of the PLEM to the seafloor. The anchors will be installed via pile driving with the final anchor locations, size of chains, pile diameter, and piling depth to be determined by the CALM Buoy provider during detailed design.

5.0 FEDERALLY LISTED SPECIES AND ESSENTIAL FISH HABITAT

5.1 FEDERALLY LISTED SPECIES

Federally listed species under the protection of the ESA in the vicinity of the onshore portion of the Project were identified by a review of publicly available databases and through coordination with federal resource agencies. The Applicant used the USFWS Environmental Conservation Online System Information, Planning, and Conservation (IPaC) System consultation tool (USFWS, 2020) to generate a species list to fulfill the requirements of Section 7 of the ESA. The Applicant also consulted with USFWS Louisiana Ecological Services Field Office on February 12, 2020 and USFWS Texas Coastal Ecological Services Field Office on March 5, 2020. Following the initial consultation meetings, field surveys were conducted within the footprint of the onshore pipeline to evaluate the potential for the onshore Project area to support federally listed threatened and endangered species.

Based on agency consultation and data obtained from the USFWS IPaC System consultation tool (USFWS, 2020), nine federally listed threatened and endangered species and one candidate (proposed threatened) species may occur within the counties or parishes affected by the onshore pipeline (see **Table 5-1)** and 19 federally listed species may occur in the footprint of the offshore facilities (see **Table 5-2**). Based on the available habitat within the footprint of the onshore pipeline and biology of each species, the Project is not anticipated to adversely affect any federal listed species protected under the ESA. A more detailed assessment of the onshore pipeline's potential impact to federally listed threatened and endangered species can be found in Topic Report 5 of Volume IIb of the Project's DWP Application and a detailed discussion of the offshore facilities' potential impact to federally listed species can be found in Topic Report 6 of Volume IIa of the Project's DWP Application.

The final effects determination of the construction and operation of the Project on federally listed species will be made during MARAD's and USCG's Section 7 consultation with USFWS and NOAA Fisheries.

TABLE 5-1
Federally Listed Threatened and Endangered Species Potentially Occurring in the Footprint of the Onshore Pipeline

Common Name/ Scientific Name	Listing County/ Parish	Federal Status	Habitat Requirements	Potential to Occur in Footprint of the Onshore Pipeline	Preliminary Effects Determination
Birds					
Eastern black rail (*Laterallus jamaicensis jamaicensis*)	Jefferson County, TX and Cameron Parish LA	C PT[a]	Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of *Salicornia*	May Occur (Non-Nesting)	Not likely to jeopardize the continued existence of the species
Piping plover (*Charadrius melodus*)	Jefferson County, TX and Cameron Parish LA	T[a]	Breeding habitat is in the northern great plains, the shorelines of the great lakes, and the Atlantic coast. Wintering habitat consists of intertidal beaches and mudflats with sparse to no vegetation. Critical Habitat for his species is crossed by the existing Stingray Mainline.	May Occur (Non-Nesting)	May affect, not likely to adversely affect
Red knot **(***Calidris canutus rufa***)**	Jefferson and Orange County, TX and Cameron Parish LA	T[a]	Inhabits seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Winters along the Gulf Coast July-October.	May Occur (Non-Nesting)	May affect, not likely to adversely affect
Whooping crane (*Grus americana)*	Jefferson and Orange County, TX Cameron Parish LA	NEP-LA E-TX[a]	Inhabits salt marshes dominated by salt grass, dry prairies, and cypress or oak forests. Uses potholes surrounded by bulrush for nesting.	May Occur (Non-Nesting in Project Area)	May affect, not likely to adversely affect
Mammals					
West Indian manatee *(Tricheceus manatus latirostri)*	Jefferson and Orange County, TX and Cameron Parish LA	T[b]	Inhabits tropical and subtropical estuaries, freshwater rivers, and coastal waters. Relies on access to natural springs or warm freshwater ponds that contain aquatic vascular vegetation. They seek out quiet areas in riverine habitat for feeding, resting, mating, and nursing.	Unlikely to occur	May affect, not likely to adversely affect
Reptiles					

TABLE 5-1
Federally Listed Threatened and Endangered Species Potentially Occurring in the Footprint of the Onshore Pipeline

Common Name/ Scientific Name	Listing County/ Parish	Federal Status	Habitat Requirements	Potential to Occur in Footprint of the Onshore Pipeline	Preliminary Effects Determination
Green sea turtle (*Chelonia mydas*)	Jefferson County, TX	T	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June.	May Occur (Not known to nest in Project Area)	May affect, not likely to adversely affect
Hawksbill sea turtle *(Eretmochelys imbricata)*	Jefferson County, TX and Cameron Parish LA	E	Nests from April to November on tropical and subtropical undisturbed deep sand beaches. Females climb over reefs and rocks to nest in beach vegetation. Nests nocturnally up to five times a season in 14-day intervals.	May Occur (Not known to nest in Project Area)	May affect, not likely to adversely affect
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	Jefferson County, TX and Cameron Parish LA	E	Nests from April to July on tropical and subtropical soft sand beaches that are backed by dunes in Texas and Mexico. Nests diurnally up to 3 times a season in 14- to 28-day intervals.	May Occur (Not known to nest in Project Area)	May affect, not likely to adversely affect
Leatherback sea turtle *(Dermochelys coriacea)*	Jefferson County, TX and Cameron Parish LA	E	Nests from March to July on tropical and temperate sandy beaches backed with vegetation and in close proximity to deep rough seas. Beaches must be sloped sufficiently so that the distance to dry sand is limited.	May Occur (Not known to nest in Project Area)	May affect, not likely to adversely affect
Loggerhead sea turtle (*Caretta caretta)*	Jefferson County, TX and Cameron Parish LA	T	Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November.	May Occur (Not known to nest in Project Area)	May affect, not likely to adversely affect

Sources: USFWS, 2020a

Key:

C - candidate

E - endangered

T - threatened

TABLE 5-1
Federally Listed Threatened and Endangered Species Potentially Occurring in the Footprint of the Onshore Pipeline

Common Name/ Scientific Name	Listing County/ Parish	Federal Status	Habitat Requirements	Potential to Occur in Footprint of the Onshore Pipeline	Preliminary Effects Determination

LA - Louisiana
NEP - non-essential experimental population
NL - not listed
PT - proposed threatened
TX – Texas

Notes:

[a] Species protected under Migratory Bird Treaty Act

[b] Species protected under Marine Mammal Protection Act

[c] Impacts are identified based on the potential for the species to occur within or in proximity to the construction footprint of the onshore pipeline.

TABLE 5-1
Federally Listed Threatened and Endangered Species Potentially Occurring in the Footprint of the Offshore Facilities

Common Name (Scientific Name)	Federal Status	Potential to Occur in Footprint of the Offshore Facilities	Preliminary Effects Determination
Mammals			
West Indian manatee *(Tricheceus manatus latirostri)*	T	Unlikely to Occur	*May affect, not likely to adversely affect*
Fin whale (*Balaenoptera physalus*)	E	Very unlikely to Occur	*No effect*
GOM Bryde's whale (*Balaenoptera edeni*)	E	Very unlikely to Occur	*No effect*
North Atlantic right whale (*Eubalaena glacialis*)	E	Very unlikely to Occur	*No effect*
Blue whale (*Balaenopter musculus*)	E	Very unlikely to Occur	*No effect*
Sei whale (*Balaenoptera borealis*)	E	Very unlikely to Occur	*No effect*
Sperm whale (*Physeter microcephalus*)	E	Unlikely to Occur	*May affect, not likely to adversely affect*
Birds			
Piping plover (*Charadrius melodus*)	T	May Occur	*May affect, not likely to adversely affect*
Red knot **(***Calidris canutus rufa***)**	T	May Occur	*May affect, not likely to adversely affect*
Reptiles			
Green sea turtle North Atlantic DPS[a] (*Chelonia mydas*)	T	May Occur	*May affect, not likely to adversely affect*
Hawksbill sea turtle *(Eretmochelys imbricata)*	E	Unlikely to Occur	*May affect, not likely to adversely affect*
Kemp's Ridley sea turtle (*Lepidochelys kempii***)**	E	Known to Occur	*May affect, not likely to adversely affect*
Loggerhead sea turtle (*Caretta caretta)*	T	Known to Occur	*May affect, not likely to adversely affect*
Leatherback sea turtle *(Dermochelys coriacea)*	E	Known to Occur	*May affect, not likely to adversely affect*
Marine Fish			
Giant manta ray (*Manta birostris*	T	Very unlikely to Occur	*No effect*
Oceanic whitetip shark (*Carcharhinus longimanus*)	T	Very unlikely to Occur	*No effect*
Smalltooth sawfish (*Pristis pectinate*)	E	Very unlikely to Occur	*No effect*
Gulf sturgeon (*Acipenser oxrhynchus desiotoi*)	T	Very unlikely to Occur	*No effect*
Dwarf seahorse (*Hippocampus zosterae*)	C	Very unlikely to Occur	*No effect*

Key:
C - candidate
DPS - distinct population segment
E - endangered
GOM - Gulf of Mexico
T - threatened

5.2 ESSENTIAL FISH HABITAT

An initial Essential Fish Habitat (EFH) Assessment, which evaluated the impacts to EFH and managed species as a result of construction and operation of the Project, was prepared by the Applicant and can be found as Appendix D of Volume IIa of the Project's DWP Application. The following is a summary of the EFH Assessment.

Under the Magnuson-Stevens Fisheries Conservation and Management Act, EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC § 1802(10)), and NOAA Fisheries promotes the protection of EFH in review of projects conducted under federal permits, licenses, or authorities that have the potential to impact EFH. Species are managed by NOAA Fisheries under fishery management plans (FMPs), with some FMPs including groups of species with similar life histories and habitats. FMPs have been developed and EFH designated for several groups of species in the Gulf of Mexico, including red drum (*Sciaenops ocellatus*), coastal migratory pelagic species, reef fish, and shrimp. EFH for highly migratory species, such as tunas, sharks, and billfish, is described under a separate FMP, due to similar life history and migratory habits.

EFH from five of the managed fisheries (Shrimp FMP, Red Drum FMP, Reef Fish FMP, Coastal Migratory Pelagics FMP, and Highly Migratory Species FMP) in the GOM occurs in the northern GOM where the Project is located. EFH for red drum occurs only in estuarine (inshore) portions of the Project area. EFH for three of the fisheries—shrimp, reef fish, and coastal migratory pelagics—encompasses much of the continental shelf in the northcentral GOM including all of the offshore Project area as well as the inshore Project area. The Highly Migratory Species FMP provides for management of a large number of species including many species of tuna, billfish, and sharks. EFH for most of the highly migratory species is located off the continental shelf and outside the Project area; however, EFH for a number of shark species encompasses portions of the shelf and the Project area. A full description of the FMP that overlap the Project area can be found in the Project's EFH Assessment (Appendix D of Volume IIa of the Project's DWP Application).

TABLE 5-3
Designated Essential Fish Habitat in the Vicinity of the Project Area

Fishery	Within Northcentral Gulf of Mexico[a,b]	Within Inshore Project Area[a,c]	Within Offshore Project Area[a,d]
Coral	Yes	No	No[e]
Shrimp	Yes	Yes	Yes
Spiny lobster	No	No	No
Red drum	Yes	Yes	No
Coastal migratory pelagics	Yes	Yes	Yes
Reef fish	Yes	Yes	Yes
Highly migratory species	Yes	Yes[f]	Yes[f]

Notes:

[a] EFH as depicted by NOAA EFH mapper at: https://www.habitat.noaa.gov/application/efhmapper/index.html

[b] Northcentral GOM includes waters of continental shelf offshore of western Louisiana and eastern Texas.

[c] Inshore Project area includes Sabine Lake and all other lakes and streams traversed by the onshore portions of th Project;

[d] Offshore Project area includes only continental shelf waters in the northcentral GOM.

[e] All coral EFH is located >34 miles from Project footprint.

[f] Group includes numerous species; Project area is within EFH for some species and outside of EFH for other species.

5.2.1 EFH Habitats

Within the Project footprint, there are four EFH habitat types: emergent marsh, sand/shell bottoms, soft bottoms, and water column associated. The following is a description of the four EFH habitats and a detailed discussion of how the presence or absence of EFH habitat types within the Project footprint was determined is in Section 4.1 of the EFH Assessment (Appendix D of Volume IIa of the Project's DWP Application).

5.2.1.1 *Emergent Marshes*

Most of the eastern and northern shores of Sabine Lake consists of emergent marsh of two types: brackish marsh found along most of the eastern shoreline and intermediate marsh at the north end of the lake. Brackish marsh is dominated by emergent, salt-tolerant, herbaceous vegetation where salinities average about 8 parts per thousand. The dominant species in this habitat type is marsh hay cordgrass (*Spartina patens*), with varying densities of salt grass (*Distichlis spicata*), three-cornered grass (*Schoenoplectus olneyi*), saltmarsh bulrush (*S. robustus*), dwarf spikerush (*Eleocharis parvula*), seashore paspalum (*Paspalum vaginatum*), black needlerush (*Juncus roemarianus*), coastal water-hyssop (*Bacopa monnieri*), smooth cordgrass (*Spartina alterniflora*), and hogcane (*Spartina cynosuroides*) (Lester et al., 2005). Intermediate marshes occur between fresh marsh and brackish marsh, with salinities between 3 and 10 ppt. Dominant emergent plant species include marsh hay cordgrass, roseau cane (*Phragmites australis*), bulltongue (*Sagittaria lancifolia*), coastal water-hyssop, *Eleocharis* spp., three-cornered grass, bullwhip (*Schoenoplectus californicus*), and *S. americanus* (LNHP, 2009; Lester et al., 2005; USFWS, 2013). Alligator weed (*Alternanthera philoxeroides*) is a common exotic invader in this habitat type (USFWS, 2013).

The onshore pipeline crosses approximately 8.6 miles of emergent marsh including the shoreline crossings of Sabine Lake. The northern shore crossing of the onshore pipeline in Sabine Lake will be installed using HDD crossing method to avoid impacts to adjacent marsh and existing breakwaters.

5.2.1.2 *Soft Bottom and Sand / Shell*

Soft bottom habitats are areas where the sediments are unconsolidated and consist of silt, clay, and sand. These habitats encompass most of the GOM seafloor and Sabine Lake water bottom. Bottom substrate of the inner continental shelf in coastal waters is described in Section 4.2 of Topic Report 4, "Marine Environment" (Volume IIa of the Project's DWP Application). Demersal fish fauna assemblages have affinities to sediment type and water depth and have been described that way based on the common shrimp species. The pink shrimp grounds are located over the calcareous sediments found east of DeSoto Canyon and along the Florida shelf. The terrigenous sediments west of the canyon out to a depth of 66 feet where finer sediments prevail are termed the white shrimp grounds, and brown shrimp grounds are located in coarser sediments offshore in water depths of 66 to 197 feet (Chittenden and McEachran, 1976; Gallaway, 1981).

The Gulf of Mexico Fishery Management Council (GMFMC [2004]) developed both detailed and summarized maps of GOM sediments, which indicate the entire offshore Project area is located in soft bottom habitats consisting of silty clay, sand/silt/clay, sandy silt, and sand. Project surveys indicate that the Project area within Sabine Lake is also within soft bottom habitats.

5.2.1.3 *Water Column Associated*

Pelagic or water column habitat exists wherever there is estuarine, nearshore, or offshore habitat. The estuarine habitat zone extends landward to the estuarine/freshwater interface, as identified by GMFMC using the National Wetlands Inventory and seaward to the GOM shoreline or barrier islands. The nearshore zone extends from the estuarine zone seaward to the 10-fathom or 60-foot isobath, and the offshore zone extends from the nearshore zone out to the 100-fathom isobath.

5.2.2 Potential Effects to EFH

Construction of the Project, including both the onshore and offshore facilities, will result in impacts to EFH. These impacts may result from construction activities for the onshore pipeline such as trenching, drilling, and hydrostatic testing and from construction activities for the DWP such as pile driving, jet sledding, hydrostatic testing, anchoring, and increased vessel traffic. These construction activities could result in adverse impacts to EFH due to increased turbidity and sedimentation, increased noise, increased vessel traffic, entrapment, inadvertent spills, etc. These potential impacts to EFH are discussed in detail in the Project's EFH Assessment (Appendix D of Volume IIa of the Project's DWP Application), as well as the mitigation measures that will be implemented to avoid or minimized the potential impacts.

6.0 CULTURAL RESOURCES

The Project is being reviewed under Section 106 of the National Historic Preservation Act (NHPA), as amended, and under NEPA. Prior to authorizing or undertaking a project, Section 106 of the NHPA requires federal agencies to take into account the effect of that undertaking on cultural resources listed or eligible for listing on the National Register of Historic Places (NRHP) and afford the Advisory Council for Historic Preservation an opportunity to comment on the undertaking. The Section 106 compliance process is coordinated on the state level by the State Historic Preservation Office (SHPO), represented in Texas by the Texas Historical Commission (THC) and in Louisiana by the Louisiana Office of Cultural Development (LOCD). The MARAD and USCG, as the joint lead federal agencies for the Project, must consult with the SHPO for each state and appropriate federally recognized Native American tribes regarding the effects of the Project on archaeological resources and historic properties.

Cultural resource investigations were conducted along the onshore pipeline route. These investigations were designed to identify all cultural resources (i.e., archeological sites, isolated finds, historic standing structures, and cemeteries) located within or immediately adjacent to the proposed onshore pipeline route that may be impacted adversely as a result of the planned undertaking. Prior to conducting field surveys, an initial desktop analysis was conducted. The initial data analysis included a review of available historical maps and aerial photographs; examination of applicable sources at local and regional archives and other relevant public records; detailed review of the online Texas archeological site files maintained by the THC, the site files maintained by the Louisiana Division of Archaeology, the NRHP files for both Texas and Louisiana, and cemetery databases. The intent of this literature search was to identify previously recorded archeological sites, historic standing structures, historic cemeteries, and NRHP properties located within or adjacent to the proposed onshore pipeline corridor. The collected information then was used to develop the project-specific archeological and historic contexts to employ during the assessment of the significance of any cultural resources identified within the Project area.

In Texas, archeological field survey included airboat survey, pedestrian survey, and systematic and/or judgmentally-placed shovel testing, when possible, within 200 meters (m) of all wetlands and water crossings, as well as within 100m of all known archeological sites. Within the Lower Neches Wildlife Management Area, airboat survey as well as pedestrian survey and systematic and/or judgmentally-placed shovel testing was completed, when possible, along the entire length of the pipeline ROW. Shovel tests were spaced at 50-m intervals along three parallel survey transects spaced 30 m apart within those portions of the pipeline ROW that were determined to possess a high probability of containing cultural deposits. Those portions of the investigated onshore pipeline corridor that are inundated were examined via airboat.

Shovel tests within the low probability segments of the pipeline ROW were placed at 100-m intervals along three parallel survey transects spaced 30 m apart. Those portions of the proposed pipeline ROW that cross inundated private property were examined by employing an airboat along the inundated segments.

In Louisiana, airboat survey as well as pedestrian survey and systematic and/or judgmentally-placed shovel testing, when possible, was conducted along the entire length of the onshore pipeline corridor. Access to this portion of the pipeline corridor was only possible by airboat. Within the pipeline corridor, visual inspection and pedestrian survey was augmented by the systematic and/or judgmentally-placed excavation of shovel or auger tests, where possible, at elevated landforms or other features. Some areas located along the pipeline corridor were heavily eroded and inundated to such an extent that shovel or auger testing could not be conducted. These areas were visually inspected from the airboat for cultural material and/or possible features. Shovel tests were not excavated in areas that contained standing water or in areas characterized by excessive disturbance. Within the bounds of the single previously identified cultural resource, shovel testing was conducted at 10-m intervals, when possible.

Within Sabine Lake, a detailed cultural resources analysis of all remote sensing data was conducted. All data were analyzed using currently acceptable scientific methodologies. The data then were correlated with a variety of shipwreck databases, geomorphic and historical research results, nautical charts, and any observations noted in survey logs during data collection. Submerged cultural resources include shipwrecks and disposal sites, and submerged prehistoric and historic archaeological sites. These objects and deposits normally can be detected with a remote sensing array that includes a marine magnetometer, side scan sonar, and a sub-bottom profiler.

Results of the pedestrian and airboat surveys within Texas and Louisiana did not identify any sites within the survey corridor that are eligible for listing under the NRHP. Additionally, the archeological evaluation of Sabine Lake did not identify any relict geomorphic features deemed potentially archaeologically significant within the survey corridor for the onshore pipeline.

Results of the cultural resource investigation of the onshore pipeline will be presented to the SHPOs for their concurrence. The offshore cultural resource investigation will be filed with MARAD/USCG and Bureau of Safety and Environmental Enforcement for their review. No cultural resources were identified within the offshore Project footprint.

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APPENDIX A –
WETLAND DETERMINATION REPORT

Blue Marlin Offshore Port Project
Wetland Determination Report
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Prepared For:

Blue Marlin Offshore Port LLC

On Behalf Of:
EXP Energy Services, Inc.

Prepared By:
Benchmark Ecological Services, Inc.

August 3, 2020

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1.0 Introduction

EXP Energy Services, Inc., on behalf of its client, Blue Marlin Offshore Port LLC, contracted with Benchmark Ecological Services, Inc. (Benchmark) to conduct a wetland determination study for the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico to provide United States (U.S.) crude oil loading services onto very large crude carriers (and other crude oil carriers) for export to the global market. The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. Oil for export will be transported out of the existing storage facility, Nederland Terminal which is owned by Sunoco Partners Marketing and Terminals, L.P. (Sunoco Terminals) and located in Nederland, Jefferson County, Texas. This report summarizes wetland determination efforts on approximately 40 miles of proposed pipeline and access routes for the Project starting in Jefferson and Orange Counties, Texas, and ending in Cameron Parish, Louisiana (Appendix A, Figure 1).

The objectives of this study were to determine the presence of wetlands and other jurisdictional habitats located within the boundaries of the survey area and to delineate the boundaries of identified wetlands according to the U.S. Army Corps of Engineers (USACE) guidelines. The survey area is approximately 300 feet in width as depicted in Figure 5 (Appendix A). Benchmark initiated a background investigation of the proposed survey area in February 2020 and conducted the field investigation from 3 March to 6 March, 27 May to 28 May, 1 June to 3 June, and 10 June 2020. Field delineations followed guidelines from the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (the Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region* (Version 2.0) (the Supplement). The following is a summary report describing the methods and findings of the study.

2.0 Methods

During the study, Benchmark reviewed background information and conducted a site characterization and wetland delineation.

2.1 Background Information

Benchmark obtained background information for the survey area from the following sources:

- Aerial Photographs,
- National Wetlands Inventory (NWI) Maps (Appendix A, Figure 2),
- Jefferson and Orange County, and Cameron Parish National Resources Conservation Service (NRCS) Soil Surveys (Appendix A, Figure 3),
- United States Geological Survey (USGS) Topographic Maps (Appendix A, Figure 4),
- Federal Emergency Management Agency (FEMA) Floodplain Data (Appendix A, Figure 4), and
- Local Hydric Soils Lists.

Figures are presented in Appendix A, and soils data are presented in Appendix B.

2.2 Site Characterization

Benchmark conducted field surveys throughout the entire survey area to evaluate vegetation, hydrology, and soils for wetland characteristics. Benchmark utilized airboats and unmanned aerial vehicles (UAVs) to collect data where pedestrian surveys could not be performed. A portion of the project area located between mile marker 0 and 0.75 in Jefferson County was previously permitted by Sunoco Terminals under permit #SWG-2007-01401 and was not included in this survey effort (Appendix A, Figure 5).

2.2.1 Vegetation Habitat Mapping

Benchmark used site maps and knowledge generated from background information to identify major vegetation communities during the field investigation. Aerial photographs were employed in the identification, verification, and mapping of community boundaries. Benchmark used a differential global positioning system (DGPS) to record plot locations and wetland community boundaries. Additionally, Benchmark captured drone imagery along the proposed route to aid in identifying vegetation communities and to document subsided marsh areas in Texas and Louisiana.

2.3 Wetland Delineation

Benchmark evaluated areas identified as potential wetlands during the initial background and site characterizations to determine whether they satisfied the three wetland criteria established by the Manual and the Supplement (hydrophytic vegetation, wetland hydrology, and hydric soils). Benchmark selected a representative sample plot within the survey area and analyzed hydrology, soils and vegetation within the plot. Benchmark made wetland determinations for each sample plot based on the evaluation results. Data were recorded on Routine Wetland Determination Forms (Appendix C).

2.4 Documentation

Detailed field notes recorded during the field investigation include, at a minimum, the following information:

- Project name, date, and personnel,
- Notes on plant communities,
- Notes on hydrologic features (*i.e.*, ditches, depressions, standing water, and surface soil saturation conditions, etc.),
- Notes on soils, and
- Photographs documenting field conditions and habitat characteristics (Appendix D).

All location coordinates were recorded using a DGPS programmed to record points only when the following criteria were satisfied (based on USACE Standard Operating Procedures for Recording Jurisdictional Determinations Using Global Positioning Systems):

- Minimum of 4 satellites,
- PDOP (Position Dilution of Precision) value no greater than 6, and
- All data recorded and reported in NAD 1983 Decimal Degrees with a degree of precision six digits past the decimal point.

All DGPS data were post-processed to sub-meter accuracy and are presented in electronic format (including ArcView shapefiles) on compact disc (Appendix E).

3.0 Results

Following are the combined results of the Background Information Review, Site Characterization, and Wetland Determination studies.

3.1 Background Information Review

NWI designated wetlands observed within the review area include 45 mapped types. Descriptions of the NWI Classifications are presented in Table 1.

Table 1 - Review Area NWI Classification

Cowardin Classification	Habitat Description
E1AB3L	Estuarine, Subtidal, Aquatic Bed, Rooted Vascular, Subtidal, Wetland
E1UBL	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal
E1UBL5	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal, Mesohaline (Brackish)
E1UBLx	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal, excavated
E2AB3M	Estuarine, Intertidal, Aquatic Bed, Rooted Vascular, Irregularly exposed, Wetland
E2AB4M	Estuarine, Intertidal, Aquatic bed, Floating Vascular, Irregularly exposed, Wetland
E2EM1N	Estuarine, Intertidal, Emergent, Persistent, Regularly flooded, Wetland
E2EM1Ns	Estuarine, Intertidal, Emergent, Persistent, Regularly flooded, Spoil, Wetland
E2EM1P	Estuarine, Intertidal, Emergent, Persistent, Irregularly flooded, Wetland
E2EM1Ps	Estuarine, Intertidal, Emergent, Persistent, Irregularly flooded, Spoil, Wetland
E2EM5P	Estuarine, Intertidal, Emergent, *Phragmites australis*, Irregularly flooded, Wetland
E2EM5Ps	Estuarine, Intertidal, Emergent, *Phragmites australis*, Irregularly flooded, Spoil, Wetland
E2SS1P	Estuarine, Intertidal, Scrub-Shrub, Broad-Leaved deciduous, Irregularly flooded, Wetland
E2SS1Ps	Estuarine, Intertidal, Scrub-Shrub, Broad-Leaved deciduous, Irregularly flooded, Spoil, Wetland
E2SS3P	Estuarine, Intertidal, Scrub-Shrub, Broad leaved evergreen, Irregularly flooded, Wetland

Table 1 - Review Area NWI Classification (Cont.)

Cowardin Classification	Habitat Description
E2USM	Estuarine, Intertidal, Unconsolidated shore, Irregularly exposed
PEM1A	Palustrine, Emergent, Persistent, Temporarily flooded, Wetland
PEM1Ah	Palustrine, Emergent, Persistent, Temporarily flooded, Diked/Impounded, Wetland
PEM1C	Palustrine, Emergent, Persistent, Seasonally flooded, Wetland
PEM1Cd	Palustrine, Emergent, Persistent, Seasonally flooded, Partly Drained/Ditched, Wetland
PEM1Ch	Palustrine, Emergent, Persistent, Seasonally flooded, Diked/Impounded, Wetland
PEM1Fh	Palustrine, Emergent, Persistent, Semipermanently flooded, Diked/Impounded, Wetland
PEM1R	Palustrine, Emergent, Persistent, Seasonally Flooded-tidal, Wetland
PEM1T	Palustrine, Emergent, Persistent, Semipermanently Flooded-tidal, Wetland
PFO1A	Palustrine, Forested, Broad leaved deciduous, Temporarily flooded, Wetland
PFO1Ax	Palustrine, Forested, Broad leaved deciduous, Temporarily flooded, excavated, Wetland
PFO1C	Palustrine, Forested, Broad leaved deciduous, Seasonally flooded, Wetland
PFO1R	Palustrine, Forested, Broad leaved deciduous, Seasonally flooded-tidal, Wetland
PFO1S	Palustrine, Forested, Broad leaved deciduous, Temporarily flooded-tidal, Wetland
PFO1Ss	Palustrine, Forested, Broad leaved deciduous, Temporarily flooded-tidal, Spoil,Wetland
PFO4A	Palustrine, Forested, Needle Leaved Evergreen, Temporarily flooded, Wetland
PSS1A	Palustrine, Scrub-Shrub, Broad leaved deciduous, Temporarily flooded, Wetland
PSS1Ah	Palustrine, Scrub-Shrub, Broad leaved deciduous, Temporarily flooded, Dike/Impounded, Wetland
PSS1C	Palustrine, Scrub-Shrub, Broad leaved deciduous, Seasonally flooded, Wetland

Table 1 - Review Area NWI Classification (Cont.)

Cowardin Classification	Habitat Description
PSS1Cd	Palustrine, Scrub-Shrub, Broad leaved deciduous, Seasonally flooded, Partly Drained/Ditched, Wetland
PSS1S	Palustrine, Scrub-Shrub, Broad leaved deciduous, Temporarily flooded-tidal, Wetland
PSS3A	Palustrine, Scrub-Shrub, Broad leaved evergreen, Temporarily flooded, Wetland
PUBFh	Palustrine, Unconsolidated bottom, Semipermanently flooded, Diked/Impounded
PUBHx	Palustrine, Unconsolidated bottom, Permanently flooded, excavated
R1UBV	Riverine, Tidal, Unconsolidated bottom, Permanently flooded-tidal
R1UBVx	Riverine, Tidal, Unconsolidated bottom, Permanently flooded-tidal, excavated
R4SBC	Riverine, Intermittent, Streambed, Seasonally flooded
R4SBCx	Riverine, Intermittent, Streambed, Season ally flooded, excavated
R5UBFx	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently flooded, excavated
R5UBH	Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently flooded

The proposed route is located on a mixture of existing utility rights-of-way, estuarine marsh, and portions of Sabine Lake. The general drainage of the area is to the south and west. Many natural drainage laterals which facilitate drainage of surface water are present throughout the proposed route. Several significant waterbody crossings are located along the right-of-way (Appendix A, Figure 4). These include the Neches River and Sabine Lake. Portions of the survey area are located within the FEMA 100-year flood plain (Appendix A, Figure 4). The 2018 National Agriculture Imagery Program (NAIP) imagery exhibited potential wetland signatures in multiple locations throughout the survey area (Appendix A, Figure 2). Aerial photography indicates that the western portions of the survey area, located in Jefferson and Orange Counties, have been cleared in the past and are utilized as an existing pipeline right-of-way and maintained through periodic mowing. The eastern portion of the line in Cameron Parish is composed of primarily open marsh habitat. Review of the current US Department of Agriculture (USDA) soils data showed that the survey area includes 22 soil classifications for Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana. The survey area soil classifications for the project are listed in Table 2. Table 2 also indicates the soil classifications located within the survey area that are on the County and Parish Hydric Soils Lists. Descriptions of the soils are presented in Appendix B.

Table 2 - Review Area Soils

County/Parish	Symbol	Name	Hydric[1]
CAMERON PARISH	BA	Bancker muck, 0 to 0.2 percent slopes, very frequently flooded	Yes
	CR	Creole mucky clay	Yes
	Hb	Hackberry loamy fine sand	Yes
	Hm	Hackberry-Mermentau complex, gently undulating	Yes
	ME	Mermentau clay	Yes
	W	Water	N/A
JEFFERSON COUNTY	CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Yes
	NuC	Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	Yes
ORANGE COUNTY	BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Yes
	BbA	Barbary mucky clay, 0 to 1 percent slopes, frequently flooded	Yes
	CamA	Camptown silt loam, 0 to 1 percent slopes, frequently ponded	Yes
	CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Yes
	HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	Yes
	IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	Yes
	NuC	Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	Yes
	OrdB	Orcadia silt loam, 0 to 2 percent slopes, rarely flooded	Yes
	OriA	Orcadia-Anahuac complex, 0 to 1 percent slopes	Yes
	OrnA	Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded	Yes
	OsdA	Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded	Yes

Table 2 - Review Area Soils (Cont.)

County/Parish	Symbol	Name	Hydric[1]
ORANGE COUNTY	OsuB	Orcadia-Urban land complex, 0 to 2 percent slopes	No
	OsvB	Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded	No
	URLX	Urban land	No
	W	Water	N/A
	ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	Yes

[1] Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana Soil Survey, NRCS

3.2 Site Characterization

A site characterization survey was conducted from 3 March to 6 March, 27 May to 28 May, 1 June to 3 June, and 10 June 2020 to identify major vegetation communities and determine the presence of jurisdictional waters of the U.S., including wetlands.

3.2.1 Site Evaluation and Wetland Determination

Topography of the survey area ranged from gently sloping to nearly level. Vegetation varied from densely vegetated herbaceous grasslands and forests to fringe marsh and large subsided marsh complexes. The majority of the proposed route in Jefferson and Orange Counties follows existing cleared rights of way, and approximately 10 miles is located in Sabine Lake. The remaining eastern portion of the route in Cameron Parish is located in subsided marsh habitat. Land use varied but was predominantly agricultural in the form of farming, silviculture, and livestock production, as well as oil and gas production. Portions of the route in Orange County cross the Lower Neches Wildlife Management Area (WMA) which were comprised of marsh and lowland habitat. Natural drainage features consisted of intermittent stream segments, flowing perennial streams, and rivers. Site habitat and the major vegetative communities with typical vegetation found within the habitats identified in the survey area are presented in Table 3. Site habitat was further characterized using Cowardin classifications (Table 3) (Cowardin *et.al.*, 1979). Location of the wetlands and other jurisdictional waters of the U.S. identified during the field investigation are shown in Appendix A-Figure 5. Representative photographs of the habitats observed along the proposed route are presented in Appendix D.

Table 3 – Site Habitat Classification Descriptions

Classification	Habitat Description	Plant Species	Plant Common Names
E1UB	Estuarine, Subtidal, Unconsolidated Bottom	Unvegetated natural waterbody feature	N/A
E2EM	Estuarine, Intertidal, Emergent, Wetland	*Spartina alterniflora* *Phragmites australis* *Spartina patens* *Bolboschoenus robustus*	Smooth coordgrass Common reed Saltmeadow cordgrass Sturdy bulrush
PEM	Palustrine, Emergent, Wetland	*Alternanthera philoxeroides* *Cyperus virens* *Eleocharis cellulosa* *Eleocharis montevidensis* *Paspalum denticulatum* *Typha domingensis* *Zizaniopsis miliacea*	Alligator weed Green flatsedge Gulf Coast spikerush Sand spikerush Longtom Southern cattail Giant cutgrass
PEMx	Palustrine, Emergent, Wetland, excavated	*Typha latifolia* *Eleocharis montevidensis*	Broadleaf cattail Sand spikerush
PFO	Palustrine, Forested, Wetland	*Salix nigra* *Triadica sebifera* *Liquidambar styraciflua* *Chasmanthium laxum* *Eleocharis montevidensis* *Alternanthera philoxeroides*	Black willow Chinese tallow Sweet gum Slender woodoats Sand spikerush Alligator weed
PSS	Palustrine, Scrub-Shrub, Wetland	*Triadica sebifera* *Sagittaria latifolia*	Chinese tallow Broadleaf arrowhead
PUB	Palustrine, Unconsolidated Bottom	Unvegetated natural drainage feature	N/A
PUBx	Palustrine, Unconsolidated Bottom, Excavated	Unvegetated excavated drainage feature	N/A
R2UB	Riverine, Lower Perennial, Unconsolidated Bottom	Unvegetated natural drainage feature	N/A
UPL	Uplands	*Cynodon dactylon* *Stenotaphrum secundatum* *Rubus trivialis* *Nothoscordum bivalve* *Ilex vomitoria* *Pinus taeda* *Triadica sebifera*	Bermudagrass St. Augustine grass Southern dewberry Crowpoison Yaupon holly Loblolly pine Chinese tallow

3.3 Wetland Delineation

During the conduct of the study, in addition to performing observations on the entire survey area, specific attention was focused on areas that were identified during the background investigation as areas of interest (*e.g.*, NWI Wetlands, drainage patterns, photo interpreted wetland signatures, etc.). In each case where potential wetlands were identified, sample plots were evaluated for vegetative, hydrologic, and soils characteristics to aid in delineating habitat boundaries and in determining whether the communities exhibited wetland characteristics. Sample plot locations and mapped wetland and other water areas are depicted in Figure 5 (Appendix A).

Table 4 lists the representative Waters of the U.S. (WOUS) ID, Plot ID, and acreage for the wetlands and other waters identified within the survey area. All features in Table 4 are assumed to be jurisdictional under Section 404 of the Clean Water Act (33 U.S.C. § 1344) or Section 10 of the Rivers and Harbors Act (33 U.S.C. § 403), for the purposes of this project. Jurisdictional estimates are based on physical/topographic attributes of each feature and the surrounding area. These features include the close proximity of the surveyed wetlands to the Neches River and Sabine Lake, as well as the locations of the 100-year floodplain. However, final authority rests with the USACE regarding regulated activities, permitting requirements, and jurisdictional status.

Table 4 –Wetland/WOUS ID Summary

WOUS ID	Cowardin	Plot ID[A]	Latitude[B]	Longitude[B]	Acres	Waters Name
H-001	R2UB	N/A	30.013373	-93.996503	10.92	Neches River
H-002	PEM	1	30.014574	-93.996384	0.09	Non-Tidal Wetland
H-003	PFO	3	30.015211	-93.996077	0.99	Non-Tidal Wetland
H-004	PEM	6	30.015670	-93.996184	0.46	Non-Tidal Wetland
H-005	PFO	8	30.015935	-93.995699	0.39	Non-Tidal Wetland
H-006	PEM	10	30.017603	-93.995510	0.69	Non-Tidal Wetland
H-007	PFO	11	30.018209	-93.994843	2.10	Non-Tidal Wetland
H-008	PEM	19	30.021349	-93.992073	2.18	Non-Tidal Wetland
H-009	PEM	22	30.026195	-93.984971	38.43	Non-Tidal Wetland
H-010	PEM	30	30.042710	-93.965005	0.77	Non-Tidal Wetland
H-011	PFO	32	30.043901	-93.963482	0.69	Non-Tidal Wetland
H-012	PEM	34	30.044425	-93.963399	0.76	Non-Tidal Wetland
H-013	PEM	36	30.044421	-93.962514	0.29	Non-Tidal Wetland
H-014	PFO	41	30.044854	-93.962098	0.19	Non-Tidal Wetland
H-015	PFO	43	30.046082	-93.960597	2.06	Non-Tidal Wetland
H-016	PEM	42	30.046257	-93.961162	0.38	Non-Tidal Wetland
H-017	PEM	47	30.048299	-93.958496	3.02	Non-Tidal Wetland
H-018	PFO	46	30.047691	-93.958887	0.37	Non-Tidal Wetland
H-019	PEM	51	30.049373	-93.956913	0.59	Non-Tidal Wetland
H-020	PEM	53	30.050877	-93.955285	2.15	Non-Tidal Wetland
H-021	PEM	55	30.050435	-93.956174	0.57	Non-Tidal Wetland
H-022	PFO	54	30.050317	-93.955942	0.05	Non-Tidal Wetland
H-023	R2UB	N/A	30.051277	-93.954599	1.75	Unnamed Waterbody
H-024	PEM	23	30.051908	-93.954397	0.75	Non-Tidal Wetland
H-025	PEM	26	30.053331	-93.952757	7.68	Non-Tidal Wetland
H-026	PUB	N/A	30.054895	-93.951040	1.05	Pond
H-027	PEM	29	30.054987	-93.951101	0.53	Non-Tidal Wetland
H-028	PFO	59	30.054947	-93.951327	0.23	Non-Tidal Wetland
H-029	PEM	62	30.055580	-93.950161	0.21	Non-Tidal Wetland
H-030	PFO	64	30.056542	-93.949531	1.85	Non-Tidal Wetland
H-031	PEM	65	30.057543	-93.948987	2.20	Non-Tidal Wetland
H-032	R2UB	N/A	30.058142	-93.947939	3.02	Unnamed Waterbody
H-033	PEM	67	30.058651	-93.947234	2.84	Non-Tidal Wetland
H-034	PFO	69	30.058649	-93.945843	0.64	Non-Tidal Wetland
H-035	PUB	N/A	30.059060	-93.945779	0.02	Unnamed Drainage
H-036	PEM	71	30.059168	-93.943284	0.53	Non-Tidal Wetland
H-037	PFO	74	30.058803	-93.940929	0.38	Non-Tidal Wetland
H-038	PEM	73	30.059220	-93.940804	0.35	Non-Tidal Wetland
H-039	PUB	N/A	30.058724	-93.940570	0.30	Pond
H-040	PFO	124	30.058809	-93.939918	1.17	Non-Tidal Wetland
H-041	PEM	122	30.059122	-93.939211	1.29	Non-Tidal Wetland
H-042	PEM	114	30.058803	-93.936398	0.63	Non-Tidal Wetland
H-043	PEM	116	30.058462	-93.935148	0.52	Non-Tidal Wetland

Table 4 –Wetland/WOUS ID Summary

WOUS ID	Cowardin	Plot ID[A]	Latitude[B]	Longitude[B]	Acres	Waters Name
H-044	PFO	117	30.058289	-93.935327	0.19	Non-Tidal Wetland
H-045	PEM	119	30.057017	-93.931883	0.10	Non-Tidal Wetland
H-046	PEM	78	30.055790	-93.927632	0.09	Non-Tidal Wetland
H-047	PEMx	79	30.055215	-93.925501	0.03	Non-Tidal Wetland
H-048	PEMx	81	30.055232	-93.925397	0.02	Non-Tidal Wetland
H-049	PUB	N/A	30.053664	-93.919427	0.40	Unnamed Drainage
H-050	PEM	83	30.053715	-93.919284	0.25	Non-Tidal Wetland
H-051	PFO	86	30.053557	-93.919227	0.96	Non-Tidal Wetland
H-052	PEM	84	30.053396	-93.919717	1.44	Non-Tidal Wetland
H-053	PUB	N/A	30.053281	-93.917906	0.01	Roadside Ditch
H-054	PUB	N/A	30.052773	-93.916270	0.06	Roadside Ditch
H-055	PEM	88	30.052829	-93.917388	0.14	Non-Tidal Wetland
H-056	PUB	N/A	30.051203	-93.911421	0.10	Pond
H-057	PUBx	N/A	30.050624	-93.911461	0.02	Roadside Ditch
H-058	PUB	N/A	30.045377	-93.906043	0.28	Unnamed Drainage
H-059	PEM	91	30.045062	-93.905203	1.11	Non-Tidal Wetland
H-060	PUBx	N/A	30.044703	-93.904661	0.10	Unnamed Drainage
H-061	PUBx	N/A	30.044530	-93.904812	0.29	Pond
H-062	PFO	95	30.037178	-93.896413	3.07	Non-Tidal Wetland
H-063	PFO	103	30.036159	-93.894835	0.18	Non-Tidal Wetland
H-064	PEM	101	30.038458	-93.898152	25.13	Non-Tidal Wetland
H-065	PFO	243	30.034584	-93.893423	0.63	Non-Tidal Wetland
H-066	PFO	106	30.033135	-93.891801	2.37	Non-Tidal Wetland
H-067	PEM	110	30.030901	-93.889950	0.14	Non-Tidal Wetland
H-068	PFO	111	30.031075	-93.889640	0.33	Non-Tidal Wetland
H-069	PEM	113	30.029728	-93.888789	0.53	Non-Tidal Wetland
H-070	PUB	N/A	30.029438	-93.888464	0.16	Unnamed Waterbody
H-071	PEM	125	30.029723	-93.888213	1.02	Non-Tidal Wetland
H-073	E2EM	224	30.008236	-93.870665	42.62	Tidal Wetland
H-074	E1UB	N/A	30.005973	-93.869721	1.00	Unnamed Waterbody
H-075	E1UB	N/A	30.001092	-93.866884	7.38	Canal
H-076	E1UB	N/A	30.000444	-93.866294	0.56	Unnamed Waterbody
H-077	E2EM	250	30.000649	-93.866342	0.21	Tidal Wetland
H-078	E2EM	251	30.000349	-93.866105	0.46	Tidal Wetland
H-079	PEM	15	30.018256	-93.994353	0.61	Non-Tidal Wetland
H-080	E2EM	232	30.033927	-93.975115	15.92	Tidal Wetland
H-081	E1UB	N/A	30.036744	-93.970262	29.95	Canal to Neches River
H-082	PEM	127	30.027946	-93.886997	0.73	Non-Tidal Wetland
H-083	PUBx	N/A	30.027379	-93.883225	0.24	Pond
H-084	PUB	N/A	30.027216	-93.881981	0.04	Unnamed Drainage
H-085	PEM	131	30.027501	-93.879392	0.20	Non-Tidal Wetland
H-086	PEM	133	30.027290	-93.879103	0.06	Non-Tidal Wetland
H-087	PEM	137	30.027014	-93.878361	0.20	Non-Tidal Wetland

Table 4 –Wetland/WOUS ID Summary

WOUS ID	Cowardin	Plot ID[A]	Latitude[B]	Longitude[B]	Acres	Waters Name
H-088	PEM	135	30.027419	-93.878211	2.43	Non-Tidal Wetland
H-089	PFO	136	30.027563	-93.877560	0.05	Non-Tidal Wetland
H-090	PUBx	N/A	30.027395	-93.877136	0.09	Unnamed Drainage
H-091	PUBx	N/A	30.027369	-93.876939	0.04	Unnamed Drainage
H-092	PUBx	N/A	30.027369	-93.876828	0.17	Unnamed Drainage
H-093	PEM	140	30.027090	-93.873759	0.37	Non-Tidal Wetland
H-094	PFO	201	30.027451	-93.874204	3.11	Non-Tidal Wetland
H-095	PEM	141	30.027368	-93.871962	0.69	Non-Tidal Wetland
H-096	PFO	142	30.027435	-93.871548	0.14	Non-Tidal Wetland
H-097	PEM	203	30.027135	-93.871619	0.16	Non-Tidal Wetland
H-098	PUBx	N/A	30.027506	-93.870713	0.08	Unnamed Drainage
H-099	PEM	206	30.027725	-93.868580	0.05	Non-Tidal Wetland
H-100	PUBx	N/A	30.028201	-93.867108	0.06	Unnamed Drainage
H-101	PEM	208	30.026782	-93.870910	0.29	Non-Tidal Wetland
H-102	PFO	210	30.026996	-93.870797	0.09	Non-Tidal Wetland
H-103	PEM	212	30.026260	-93.870390	0.10	Non-Tidal Wetland
H-104	PEM	214	30.022937	-93.870622	7.81	Non-Tidal Wetland
H-105	PUBx	N/A	30.023752	-93.871001	0.01	Unnamed Drainage
H-106	PEM	246	30.021708	-93.871221	0.26	Non-Tidal Wetland
H-107	PFO	247	30.020743	-93.871108	1.63	Non-Tidal Wetland
H-108	PEM	248	30.018240	-93.870994	9.78	Non-Tidal Wetland
H-109	PSS	242	30.039128	-93.898424	1.99	Non-Tidal Wetland
H-110	PFO	241	30.040551	-93.899914	0.47	Non-Tidal Wetland
H-111	PFO	240	30.042974	-93.902636	2.22	Non-Tidal Wetland
H-112	PEM	220	29.995175	-93.860326	37.42	Non-Tidal Wetland
H-113	E2EM	218	29.990168	-93.854748	0.97	Tidal Wetland
H-114	E1UB	N/A	29.910204	-93.820553	600.41	Sabine Lake
H-115	E2EM	195	29.829174	-93.796255	29.79	Tidal Wetland
H-116	E1UB	N/A	29.829202	-93.796554	4.63	Unnamed Tidal Waterbody
H-117	E1UB	N/A	29.833589	-93.789772	6.25	Madame Johnsons Bayou
H-118	E2EM	187	29.828085	-93.778932	25.22	Tidal Wetland
H-119	E1UB	N/A	29.827969	-93.776217	18.73	Unnamed Tidal Waterbody
H-120	E1UB	N/A	29.836725	-93.772409	6.62	Johnsons Bayou
H-121	E2EM	172	29.826106	-93.746979	50.75	Tidal Wetland
H-122	E1UB	N/A	29.825648	-93.739099	17.46	Deep Bayou
H-123	E2EM	152	29.821780	-93.677492	125.68	Tidal Wetland
H-124	E1UB	N/A	29.823397	-93.703671	71.02	Unnamed Tidal Waterbody
H-124D	E1UB	N/A	29.820236	-93.653263	0.77	Unnamed Tidal Waterbody
H-125	E1UB	N/A	29.819302	-93.637858	22.67	Unnamed Tidal Waterbody
H-125D	E1UB	N/A	29.819039	-93.634083	0.64	Canal
H-126	E2EM	146	29.809527	-93.620318	34.19	Tidal Wetland
H-127	E1UB	N/A	29.807819	-93.618102	36.66	Unnamed Tidal Waterbody
H-128	E2EM	259	29.776439	-93.608571	60.93	Tidal Wetland

Table 4 –Wetland/WOUS ID Summary

WOUS ID	Cowardin	Plot ID[A]	Latitude[B]	Longitude[B]	Acres	Waters Name
H-129	E1UB	N/A	29.788232	-93.612210	21.04	Unnamed Tidal Waterbody
H-130	PFO	264	29.818973	-93.625072	1.03	Non-Tidal Wetland
H-131	E1UB	N/A	29.825373	-93.735041	4.74	Deep Bayou
H-132	E1UB	N/A	29.824743	-93.725369	8.50	Unnamed Tidal Waterbody
H-132D	E1UB	N/A	29.824683	-93.723932	0.29	Canal
H-133	E2EM	173	29.825095	-93.730148	21.36	Tidal Wetland

[A] Corresponds with Datasheets in Appendix C

[B] Coordinates are for center of Habitat ID and in Nad 83, Decimal Degrees.

4.0 Literature Cited

- Cowardin, L.M, V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* United States Fish and Wildlife Service Publication No. FWS/OBS-79/31. 131 pp.

- United States Army Corps of Engineers (USACE). 1987. Wetlands Delineation Manual, (Technical Report Y-87-1), Environmental Laboratory, 1987, U.S. Army Waterways Experiment Station 1987, Vicksburg, MS.

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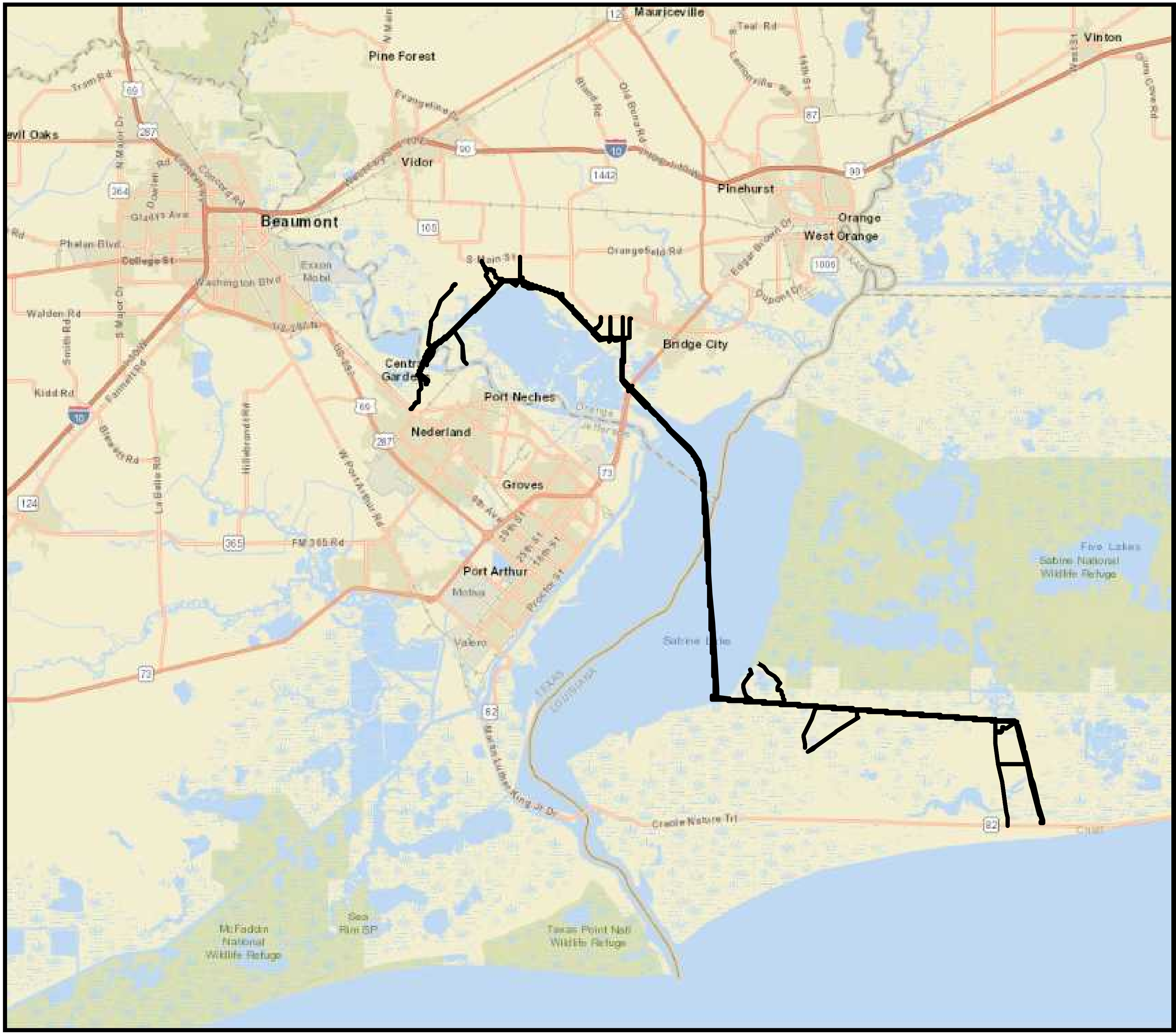
- U. S. Army Corps of Engineers. 2016. USACE Galveston District Standard Operating Procedures for Recording and Submitting Jurisdictional Delineations Using Global Positioning Systems and Geographic Information Systems Tools and Technologies.

APPENDIX A

FIGURES



N

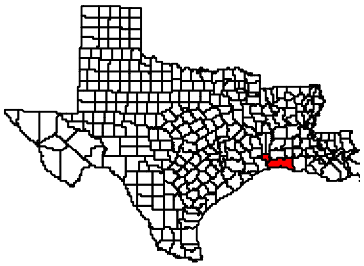
0 1.25 2.5 5 Miles

Legend

■ Survey Area

Notes

ESRI DeLorme Basemap
Orange and Jefferson Counties, Texas, and
Cameron Parish, Louisiana



Site Location

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 1

M:\13004\014\Arc\Figure1_SiteLocation.mxd

N

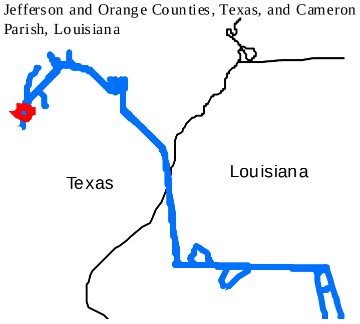
0 200 400 800 Feet

Legend

▭	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 1 of 74)

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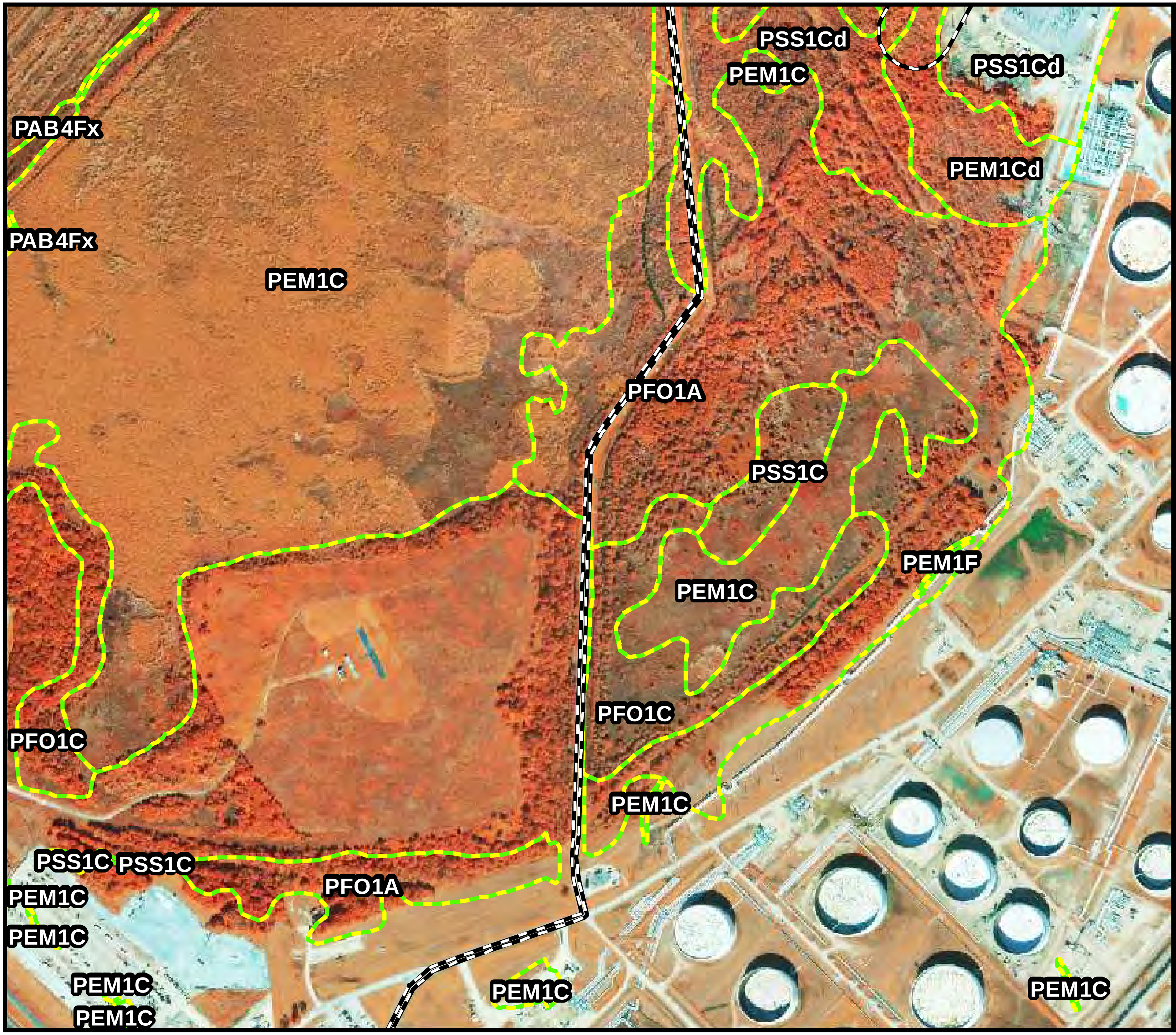
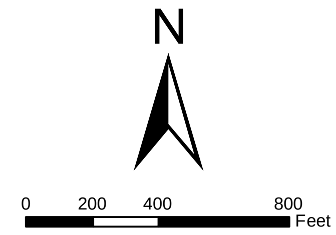


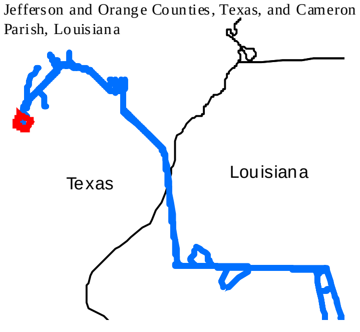


Legend

▭ Survey Area
● Mile Marker
🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 2 of 74)

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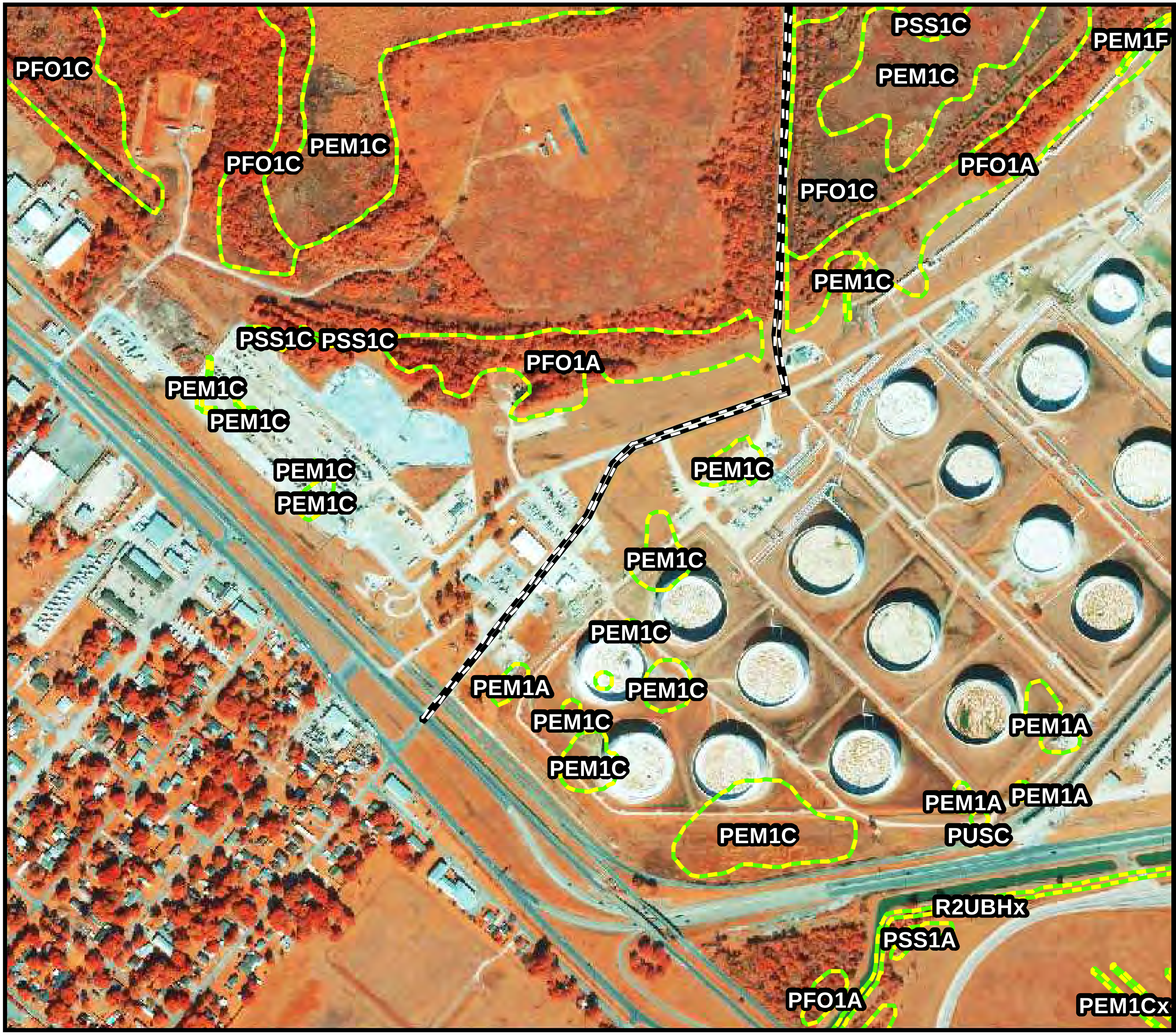

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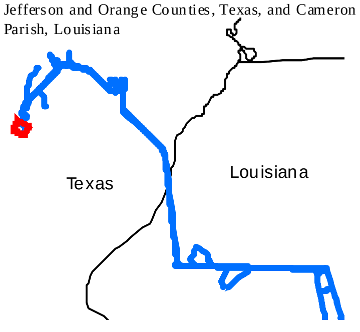
0 200 400 800 Feet

Legend

▨	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

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BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 3 of 74)

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N

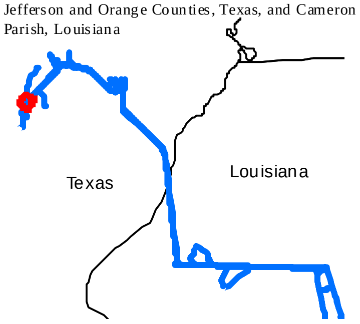
0 200 400 800
Feet

Legend

▭	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

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Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 4 of 74)

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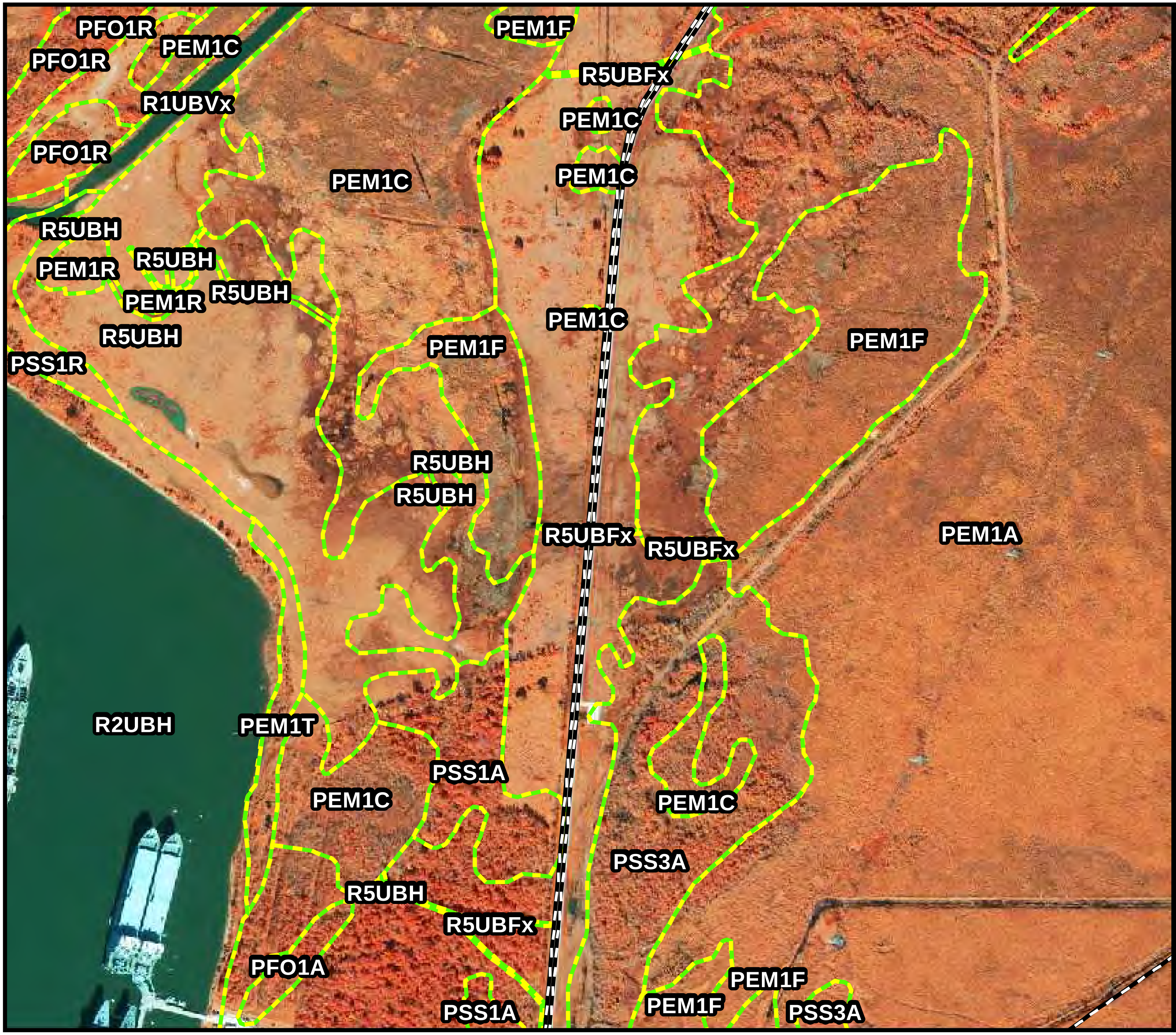
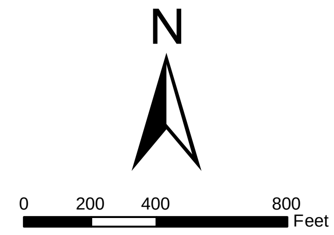




Legend

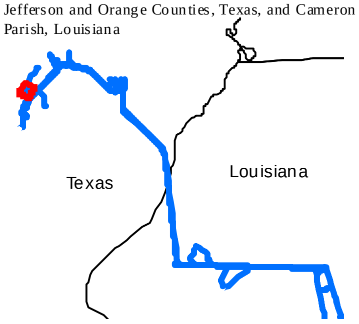
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 5 of 74)

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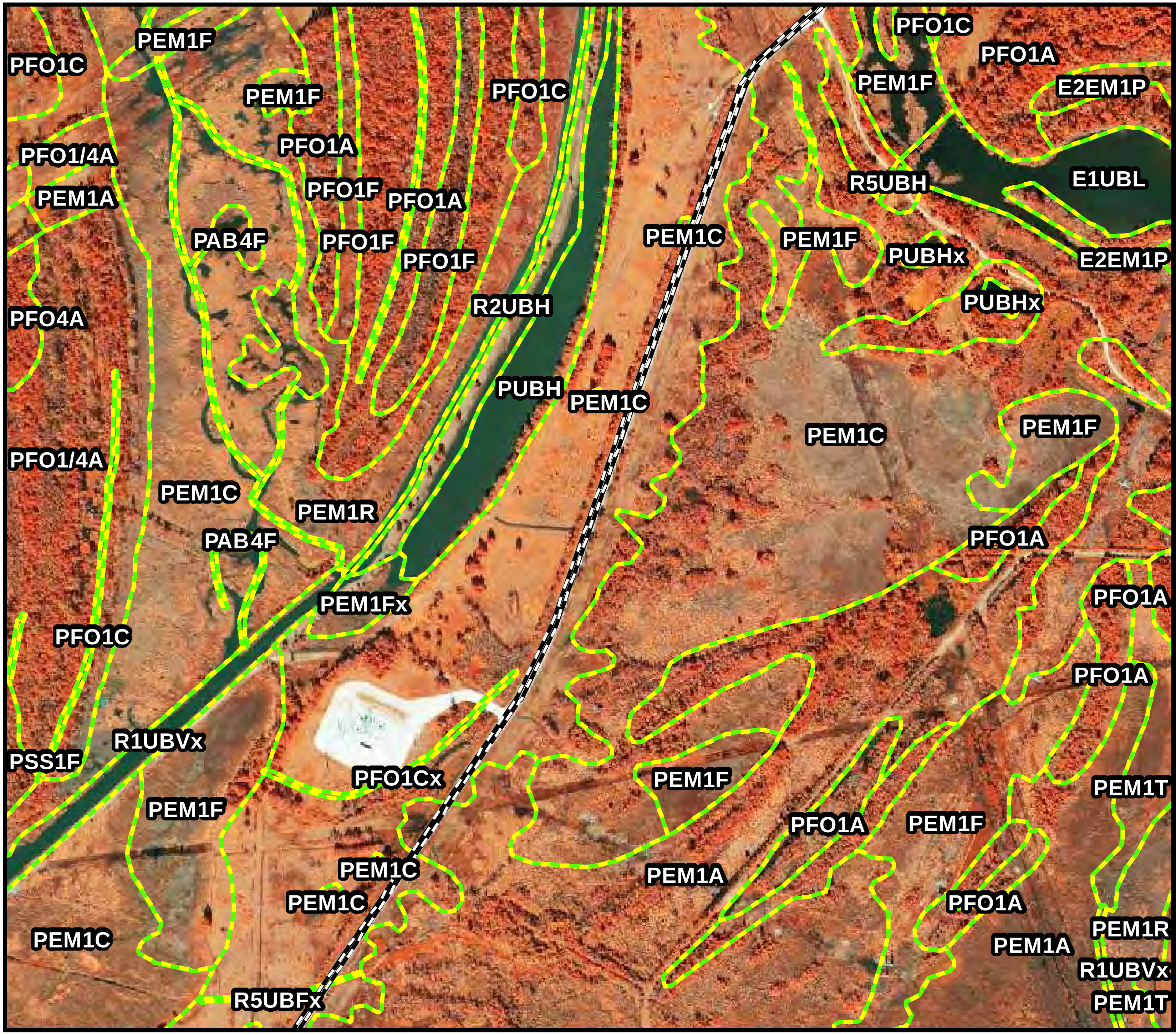


N

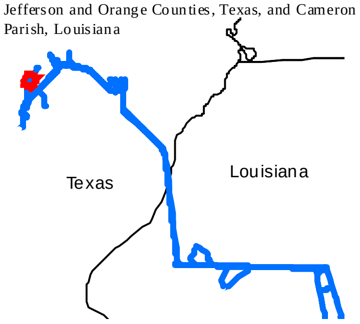
0 200 400 800 Feet

Legend

- Survey Area
- ● Mile Marker
- NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 6 of 74)

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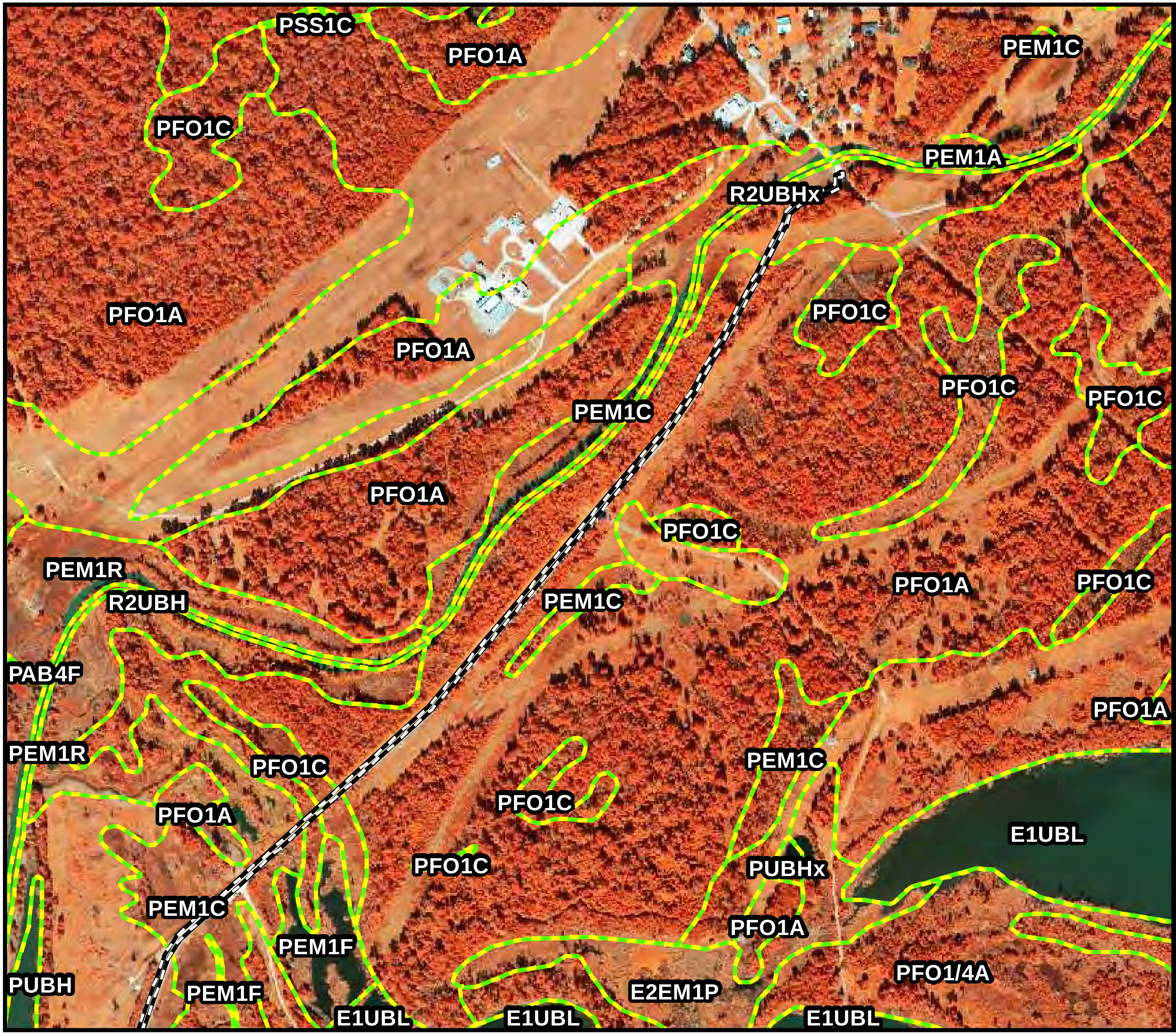


Legend

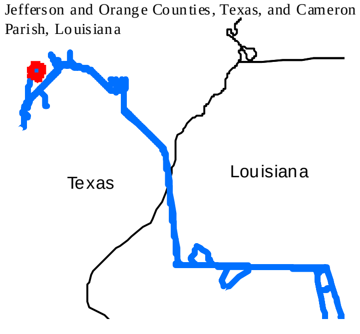
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 7 of 74)

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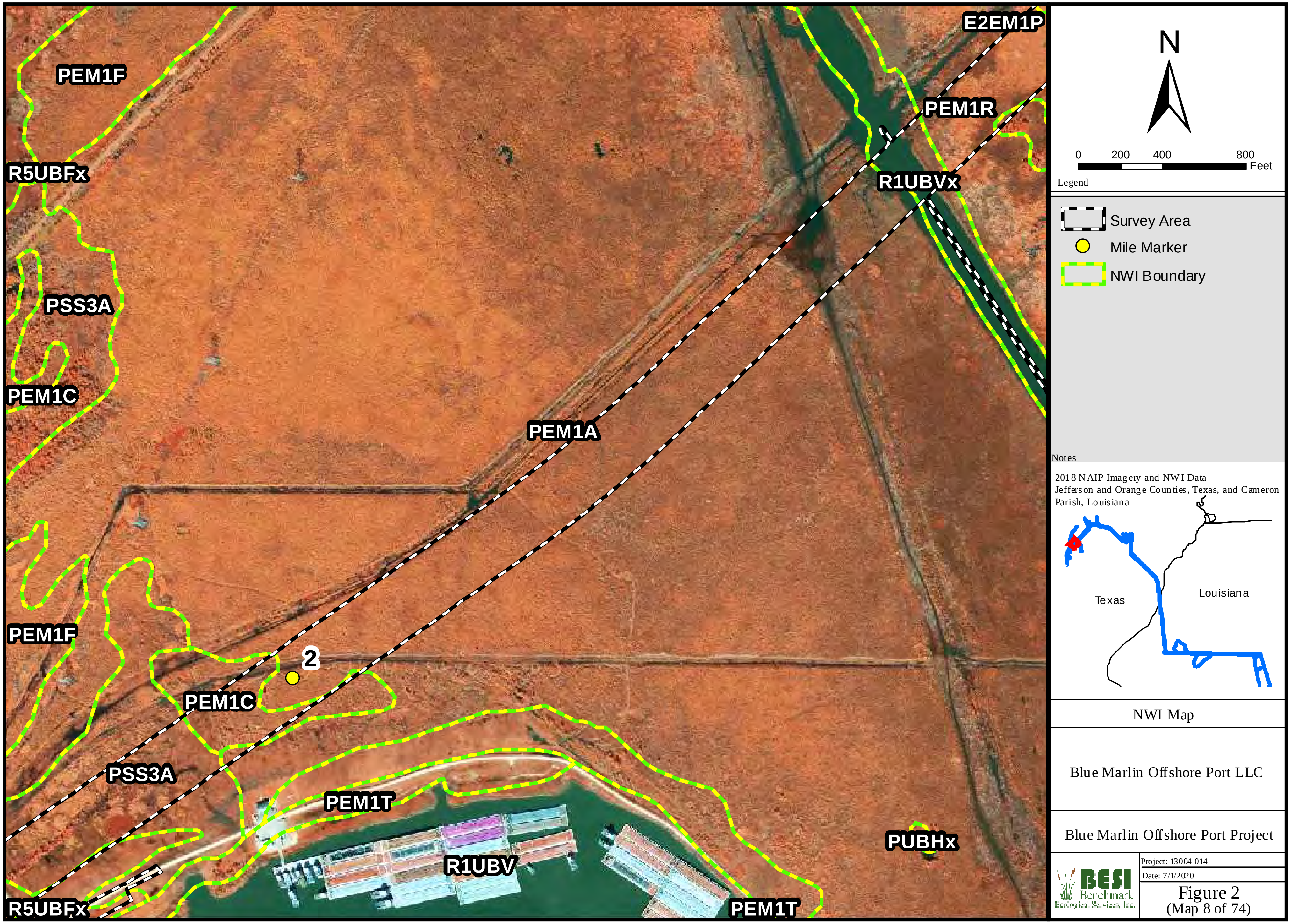

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 8 of 74)

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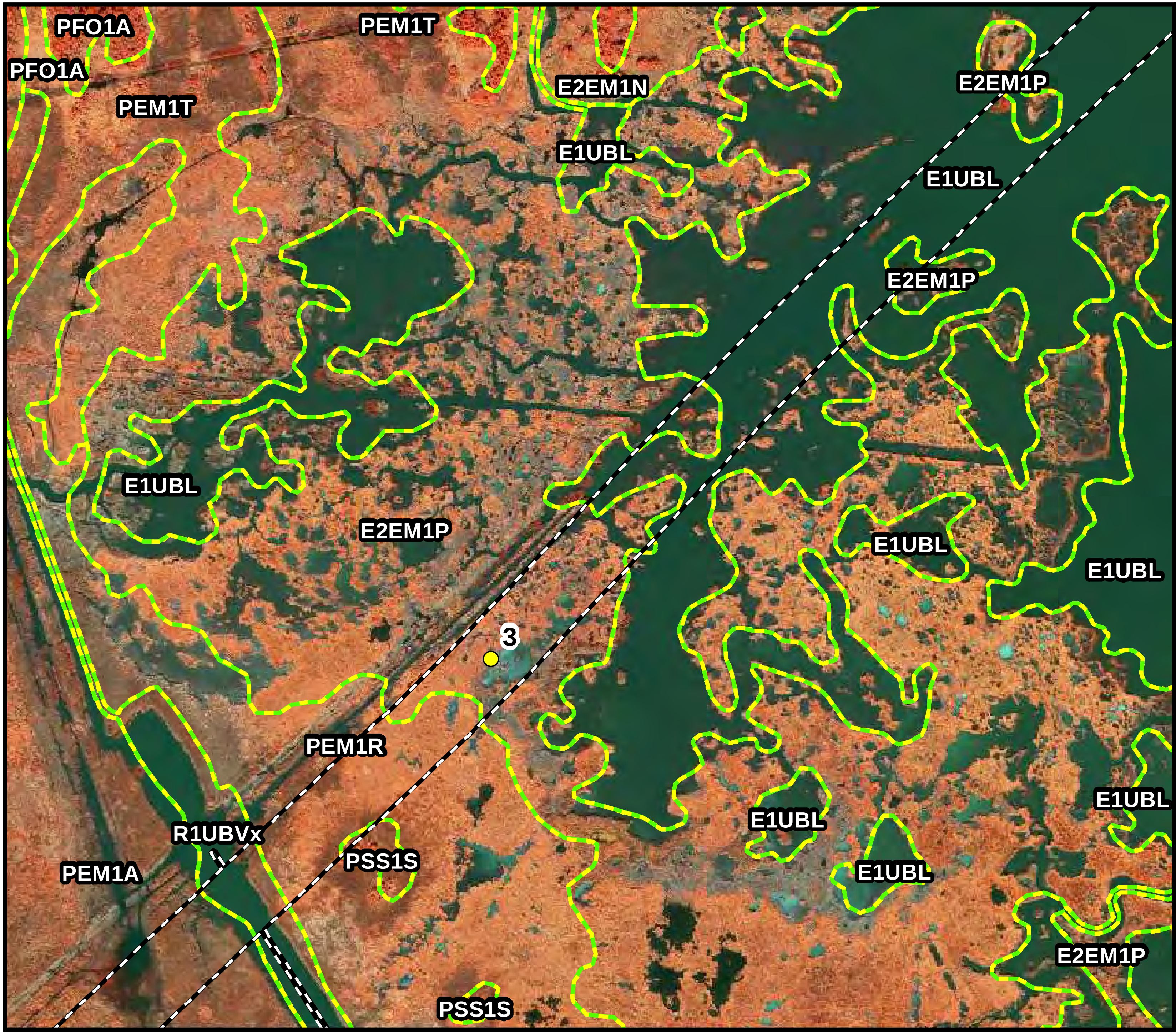


N

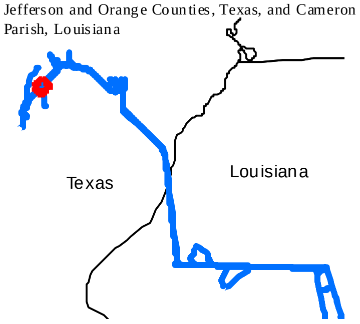
0 200 400 800 Feet

Legend

▭	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

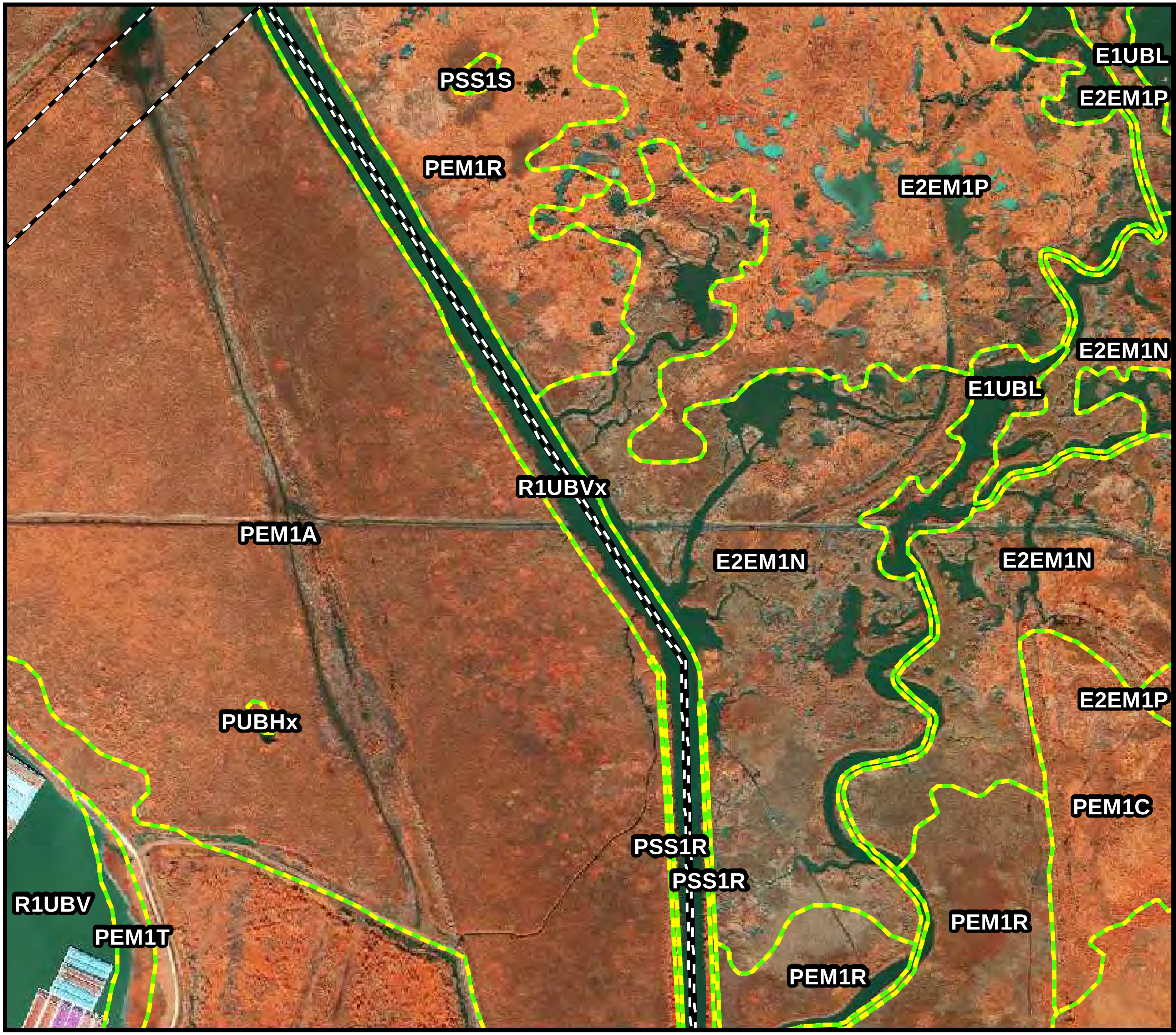
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 9 of 74)

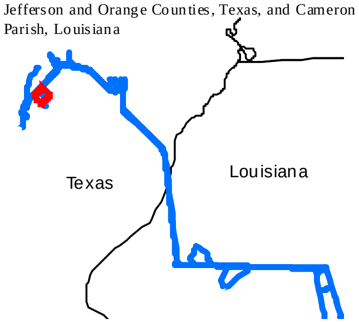


Legend

☐ Survey Area
● Mile Marker
☐ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 10 of 74)

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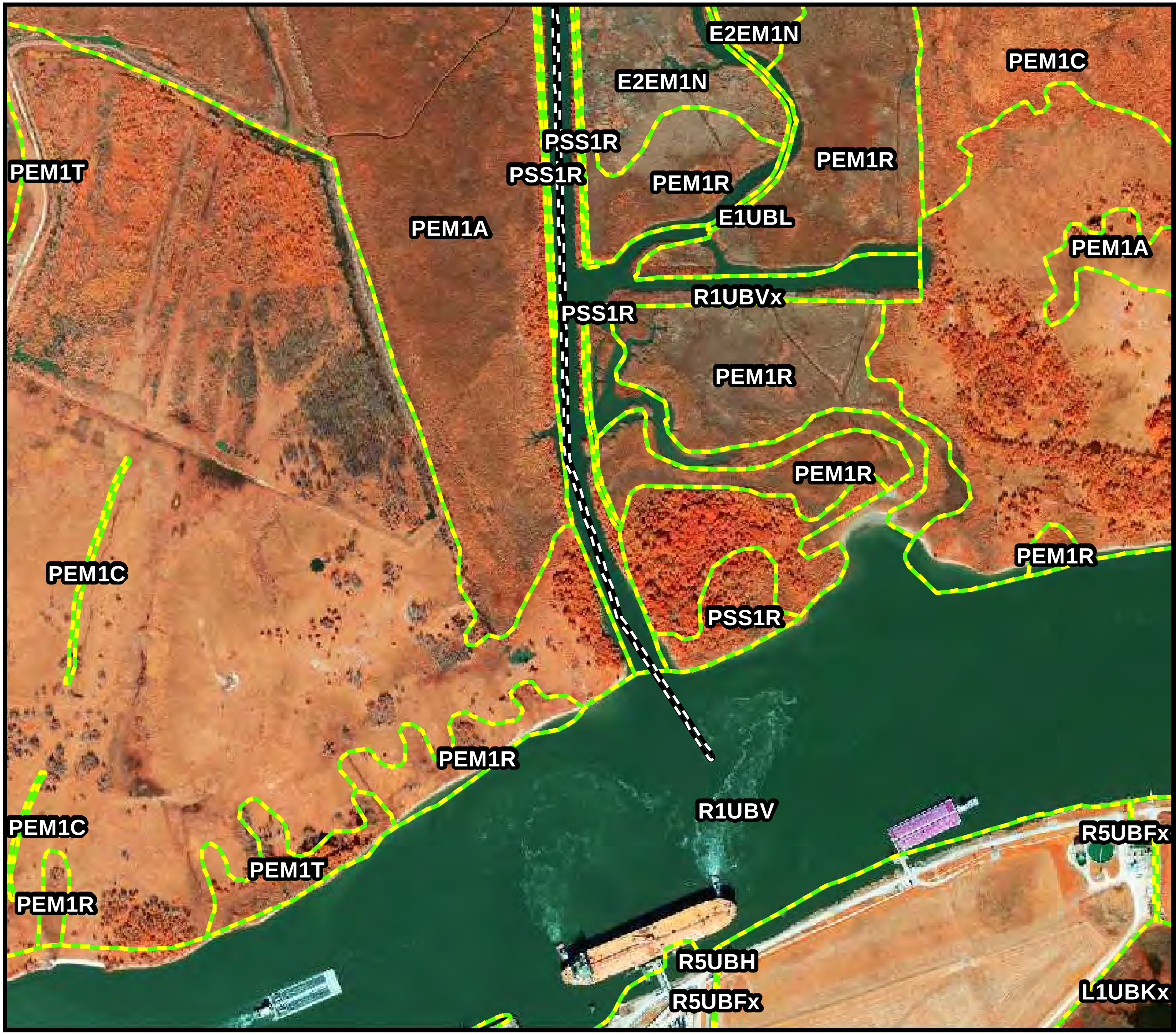
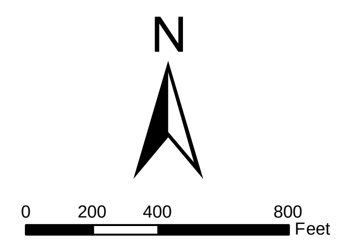




Legend

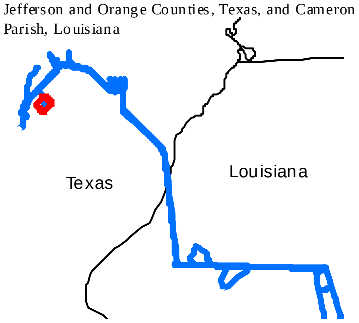
▭ Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 11 of 74)

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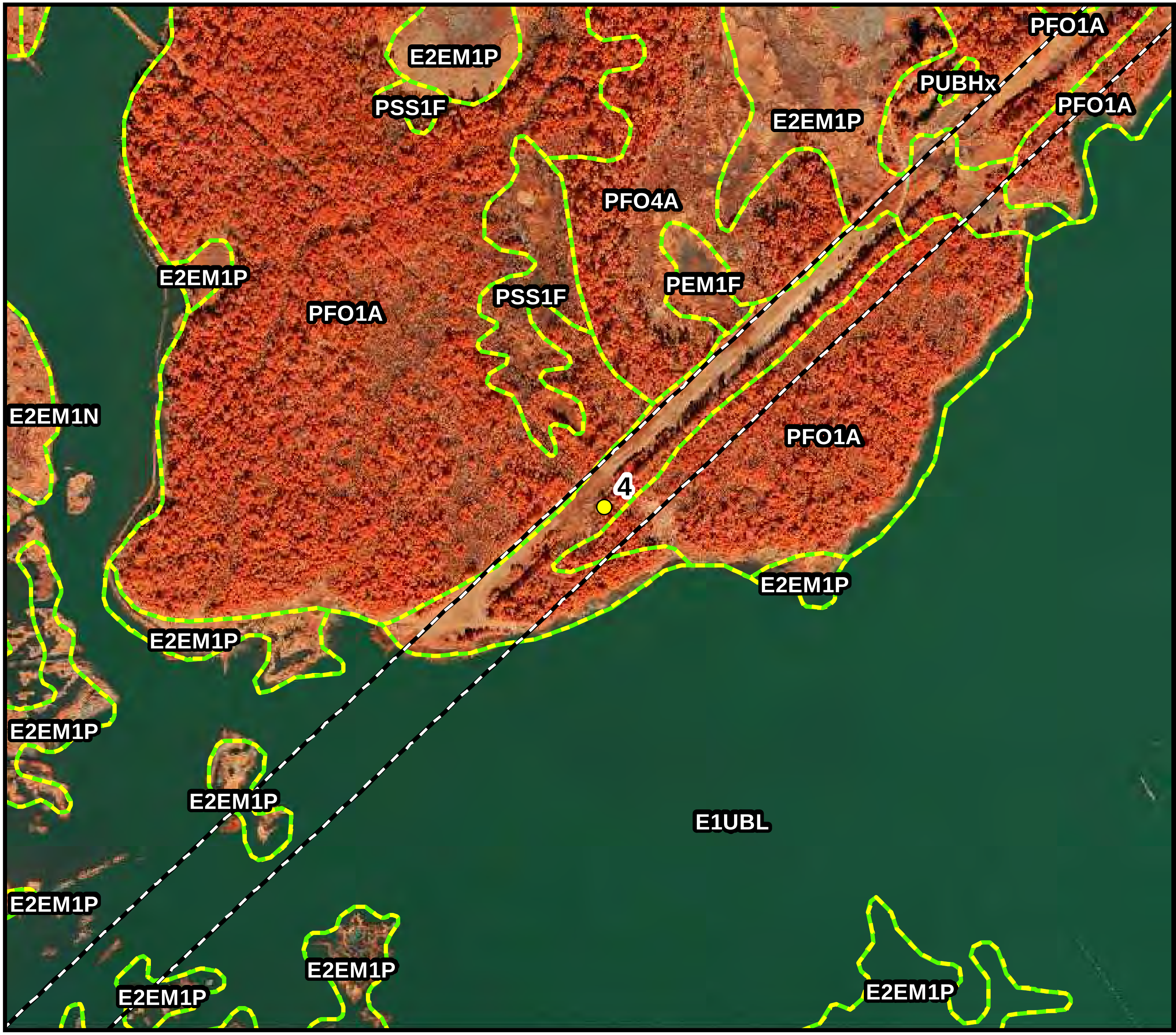
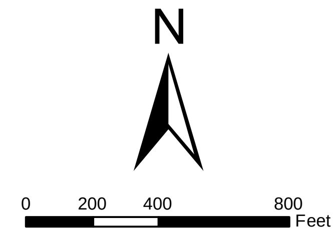




Legend

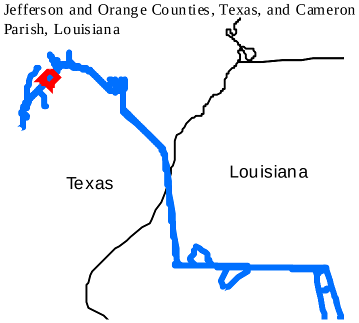
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 12 of 74)

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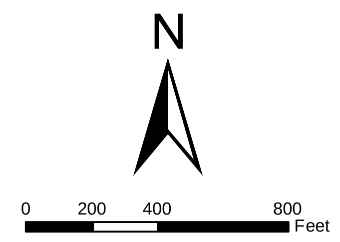
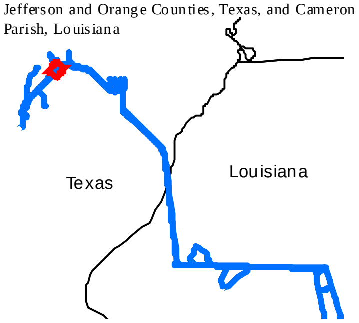


Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 13 of 74)

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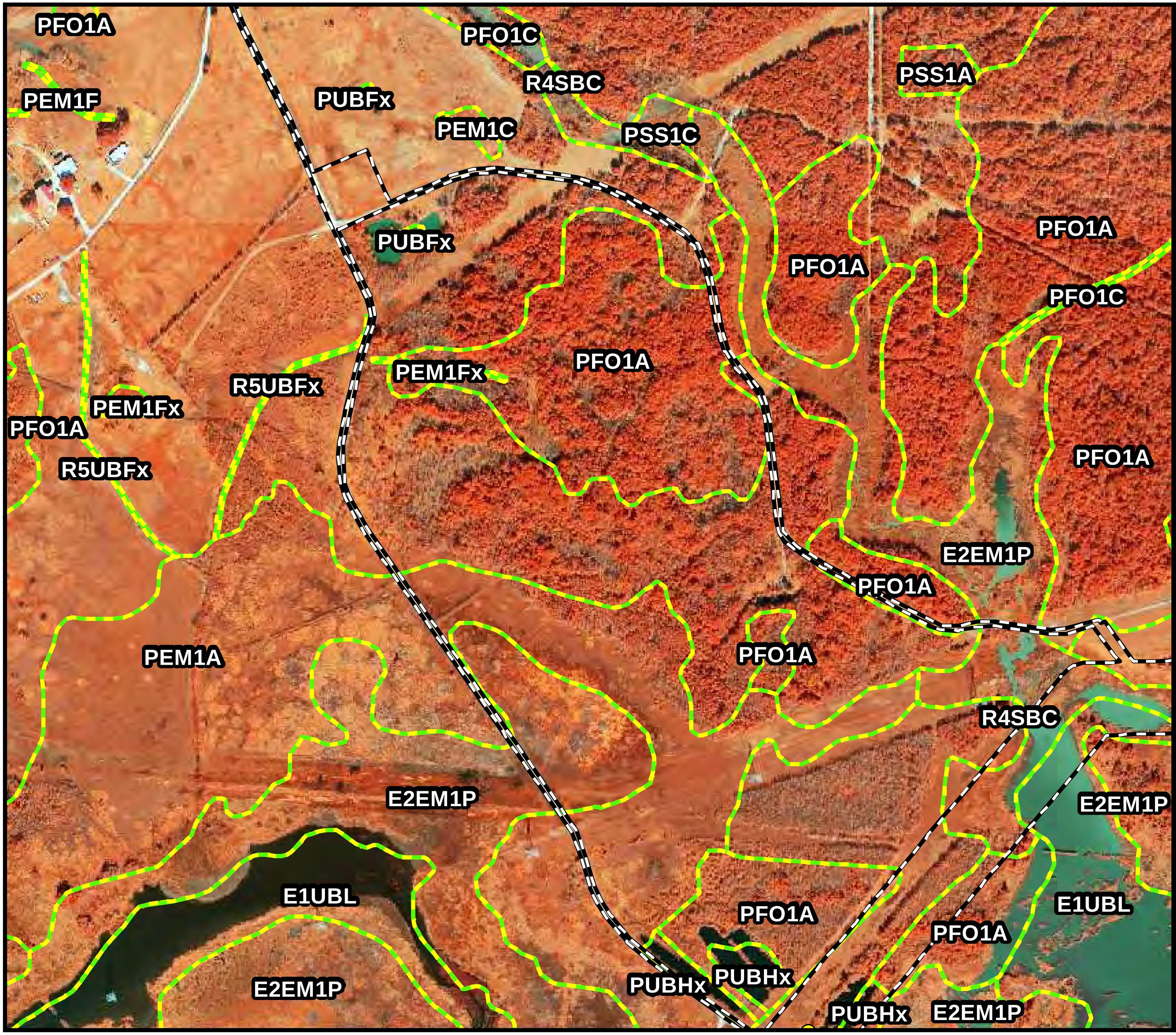


Legend

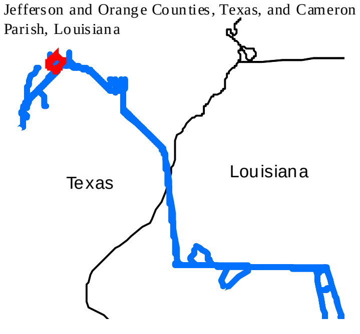
▭ Survey Area

○ Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 14 of 74)

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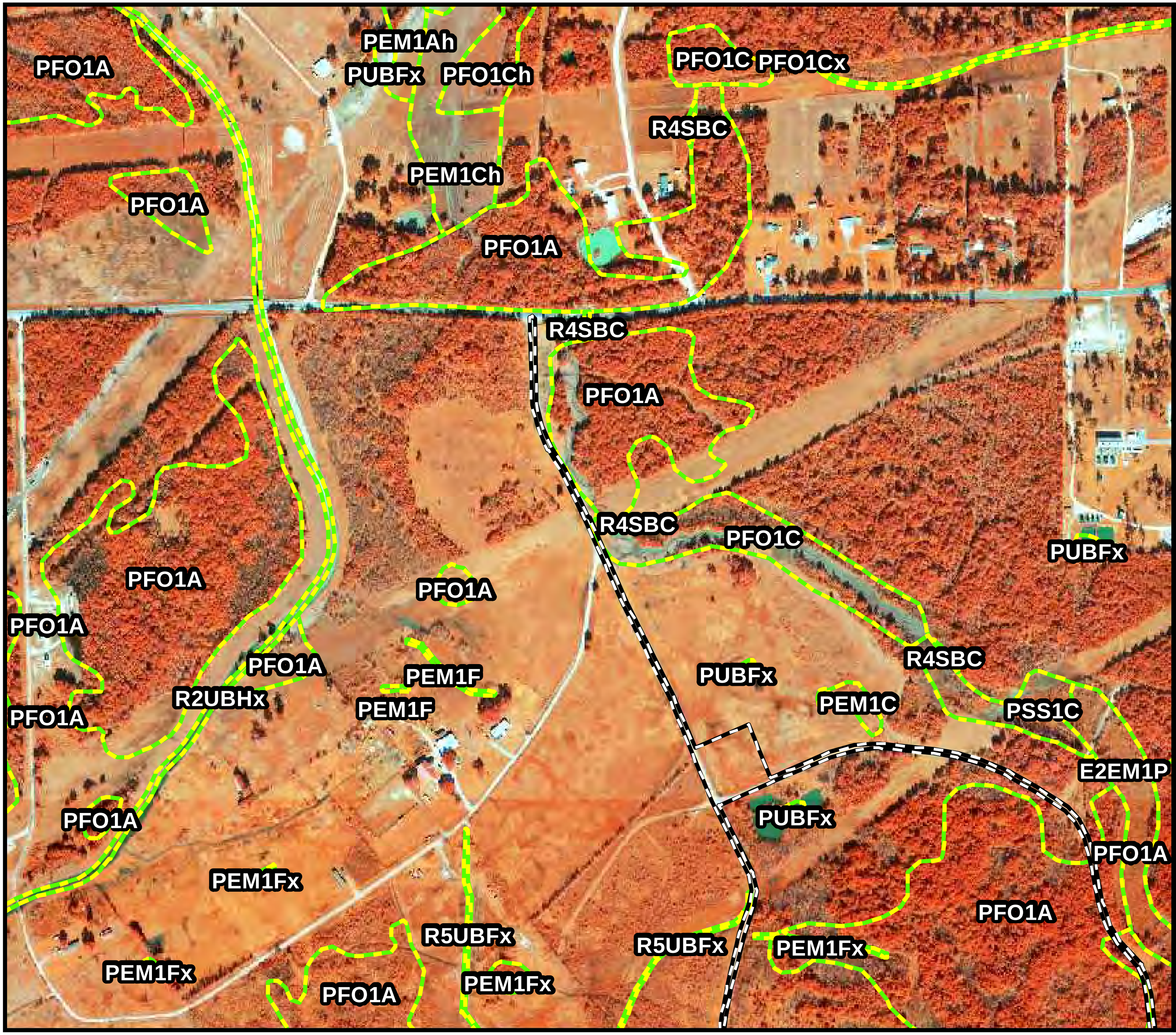
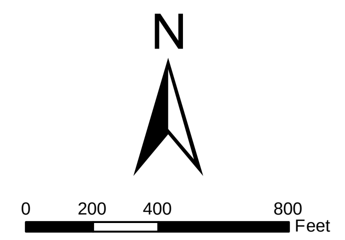


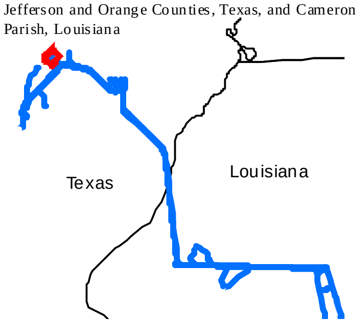


Legend

⬚	Survey Area
●	Mile Marker
⬚	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 15 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

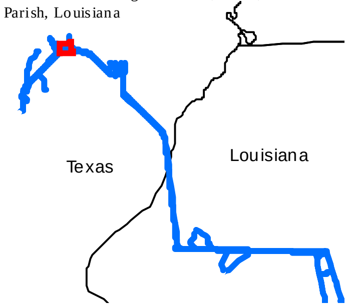
0 200 400 800
Feet

Legend

▨	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 16 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

Legend

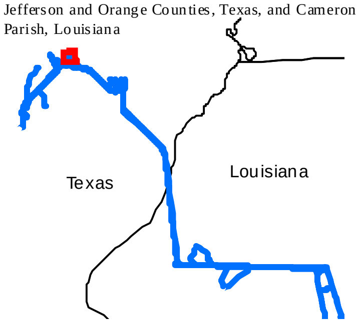
▭ Survey Area

● Mile Marker

▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 17 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

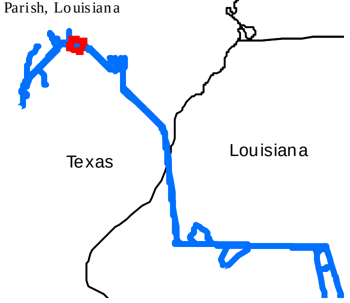
0 200 400 800 Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 18 of 74)

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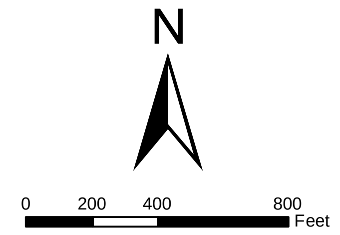


Legend

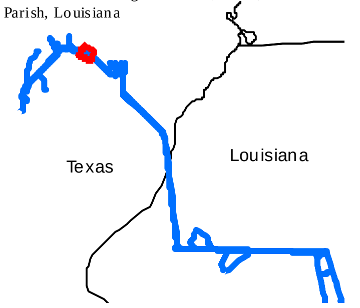
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 19 of 74)

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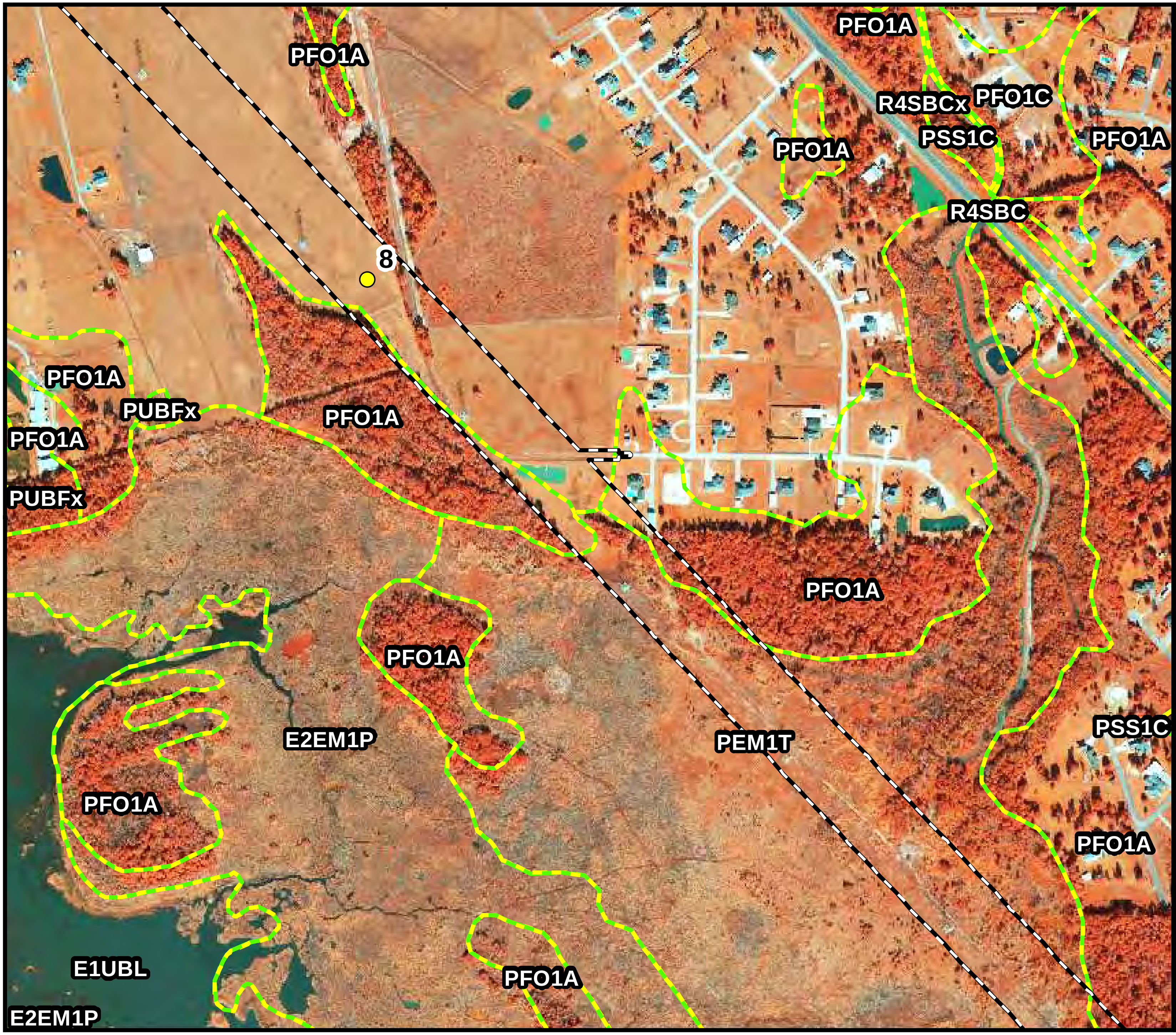


N

0 200 400 800
Feet

Legend

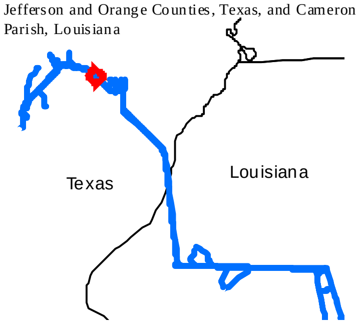
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 20 of 74)

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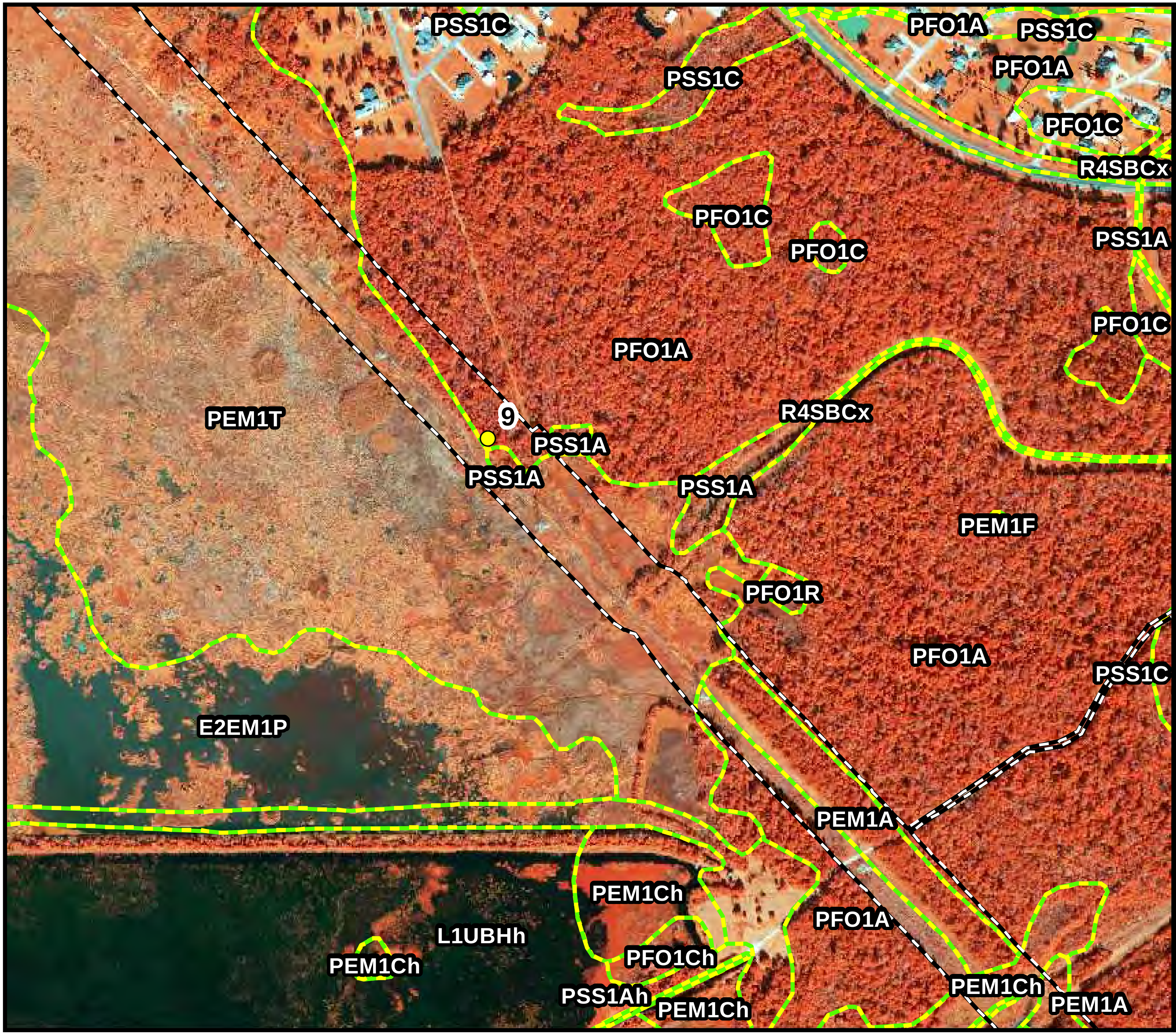


N

0 200 400 800 Feet

Legend

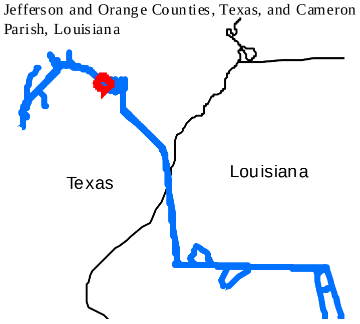
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

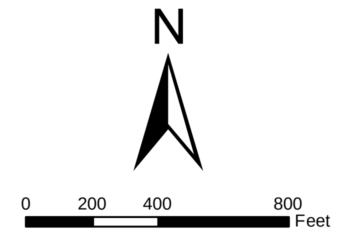
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 21 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

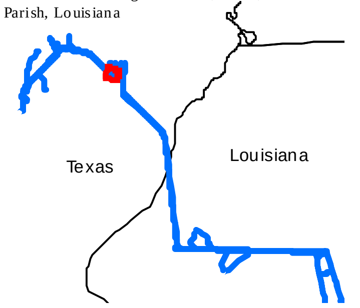


Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 22 of 74)

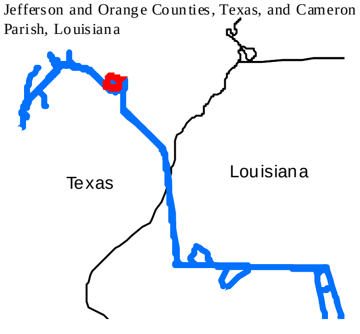
M:\13004\014\Arc\Figure2_NWI.mxd

Legend

- ⬚ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

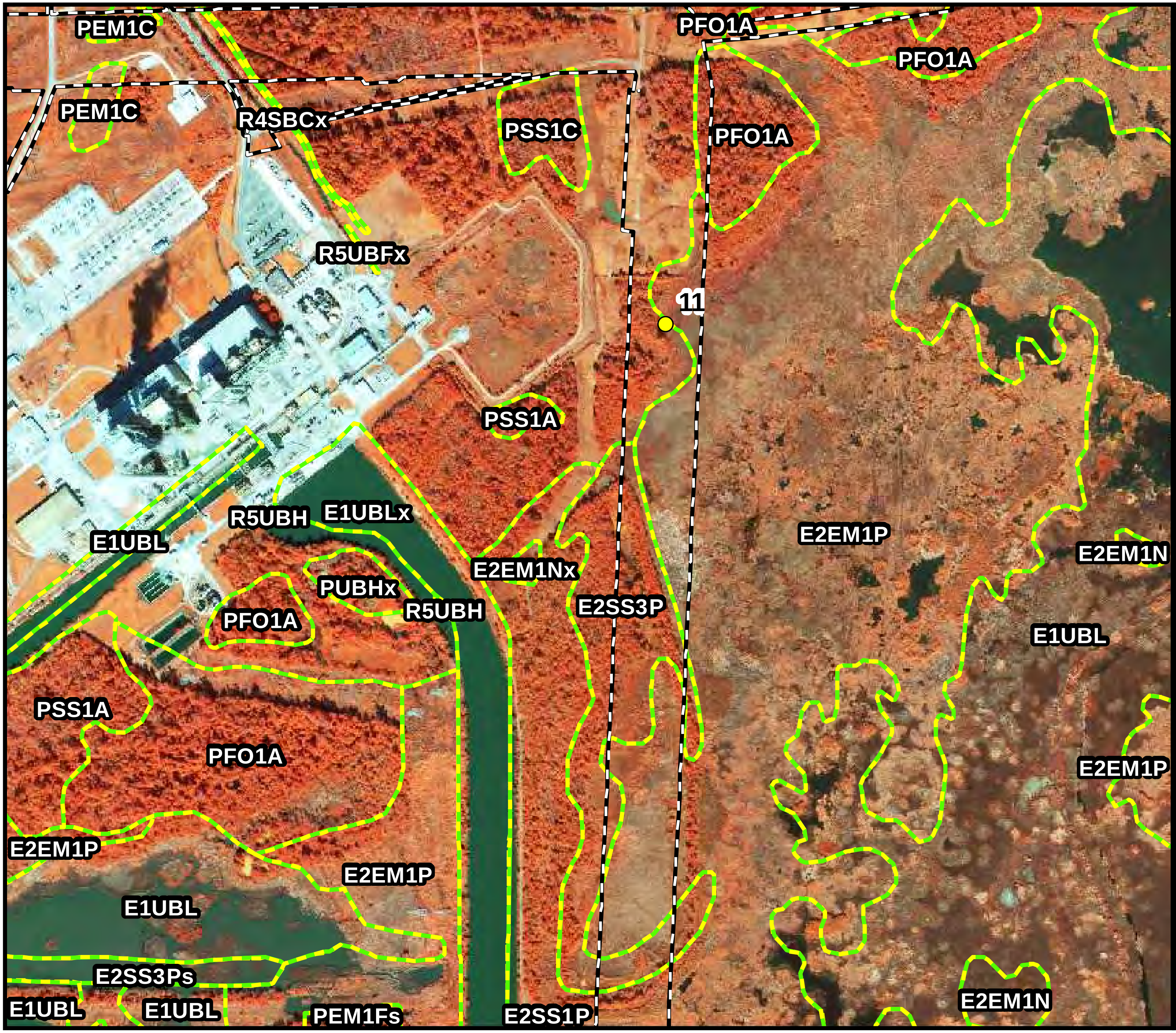
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 23 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

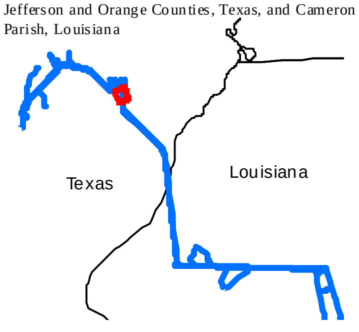
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

BESI Benchmark Ecological Services, Inc.

Figure 2
(Map 24 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

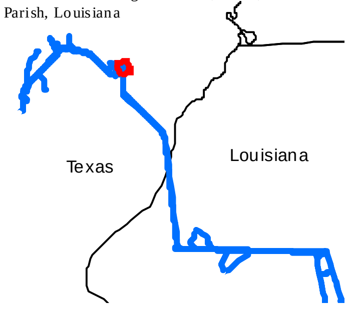
0 200 400 800
Feet

Legend

▭	Survey Area
●	Mile Marker
🟩	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

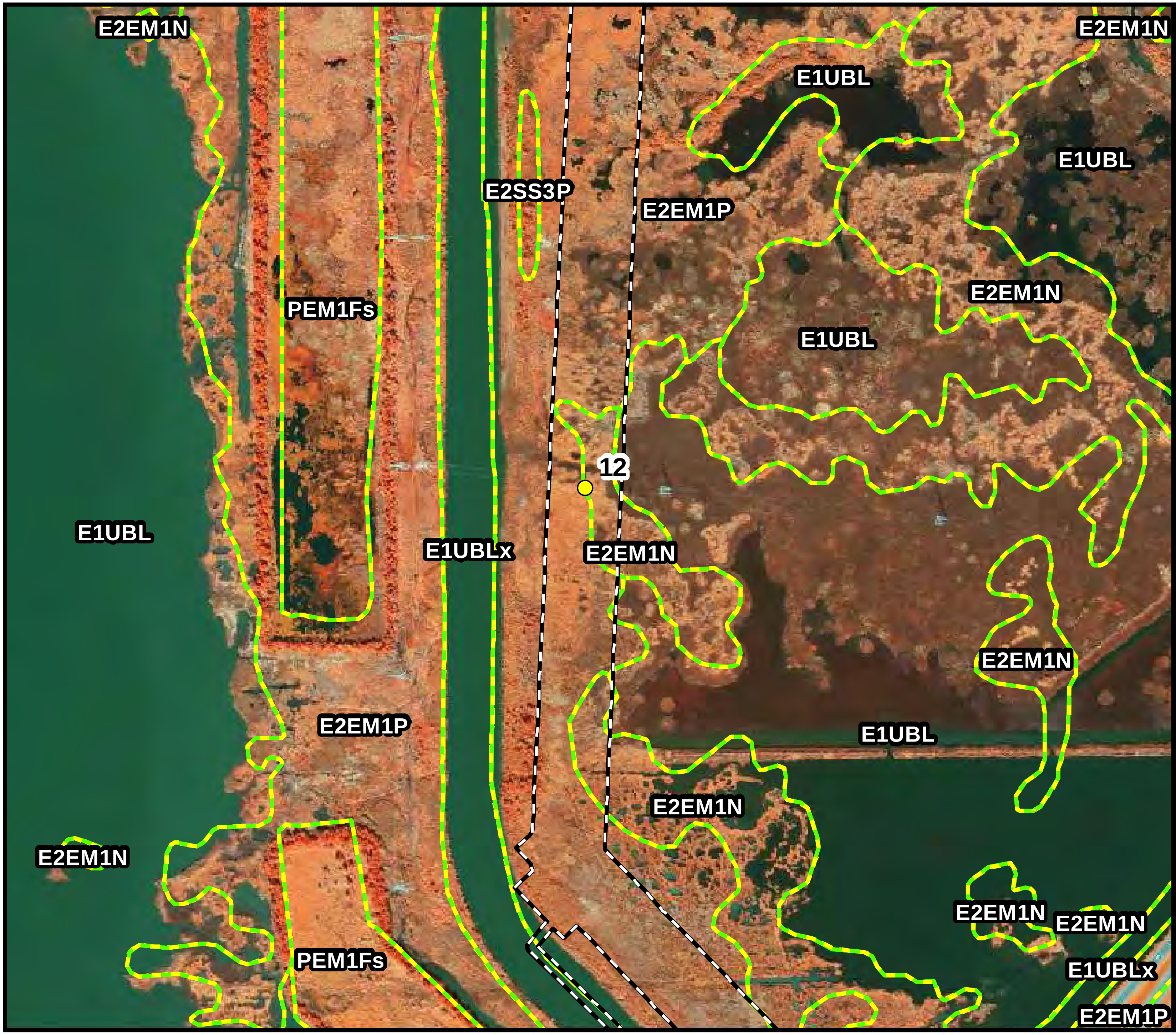
Blue Marlin Offshore Port LLC

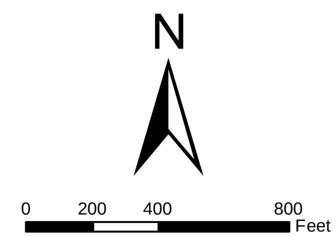
Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 25 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



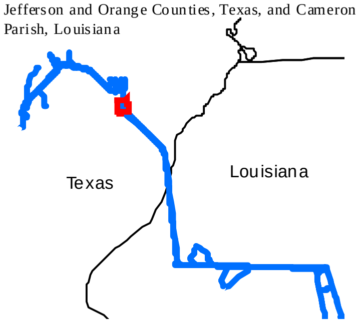


Legend

▭ Survey Area
● Mile Marker
🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

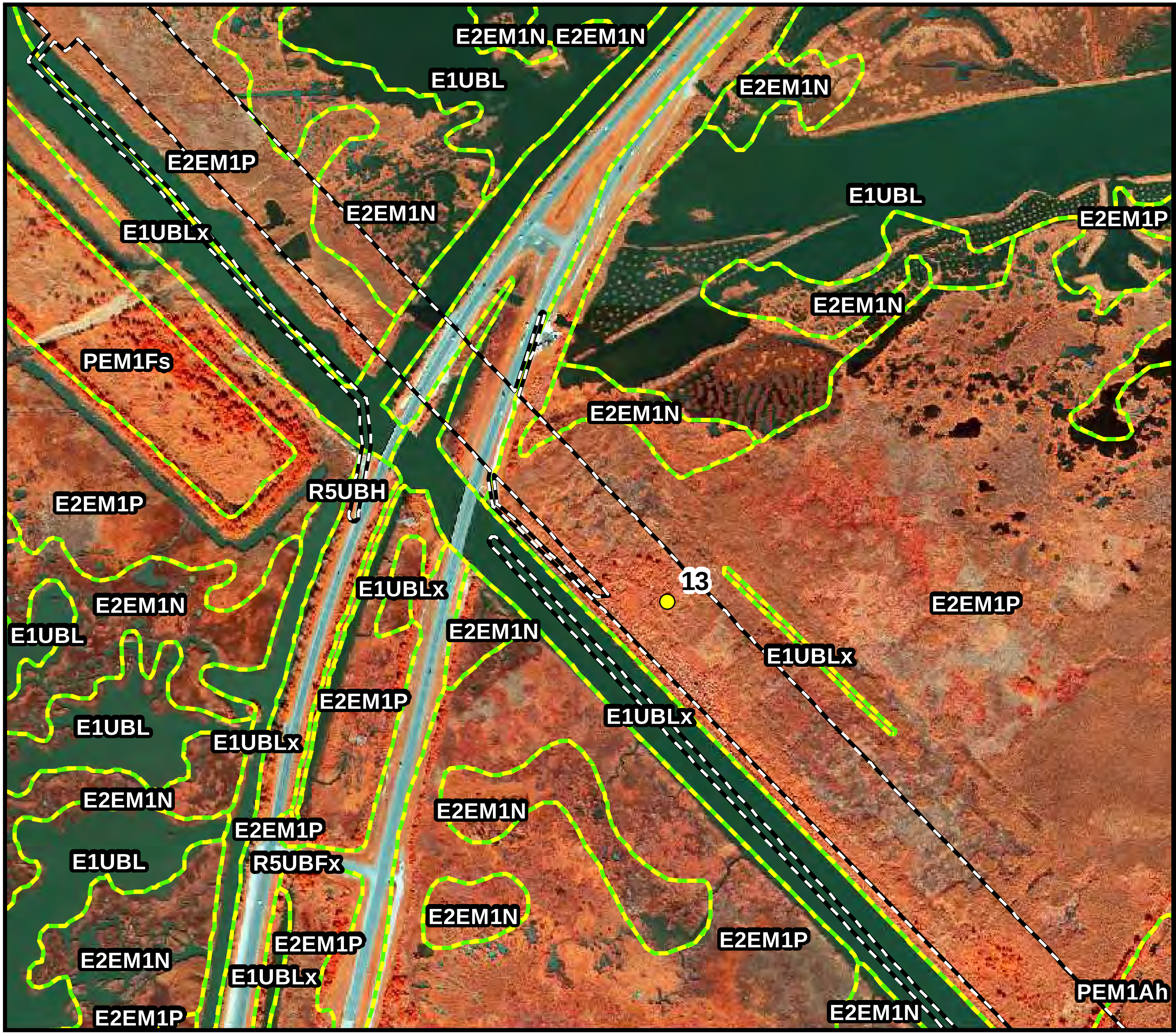
Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 26 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

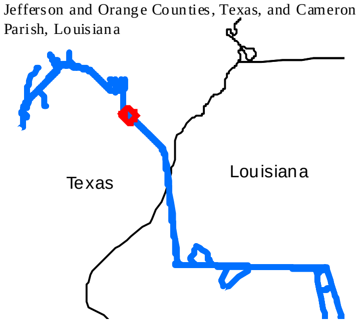
🔲 Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 27 of 74)

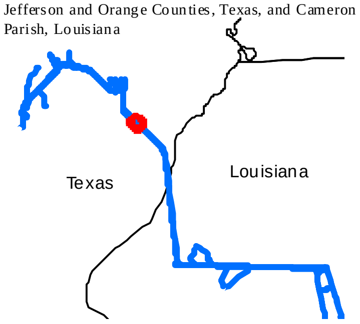
M:\13004\014\Arc\Figure2_NWI.mxd

Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 28 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

0 200 400 800 Feet

Legend

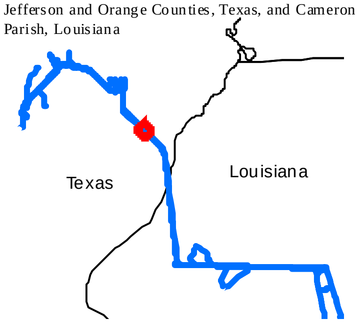
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

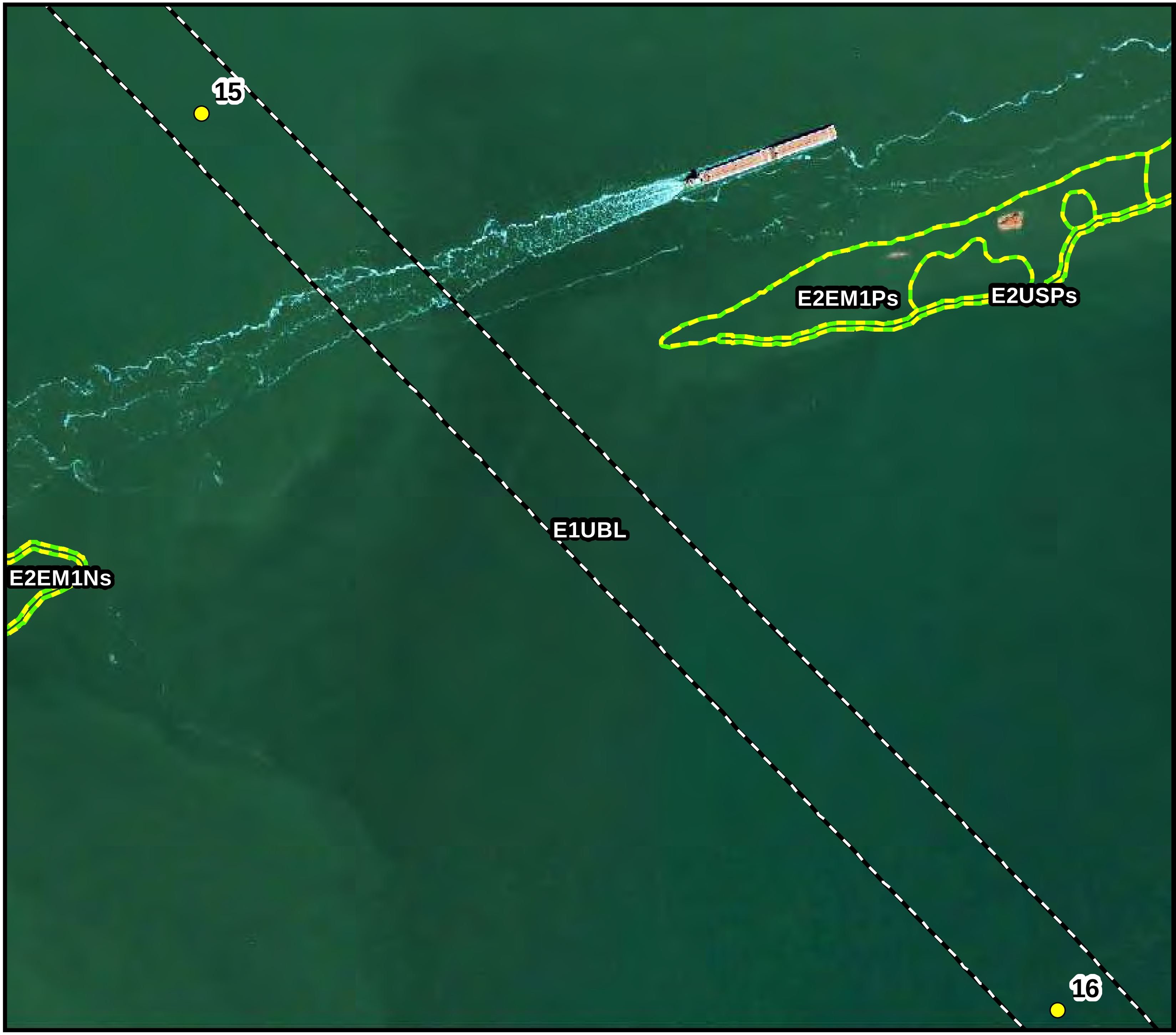
BESI
Benchmark
Ecological Services, Inc.

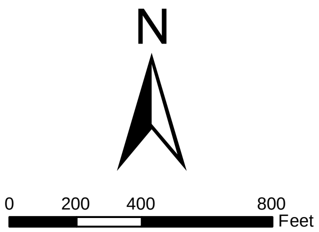
Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 29 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd





Legend

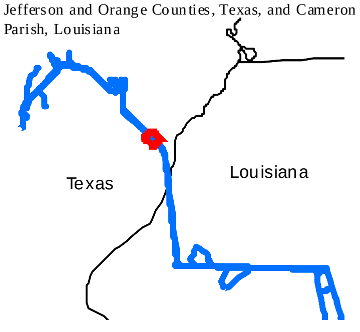
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

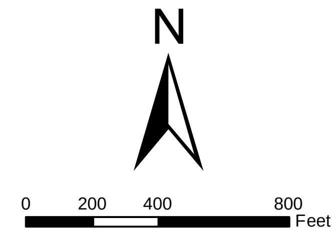
BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 30 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

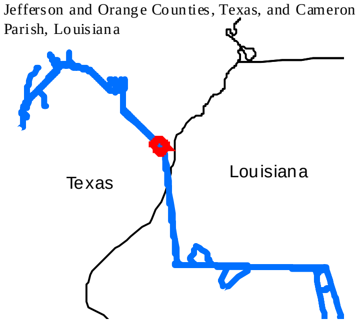
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 31 of 74)

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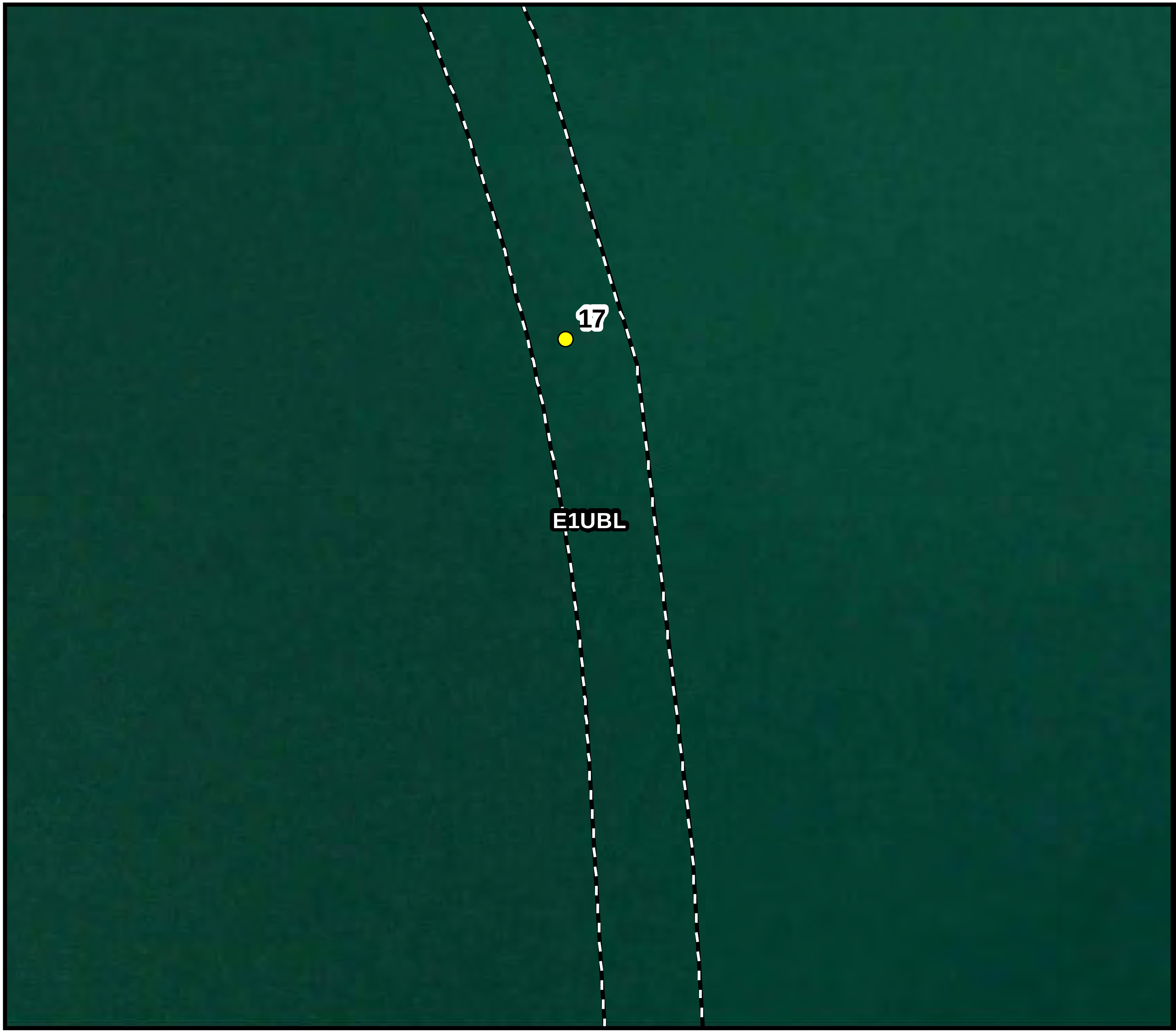


Legend

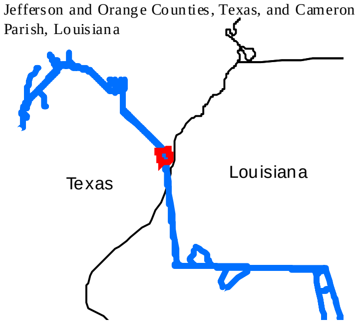
▭ Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 32 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

0 200 400 800 Feet

Legend

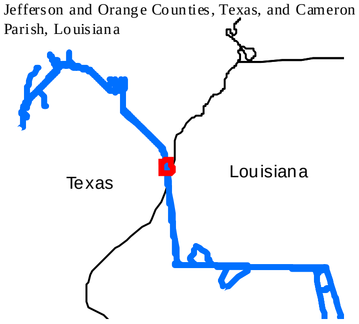
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

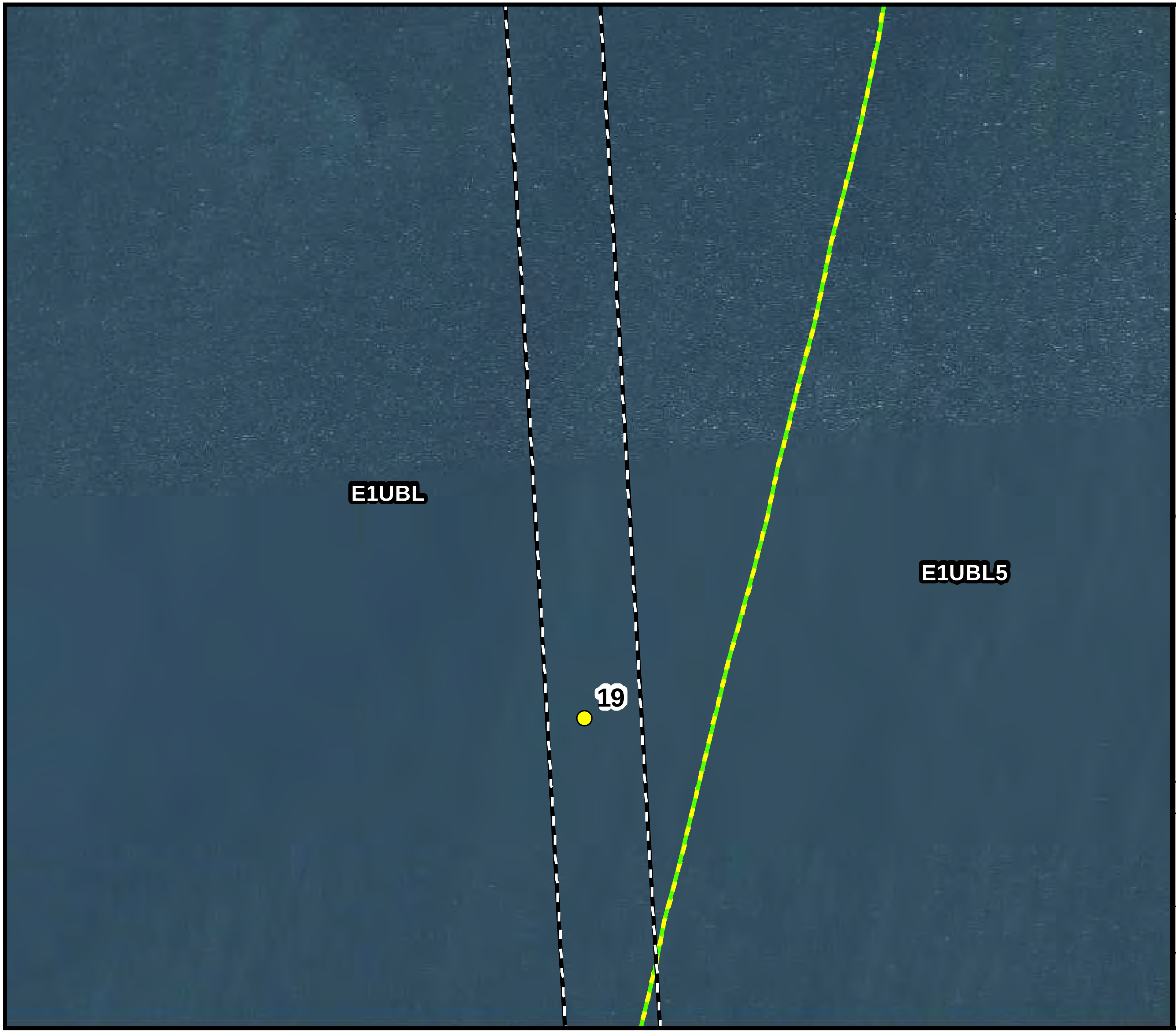
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 33 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



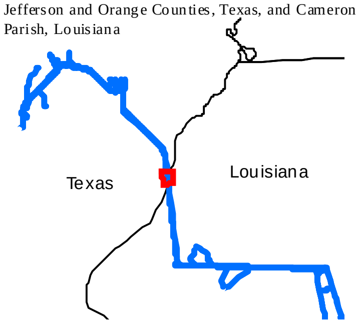
0 200 400 800
Feet

Legend

▭ Survey Area
● Mile Marker
🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

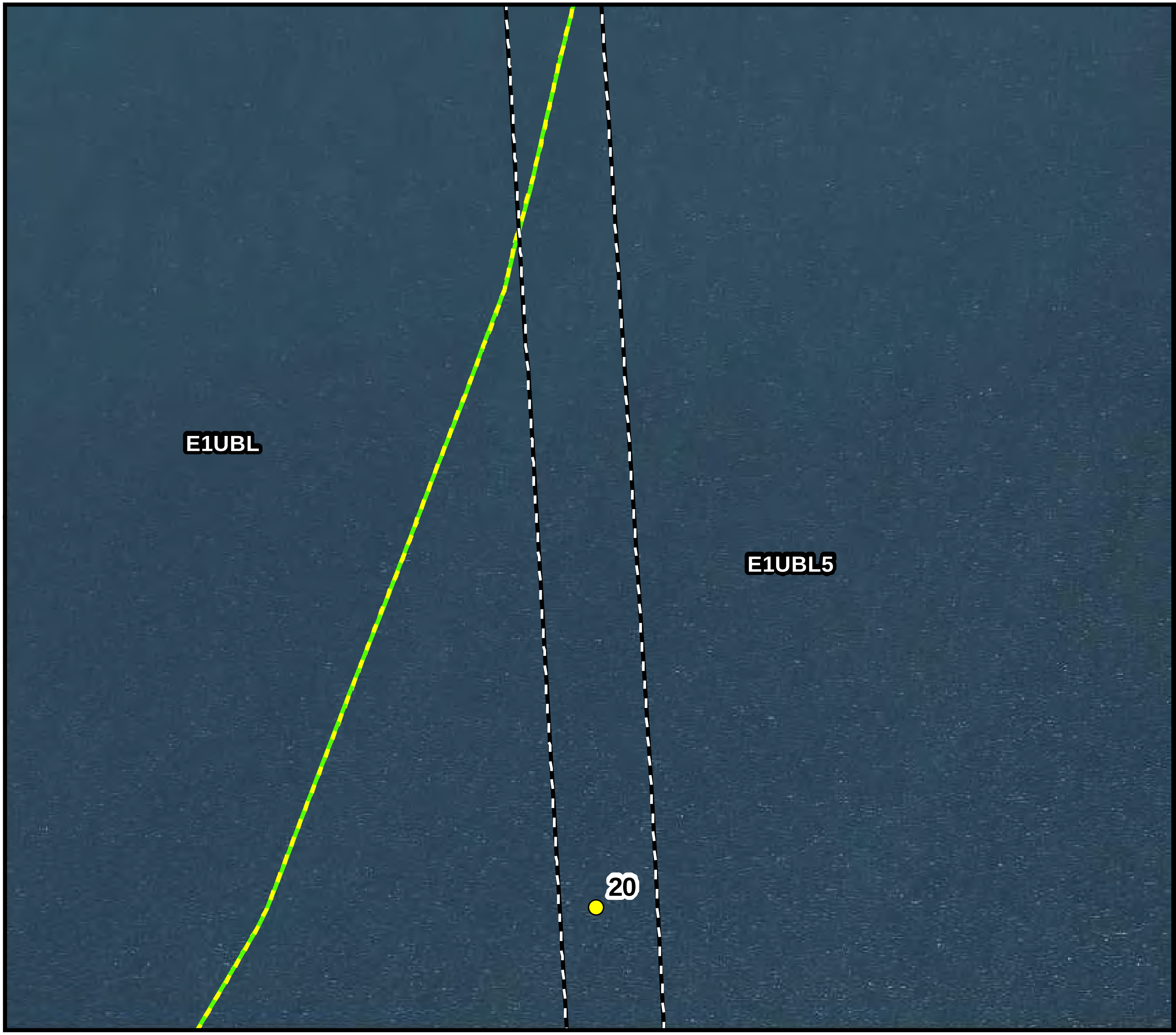
Blue Marlin Offshore Port Project

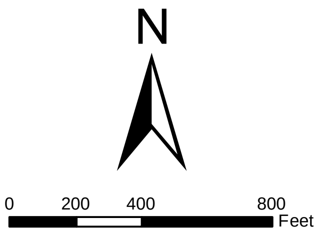
BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 34 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd





Legend

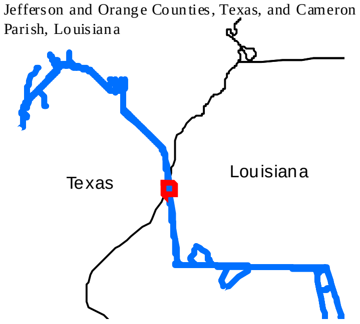
▭ Survey Area

● Mile Marker

▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 35 of 74)

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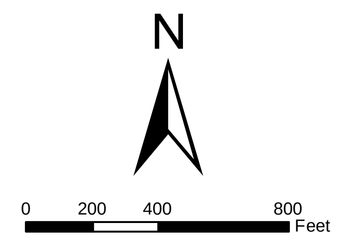


Legend

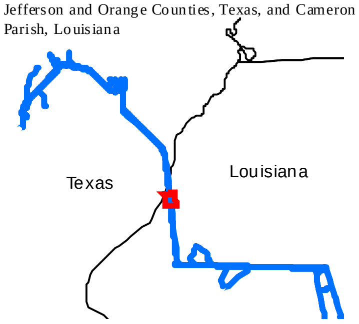
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

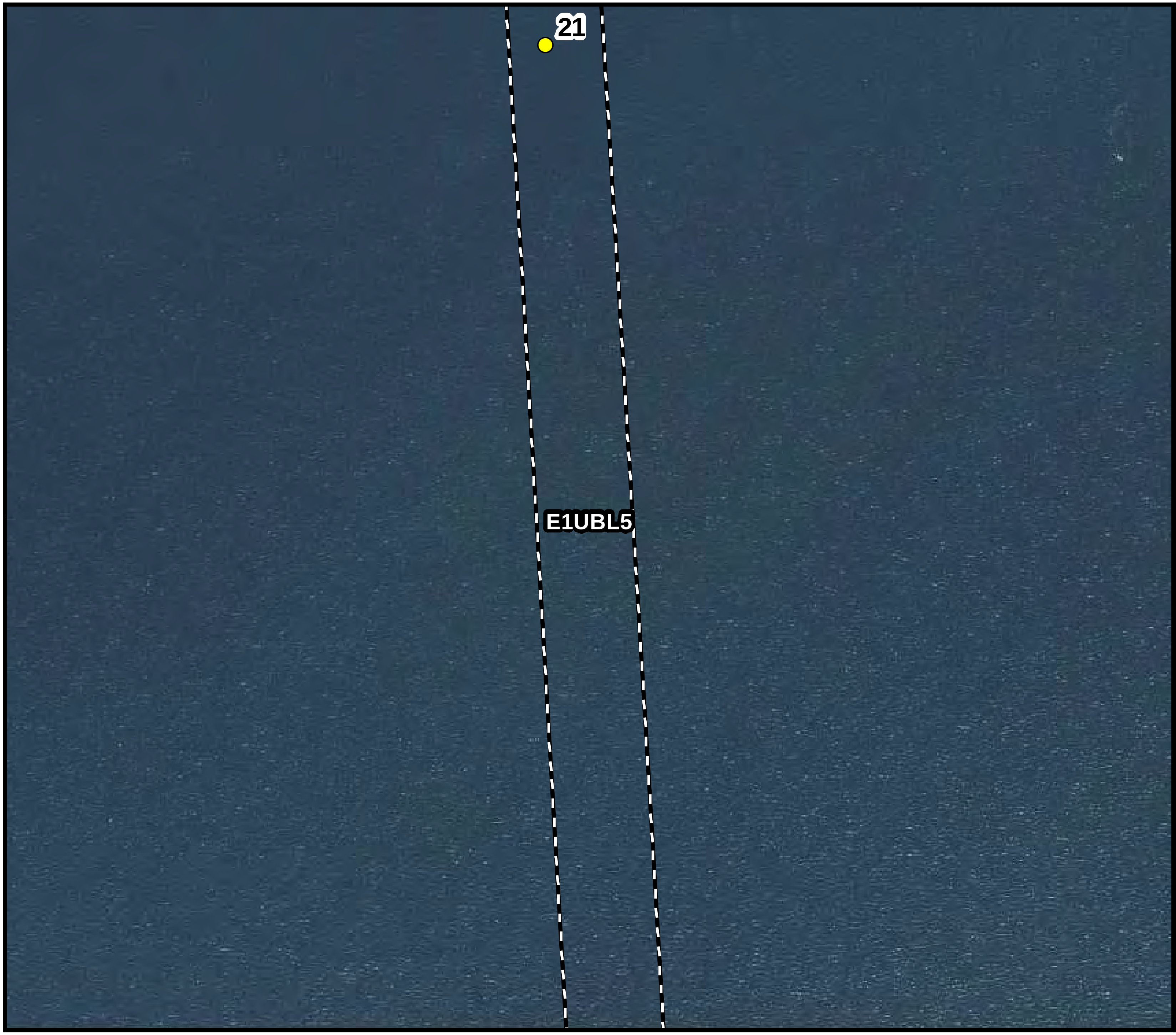
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 36 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

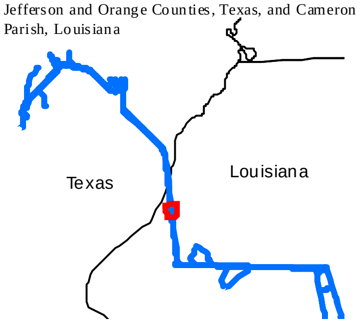
▭ Survey Area

● Mile Marker

▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 37 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

Legend

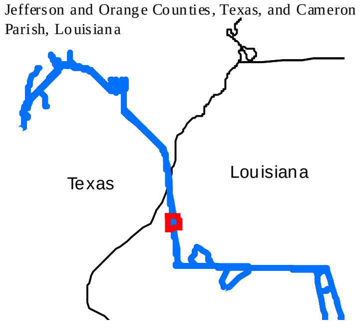
▭ Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 38 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

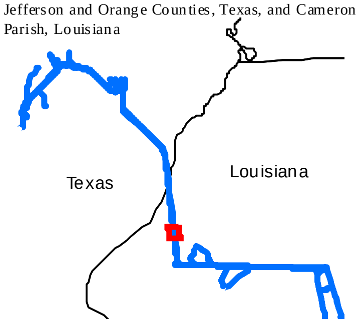
0 200 400 800 Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

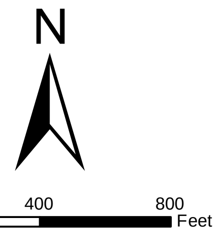
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 39 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

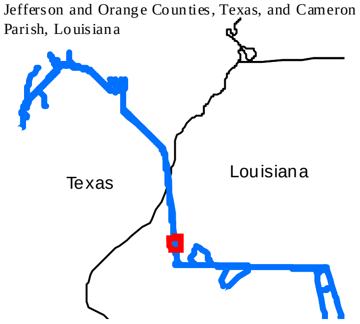


Legend

- ▭ Survey Area
- ● Mile Marker
- ▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 40 of 74)

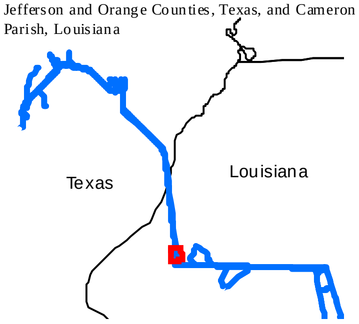
M:\13004\014\Arc\Figure2_NWI.mxd

Legend

▭ Survey Area
● Mile Marker
🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

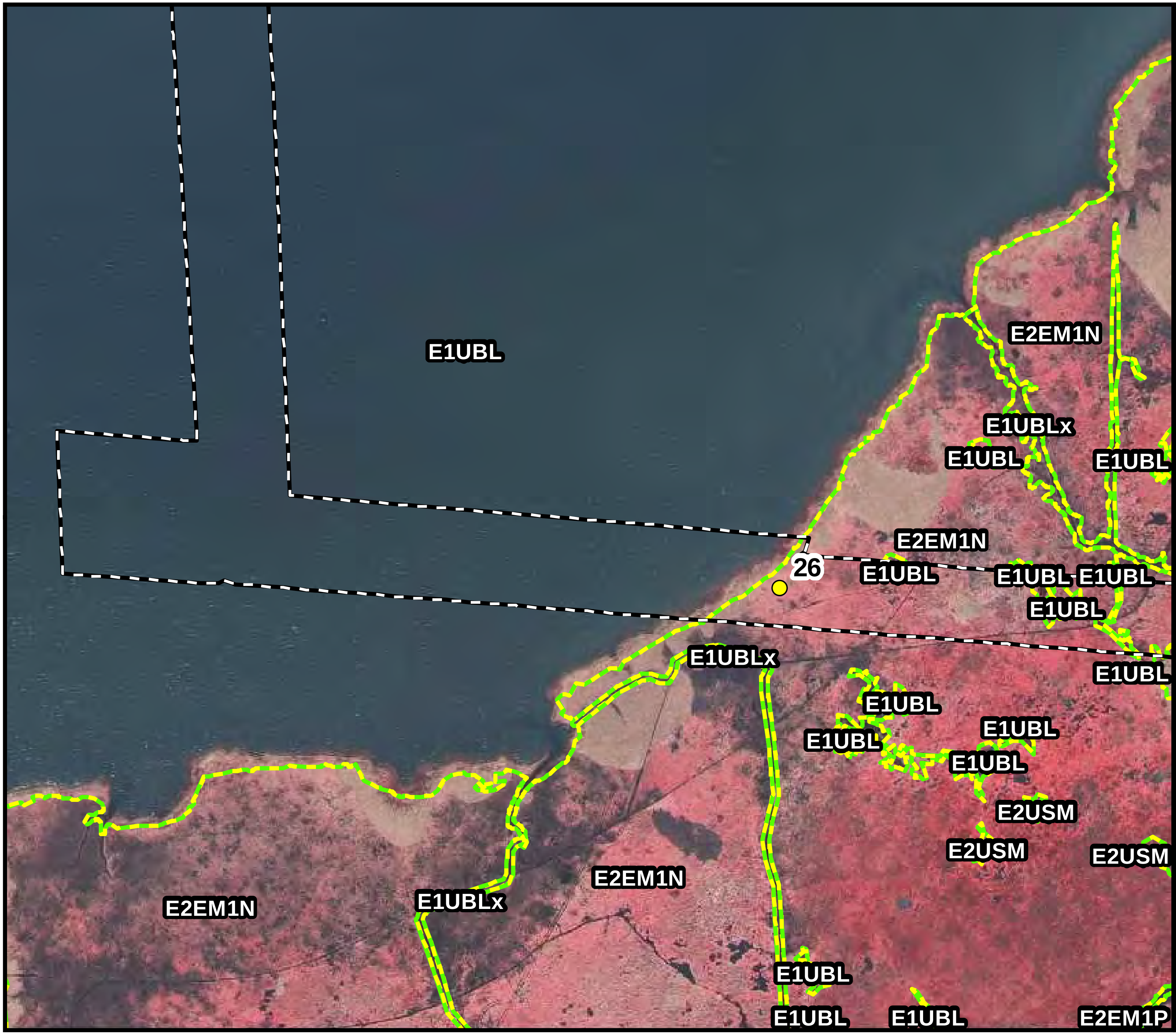
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 41 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

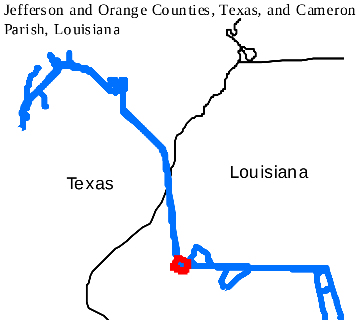
0 200 400 800
Feet

Legend

▭ Survey Area
● Mile Marker
▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

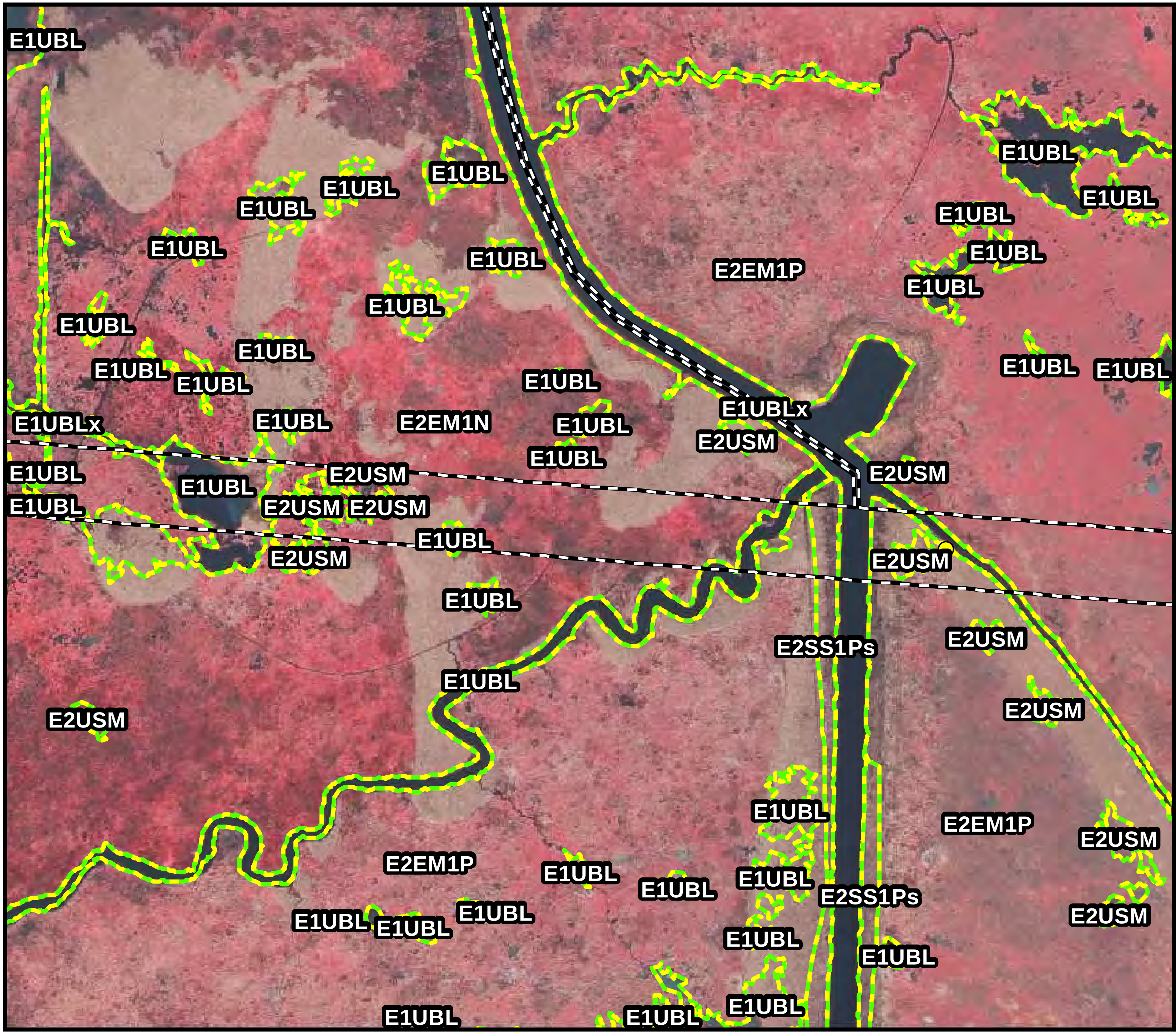
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 42 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

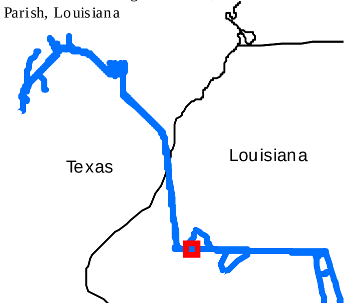
0 200 400 800 Feet

Legend

⬚ Survey Area
● Mile Marker
▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 43 of 74)

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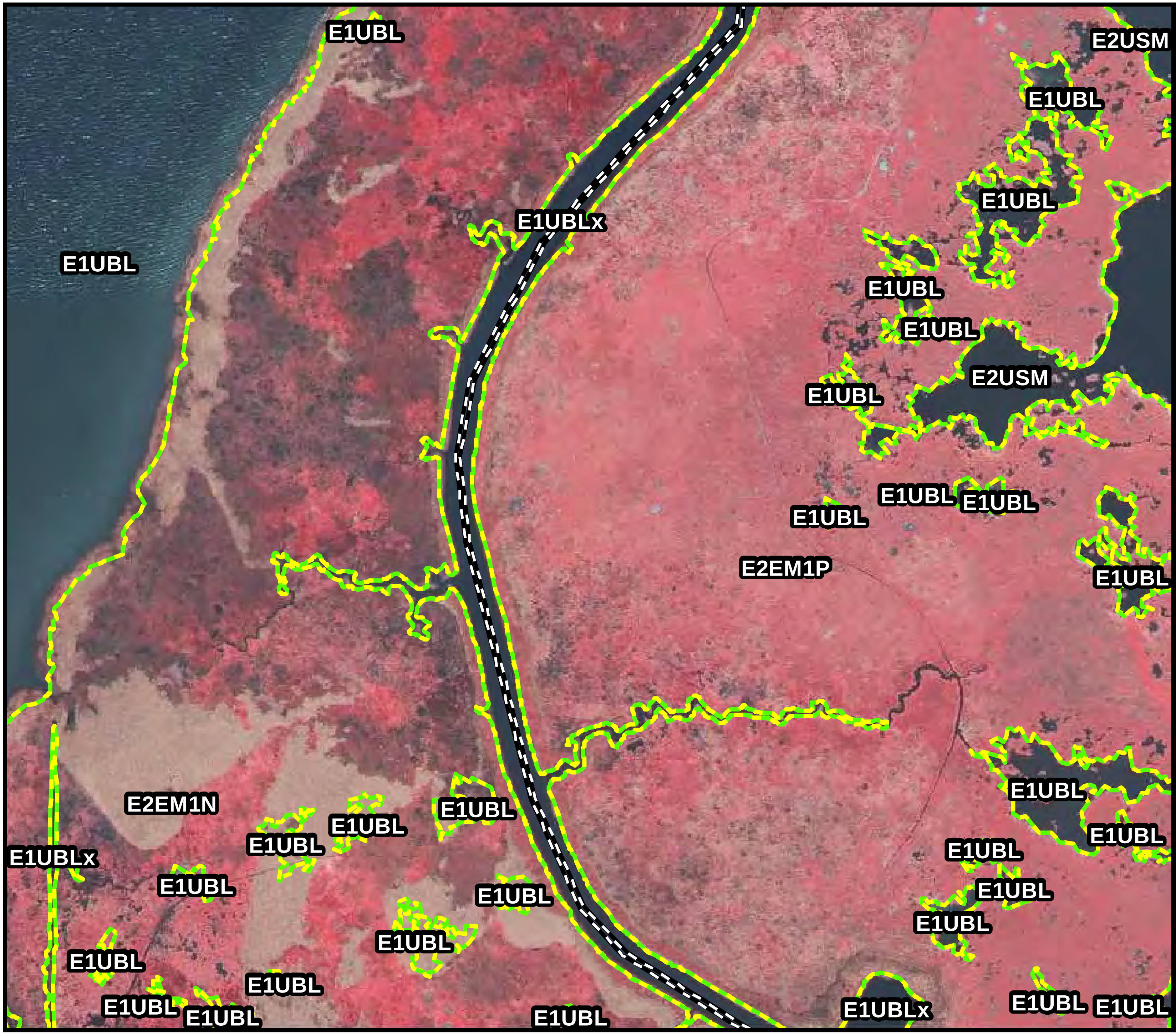
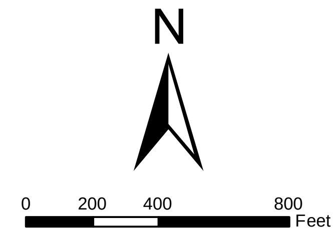




Legend

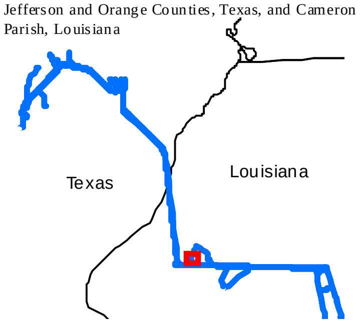
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

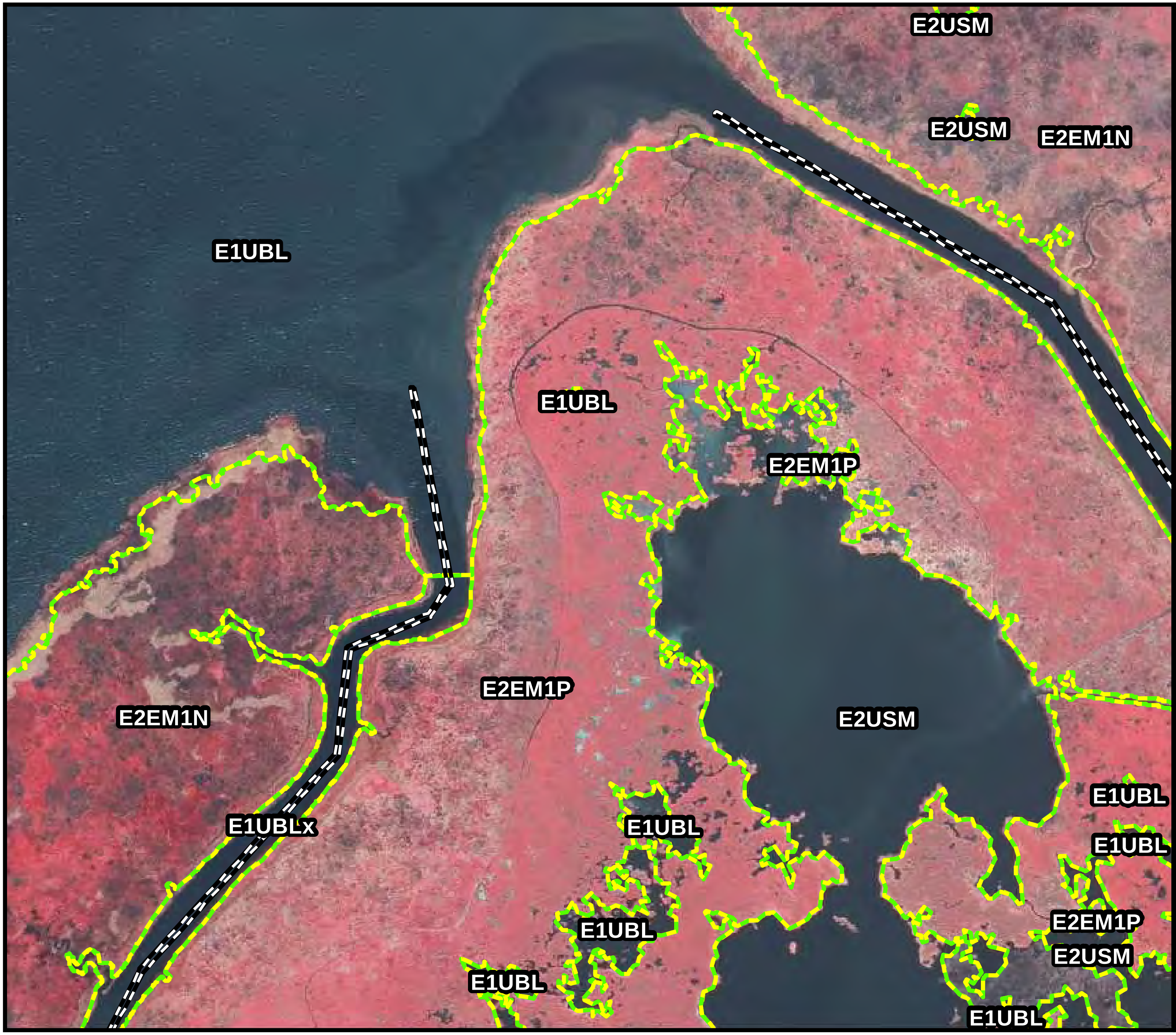
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 44 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

0 200 400 800
Feet

Legend

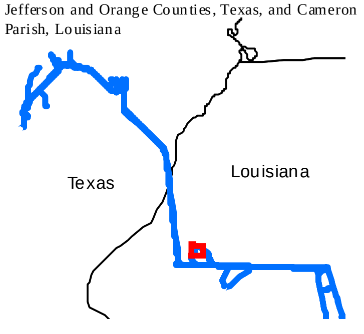
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

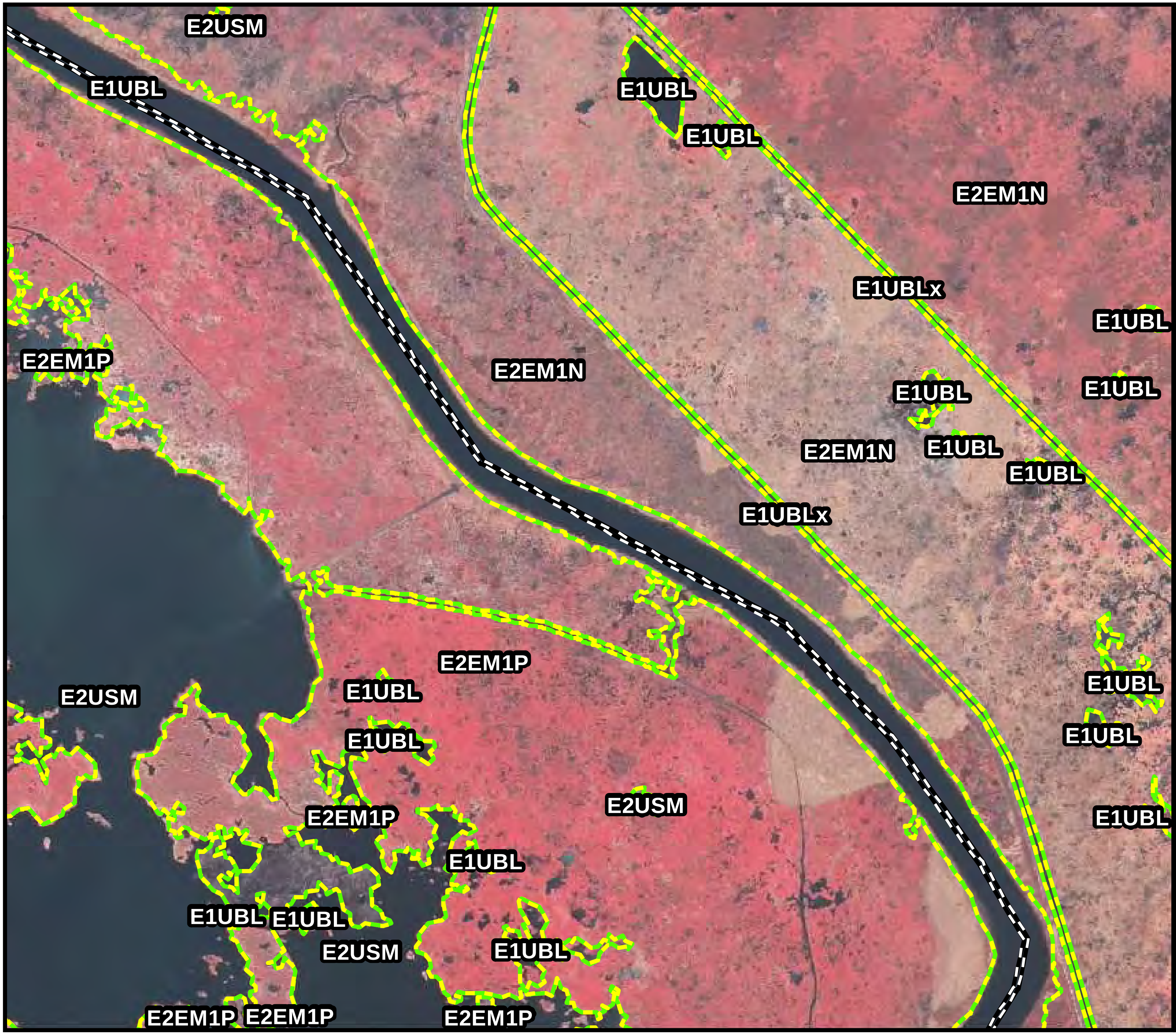
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 45 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

0 200 400 800 Feet

Legend

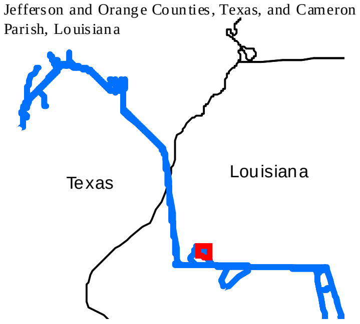
▭ Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

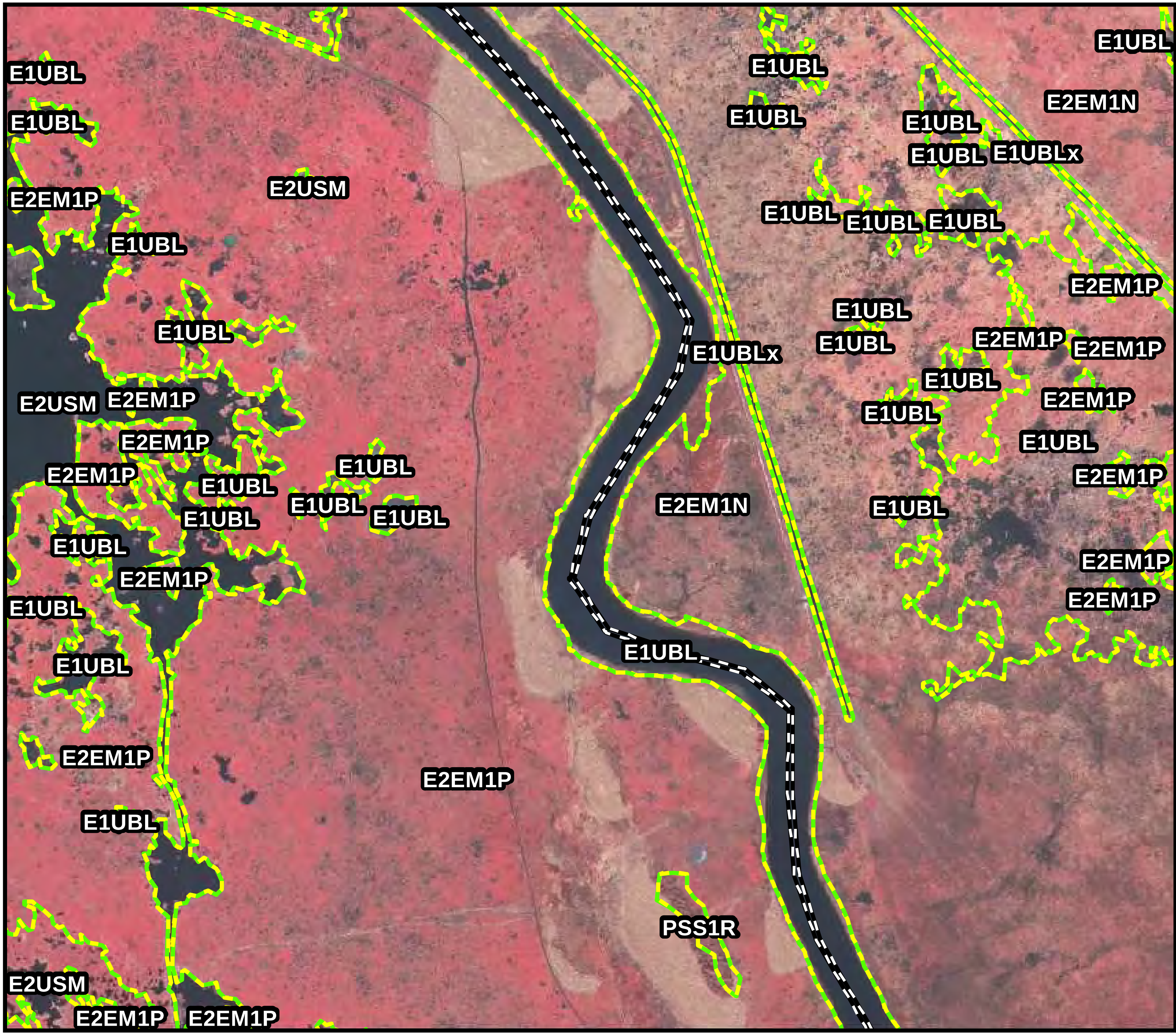
Blue Marlin Offshore Port LLC

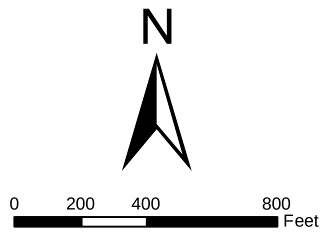
Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 46 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



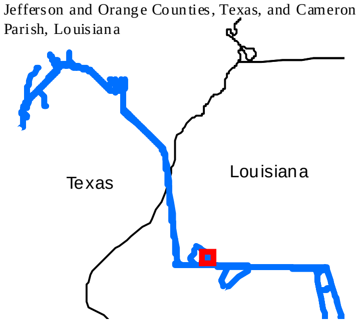


Legend

- Survey Area
- ● Mile Marker
- NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

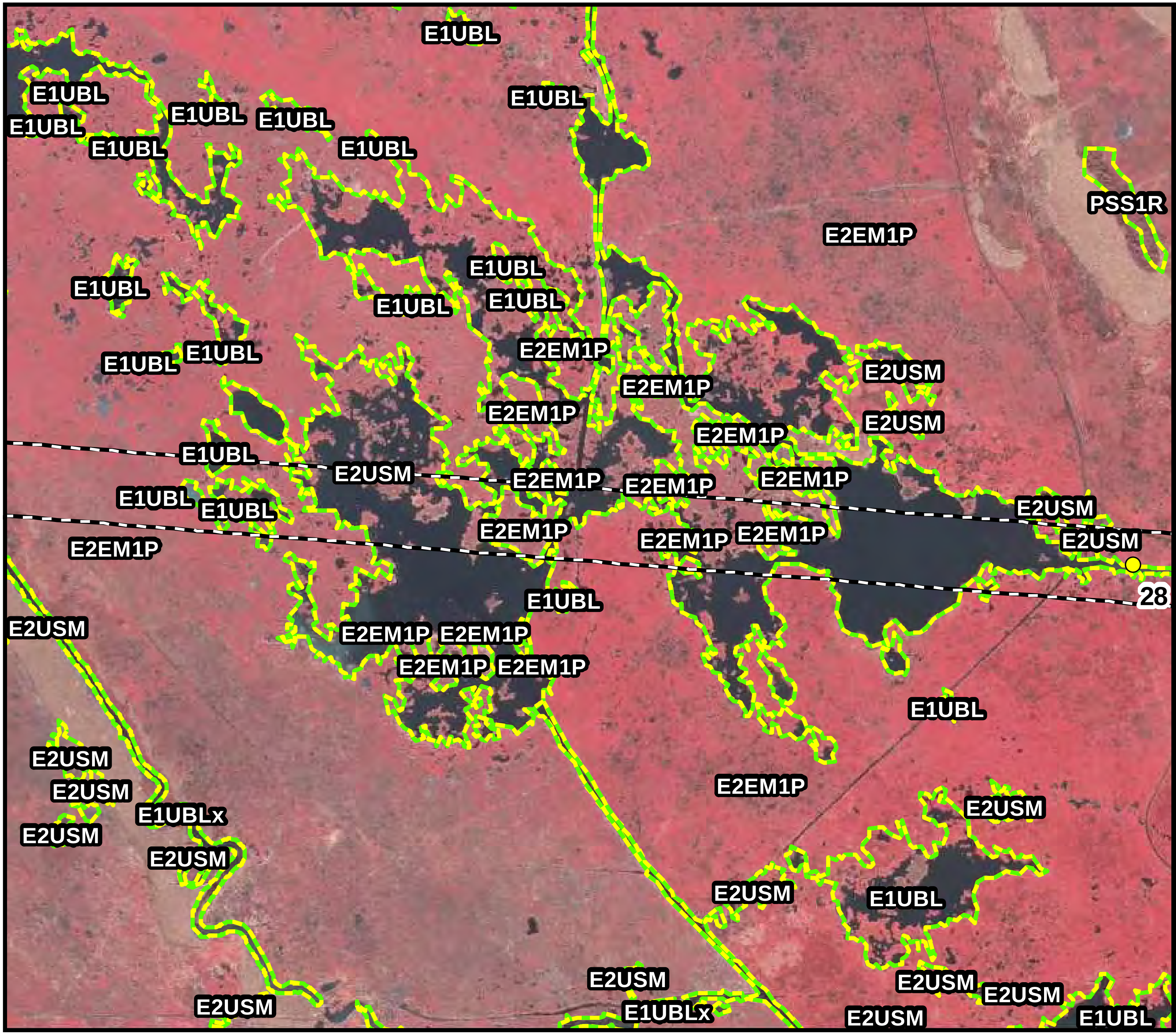
BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 47 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

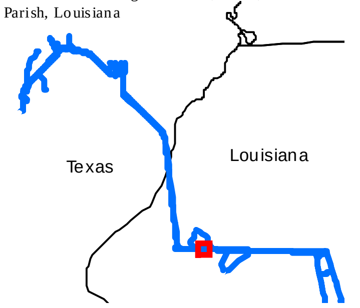
0 200 400 800
Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

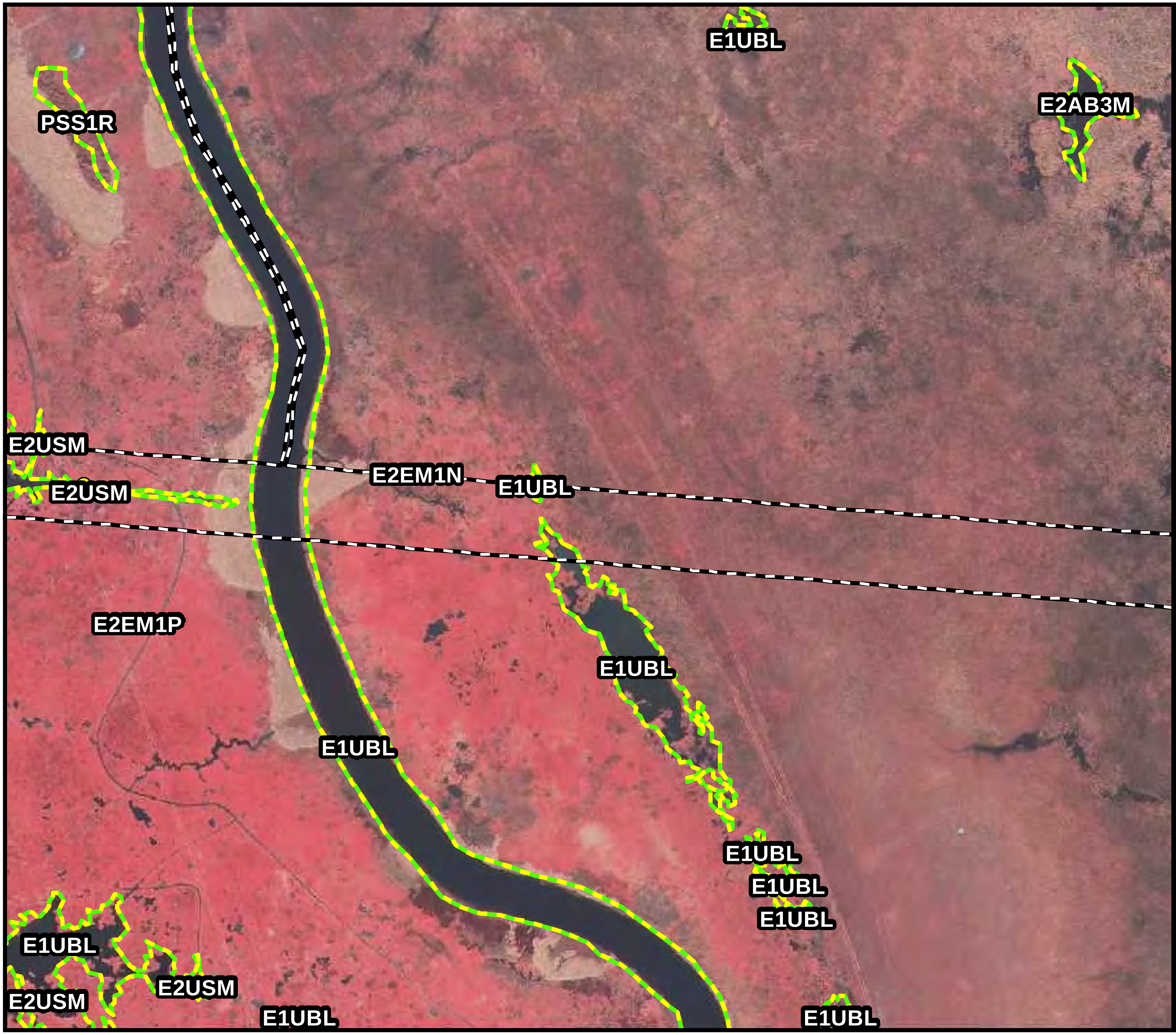
Blue Marlin Offshore Port Project

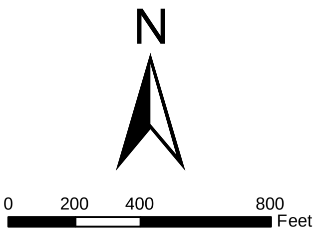
BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 48 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



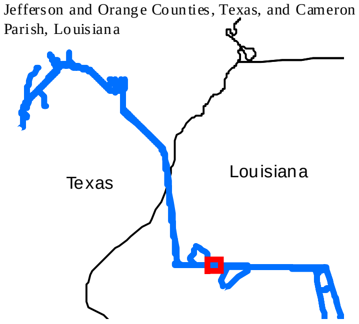


Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

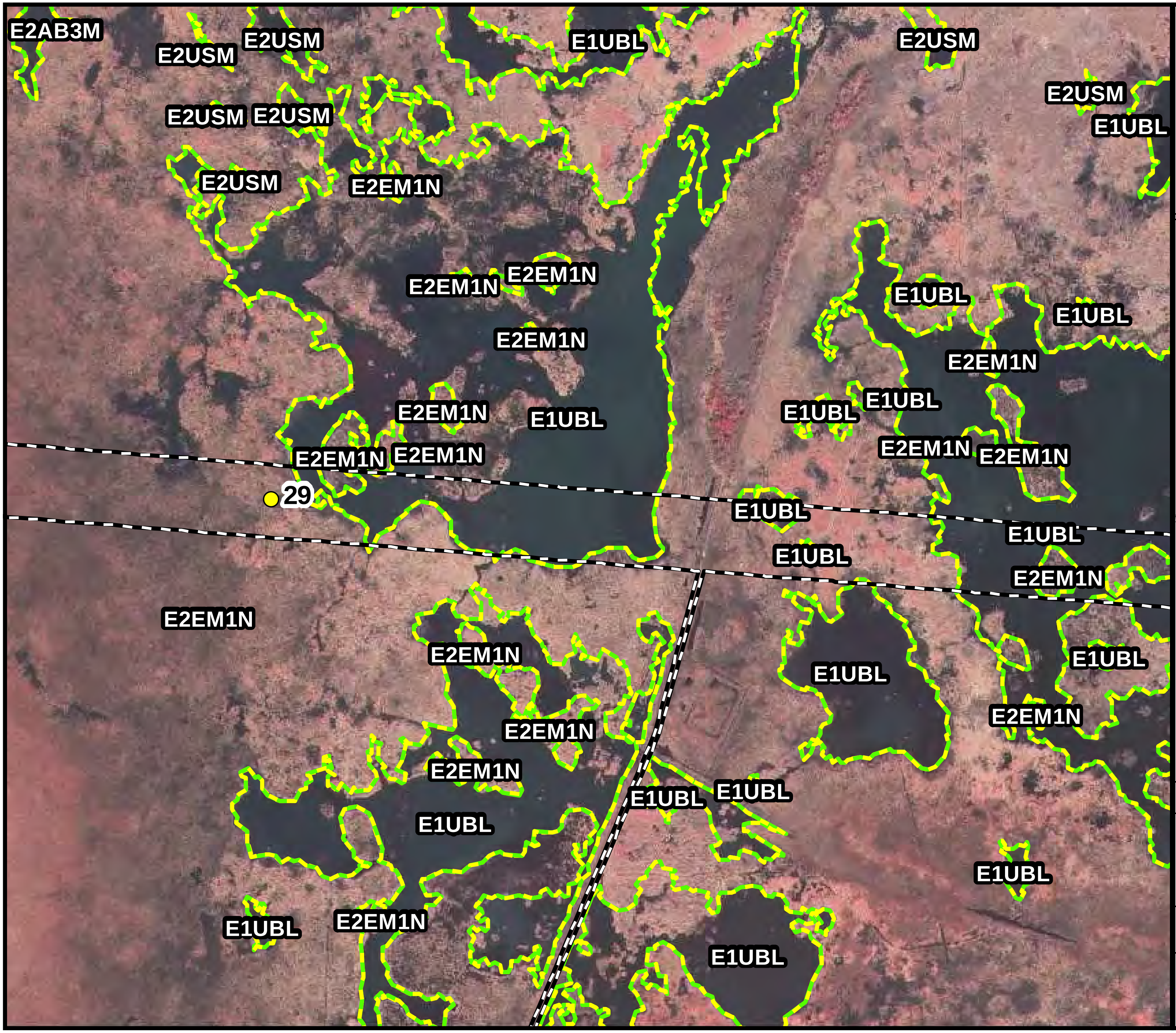
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 49 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

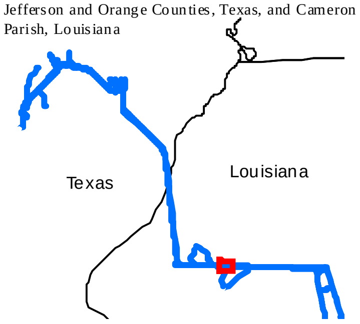
0 200 400 800 Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

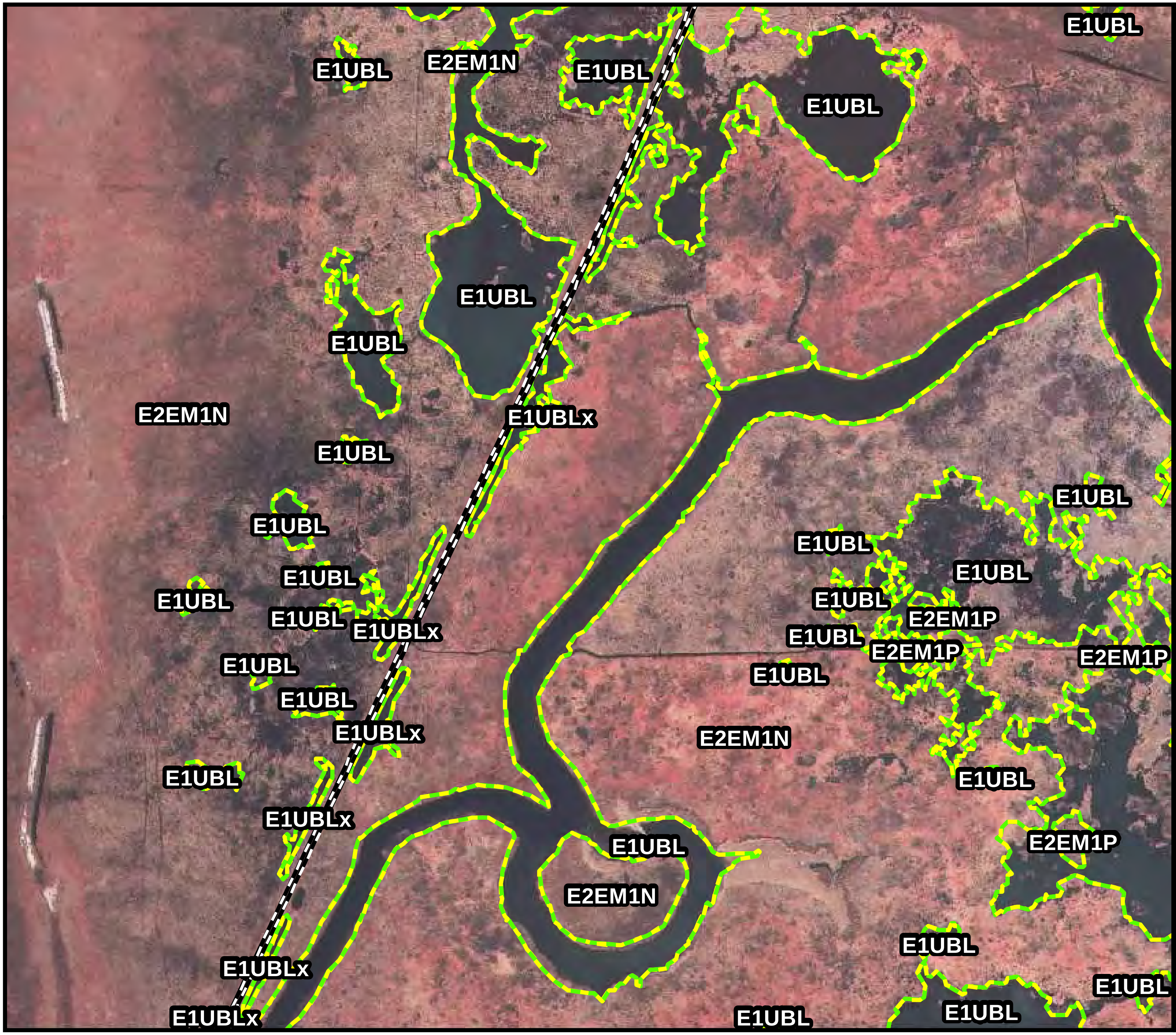
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 50 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

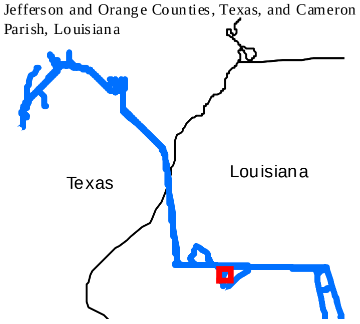


Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 51 of 74)

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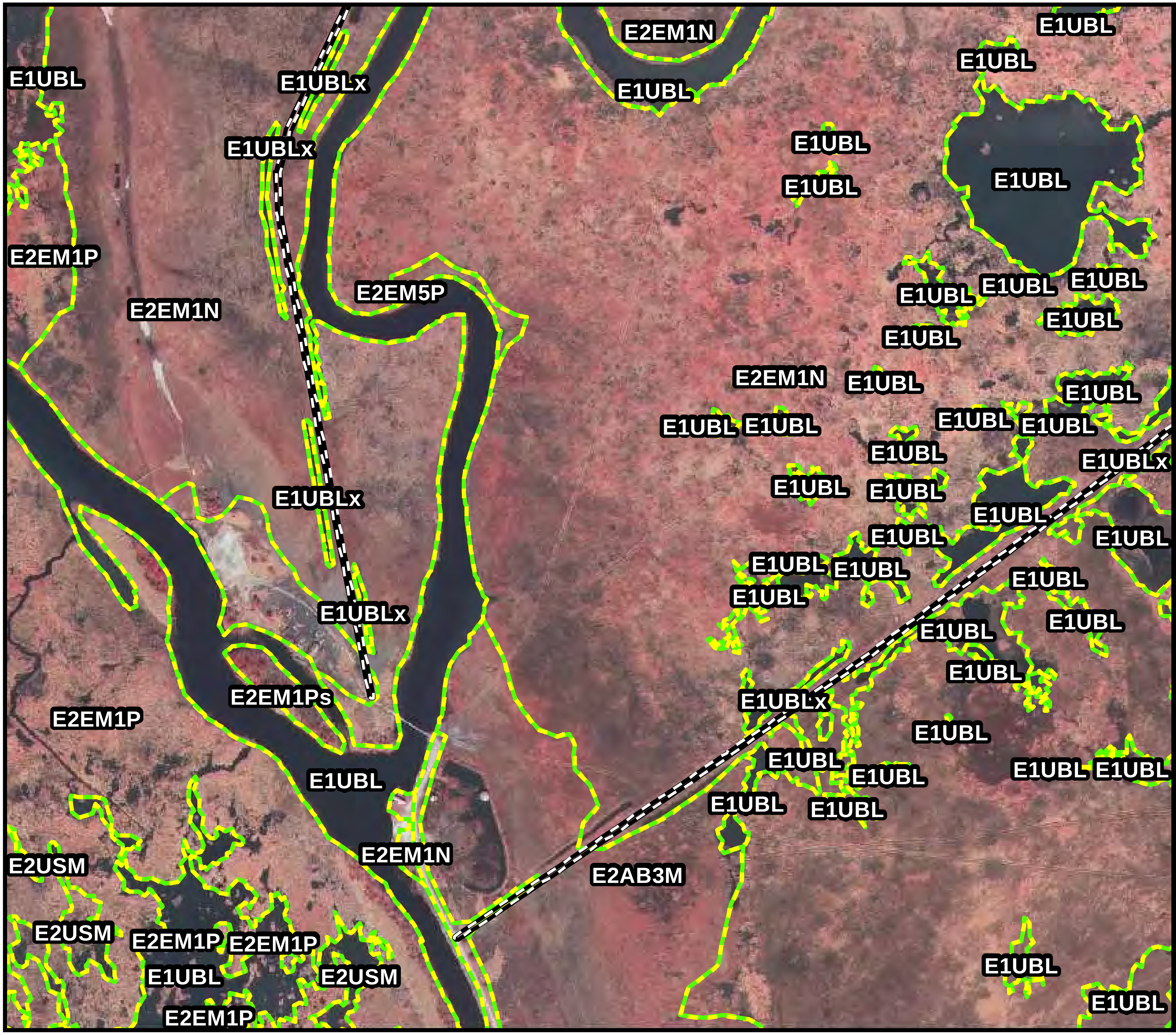


N

0 200 400 800 Feet

Legend

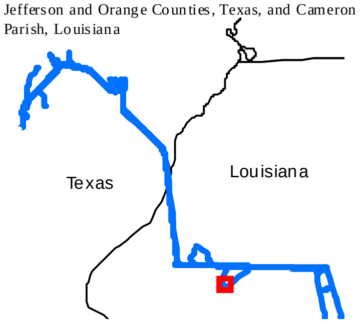
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 52 of 74)

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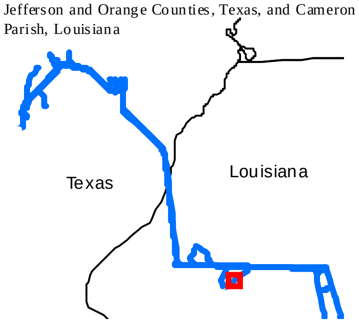
Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

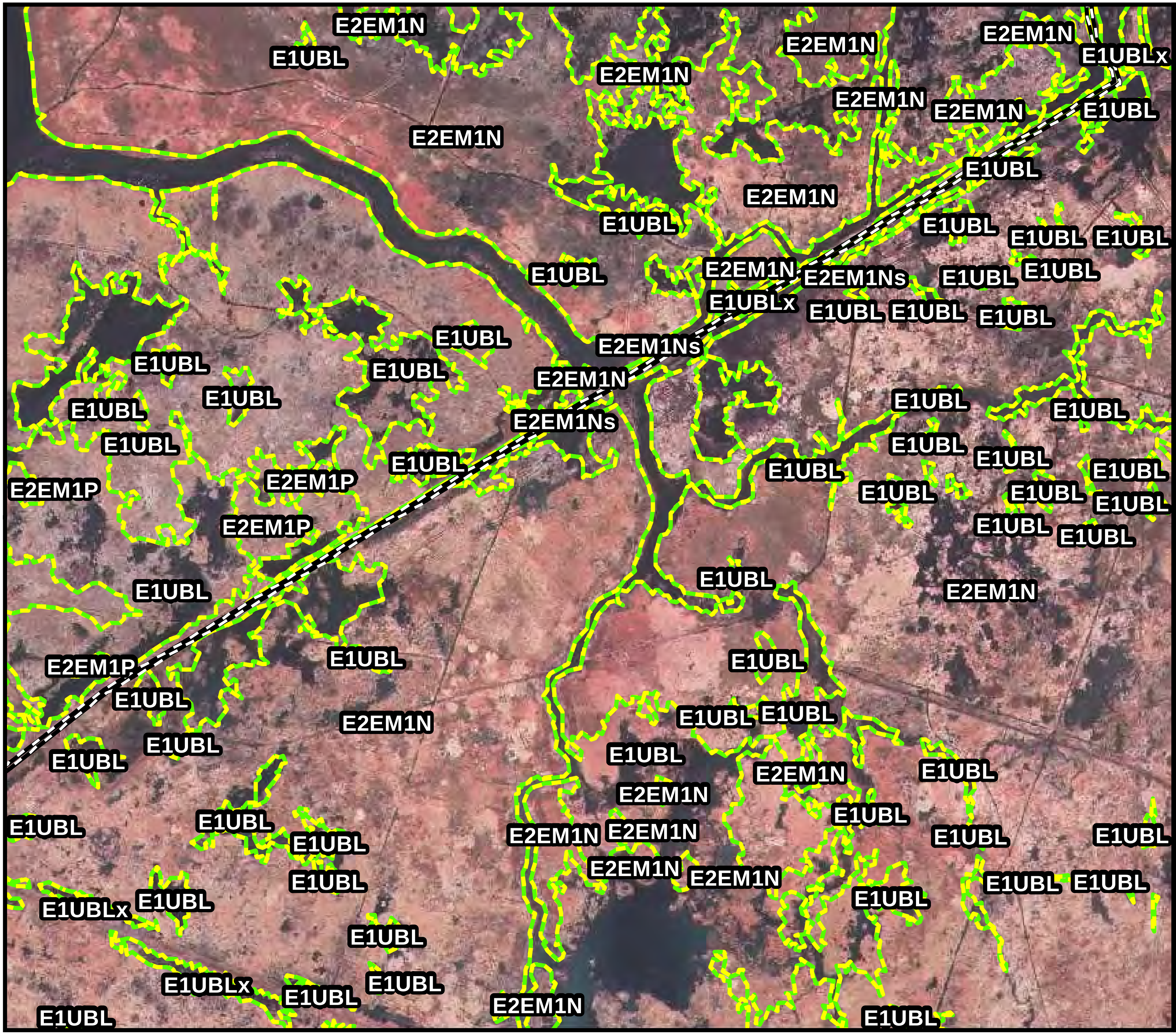
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 53 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

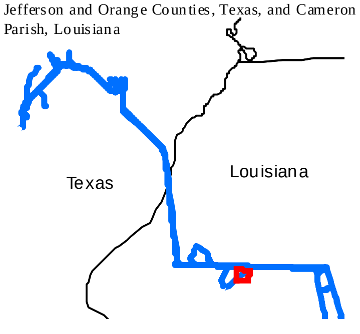
Survey Area

● Mile Marker

NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

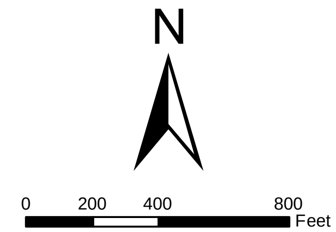
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 54 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

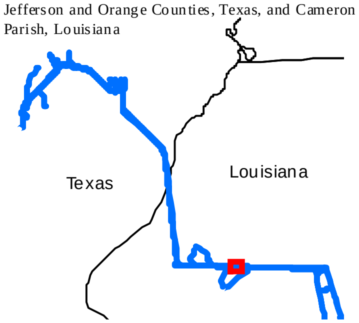


Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

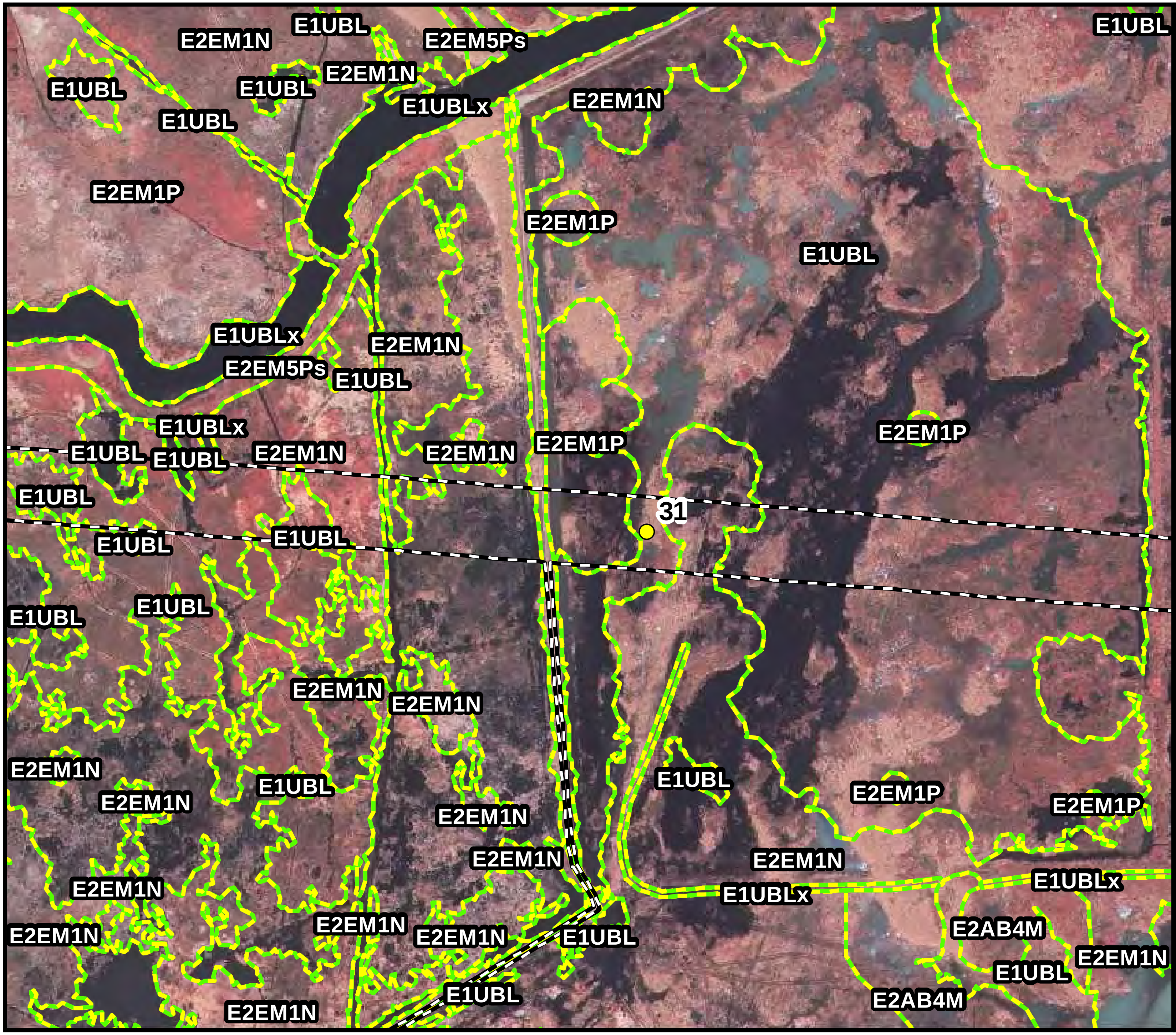
BESI
Benchmark
Ecological Services, Inc.

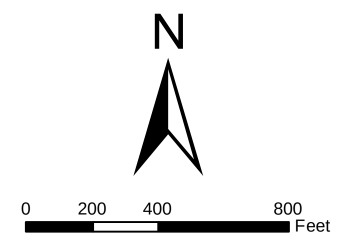
Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 55 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



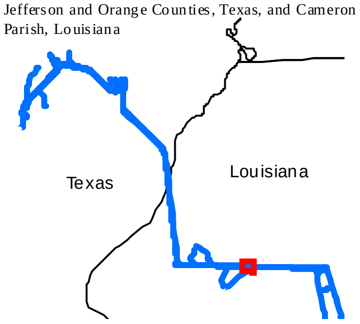


Legend

- Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

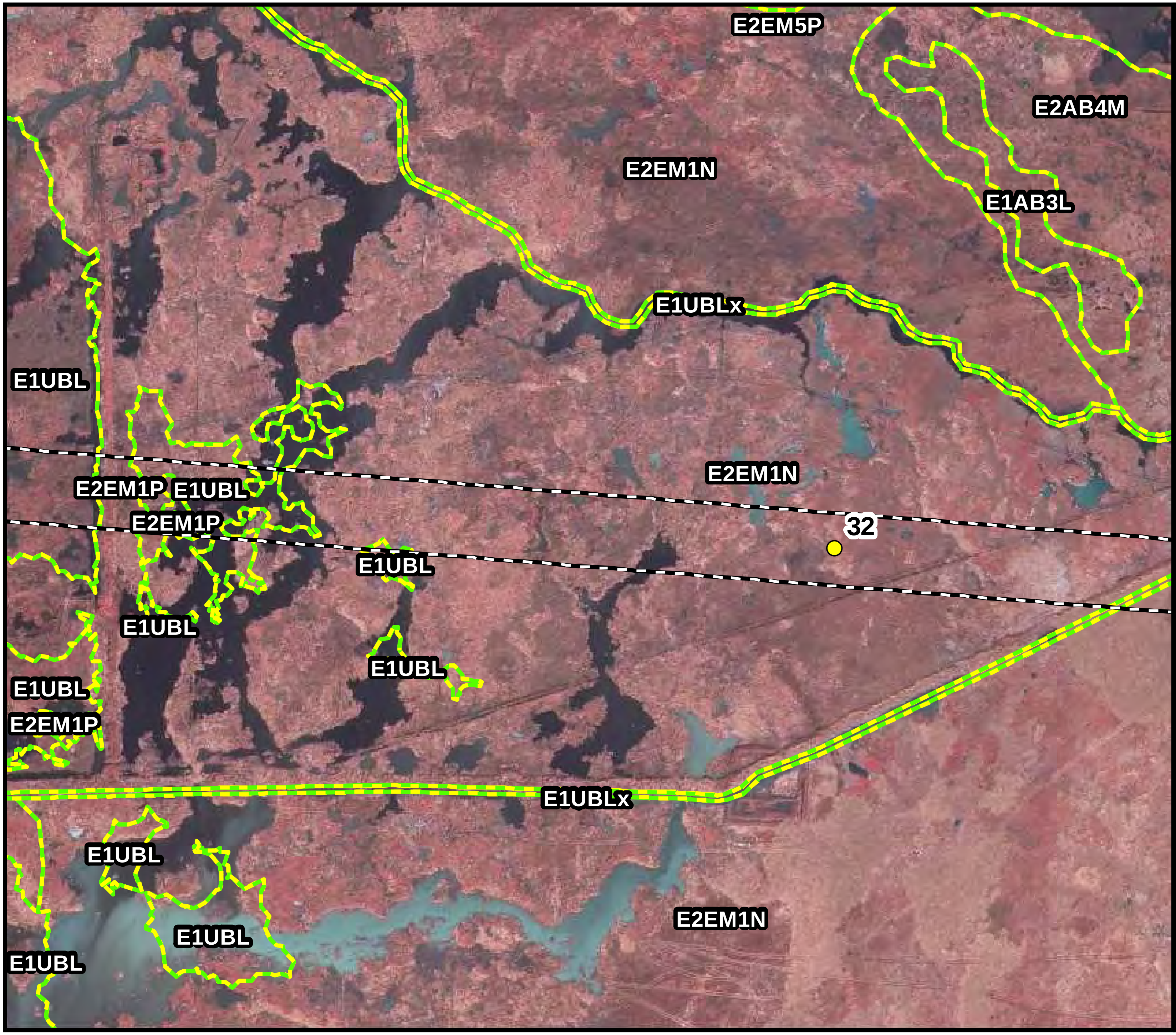
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 56 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

0 200 400 800 Feet

Legend

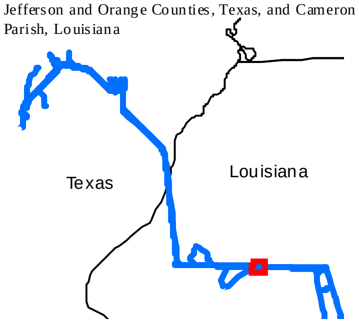
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

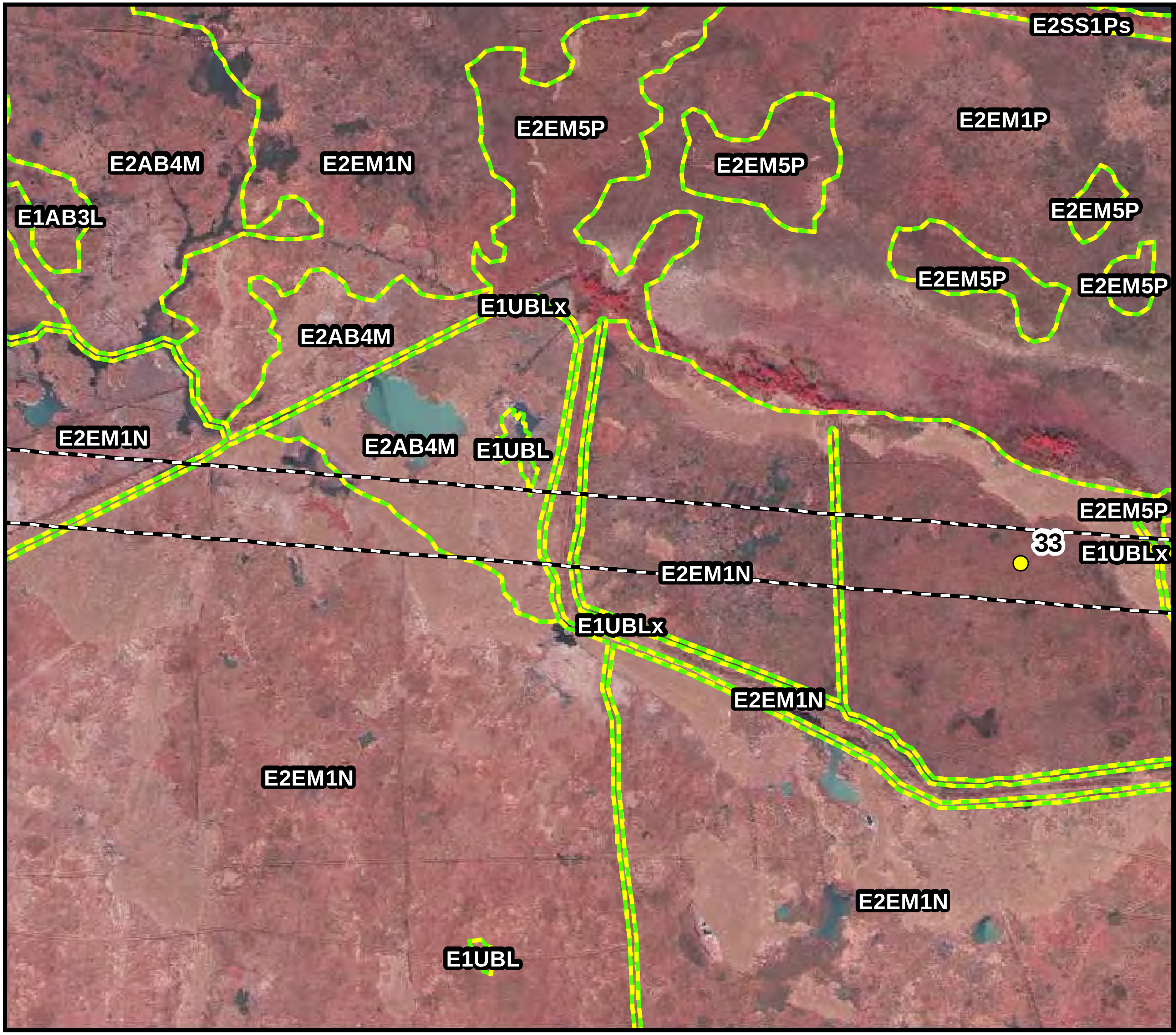
Blue Marlin Offshore Port Project

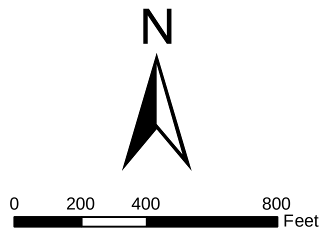
BESI
Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 57 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



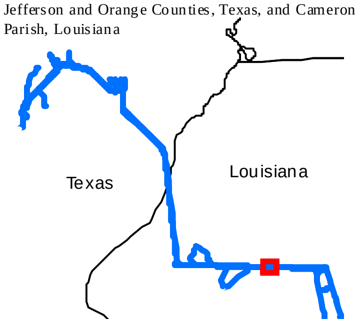


Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

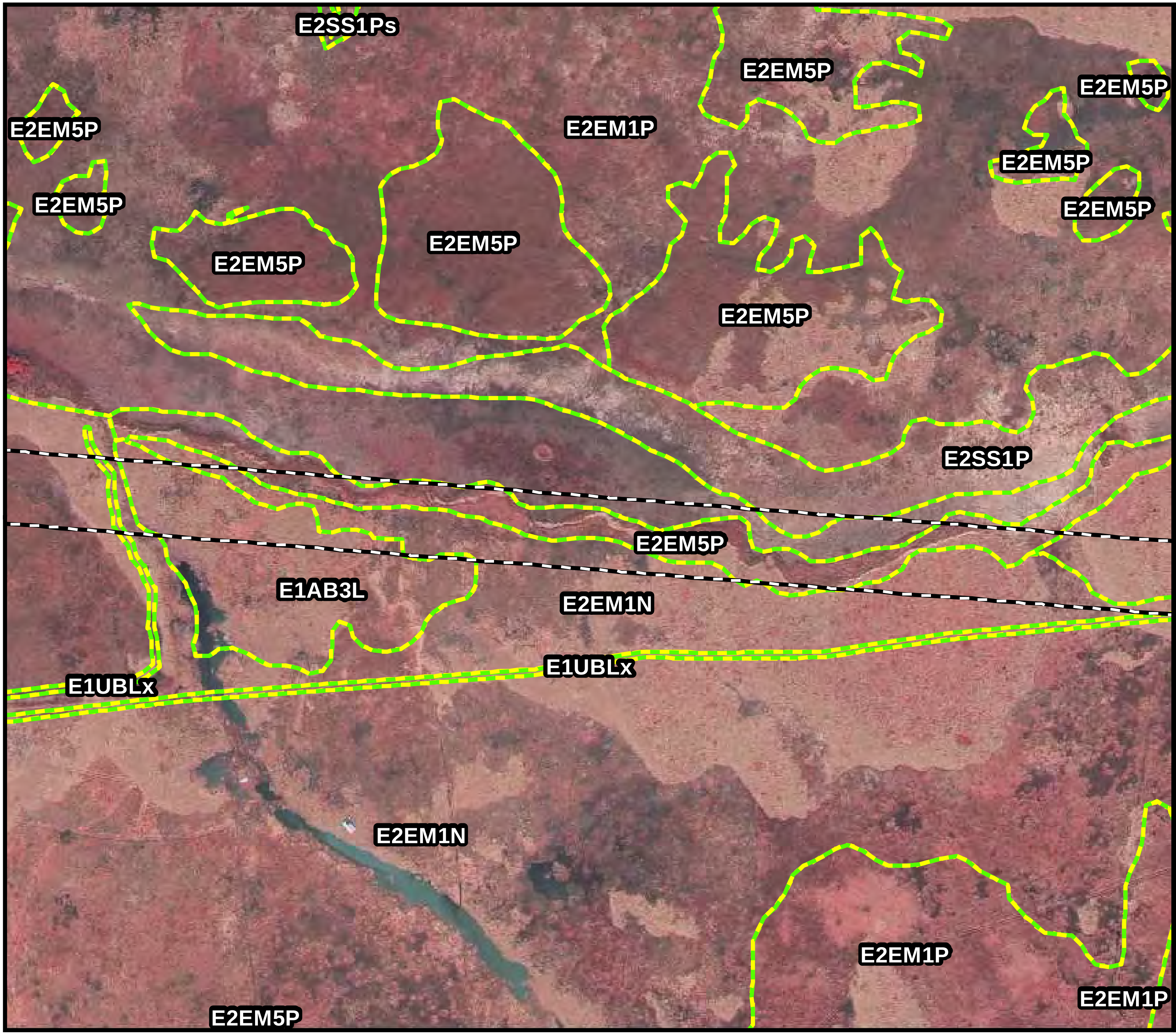
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 58 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

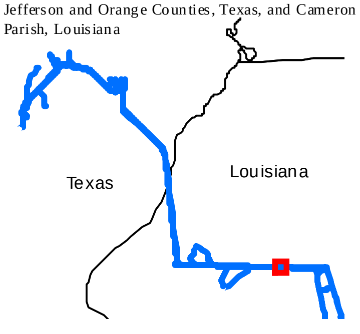
0 200 400 800
Feet

Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

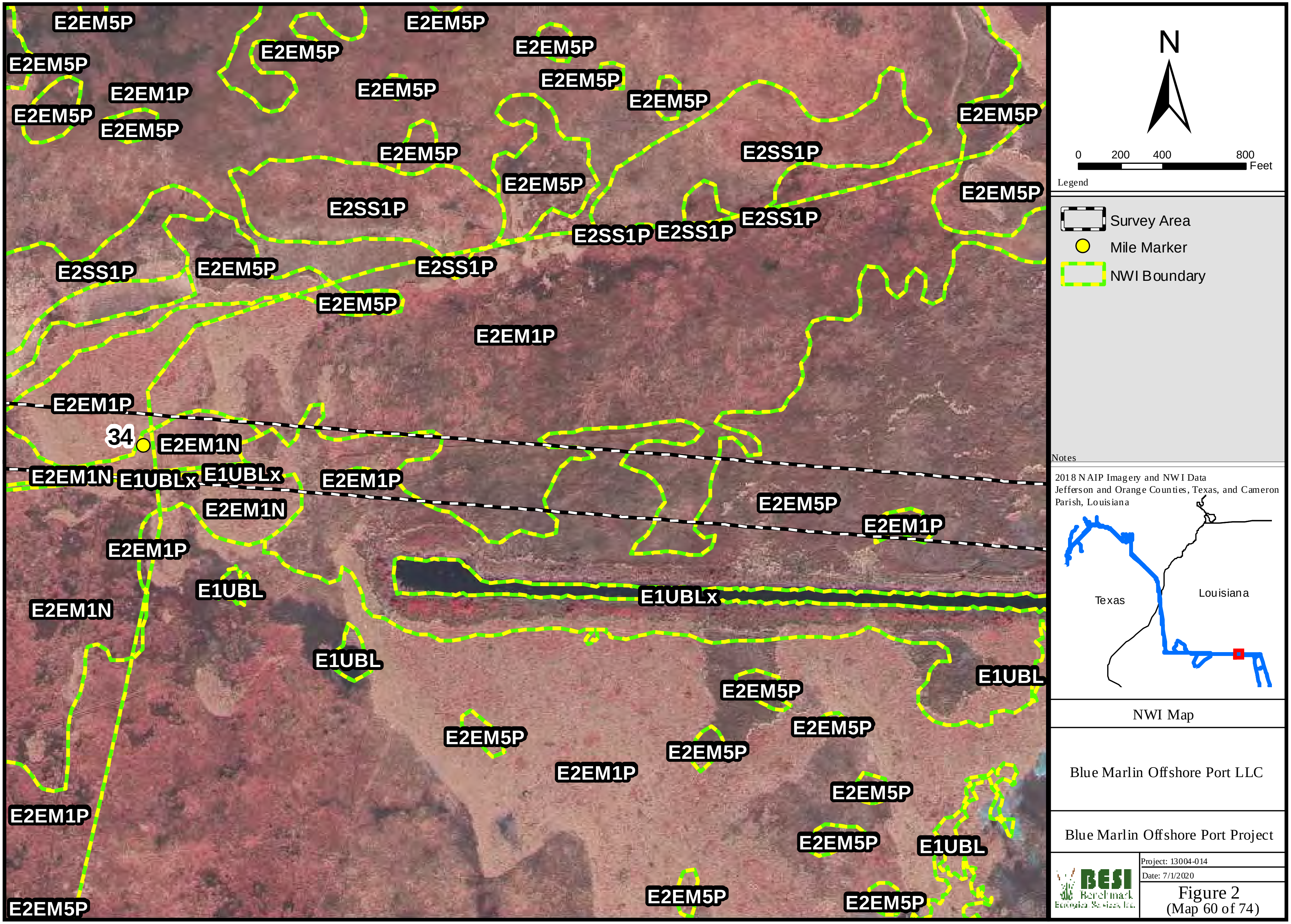
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 59 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

NWI Map

Blue Marlin Offshore Port LLC

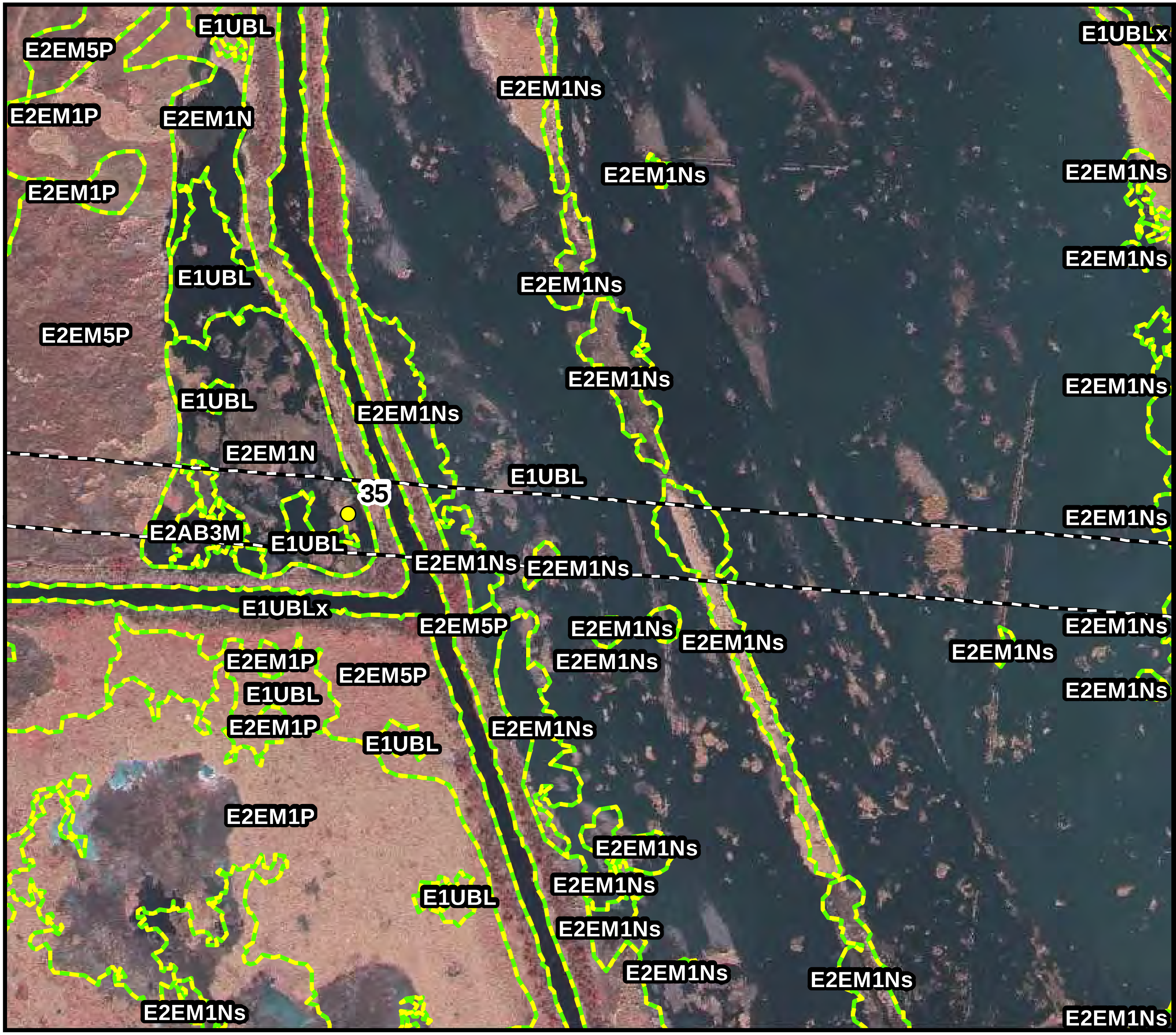
Blue Marlin Offshore Port Project

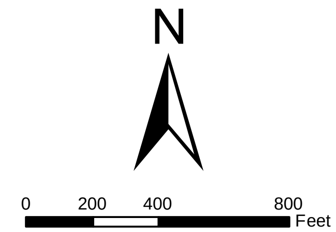
Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 60 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



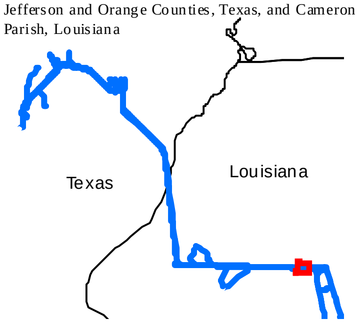


Legend

▭	Survey Area
●	Mile Marker
▭	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

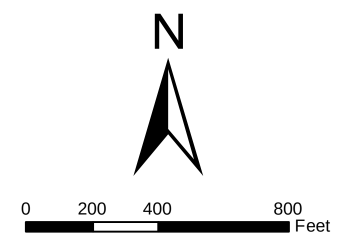
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 61 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

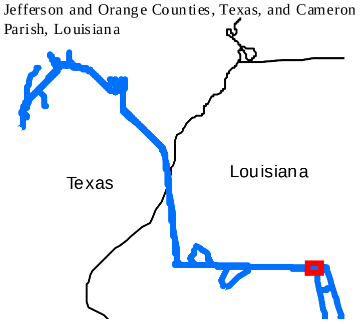


Legend

- Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

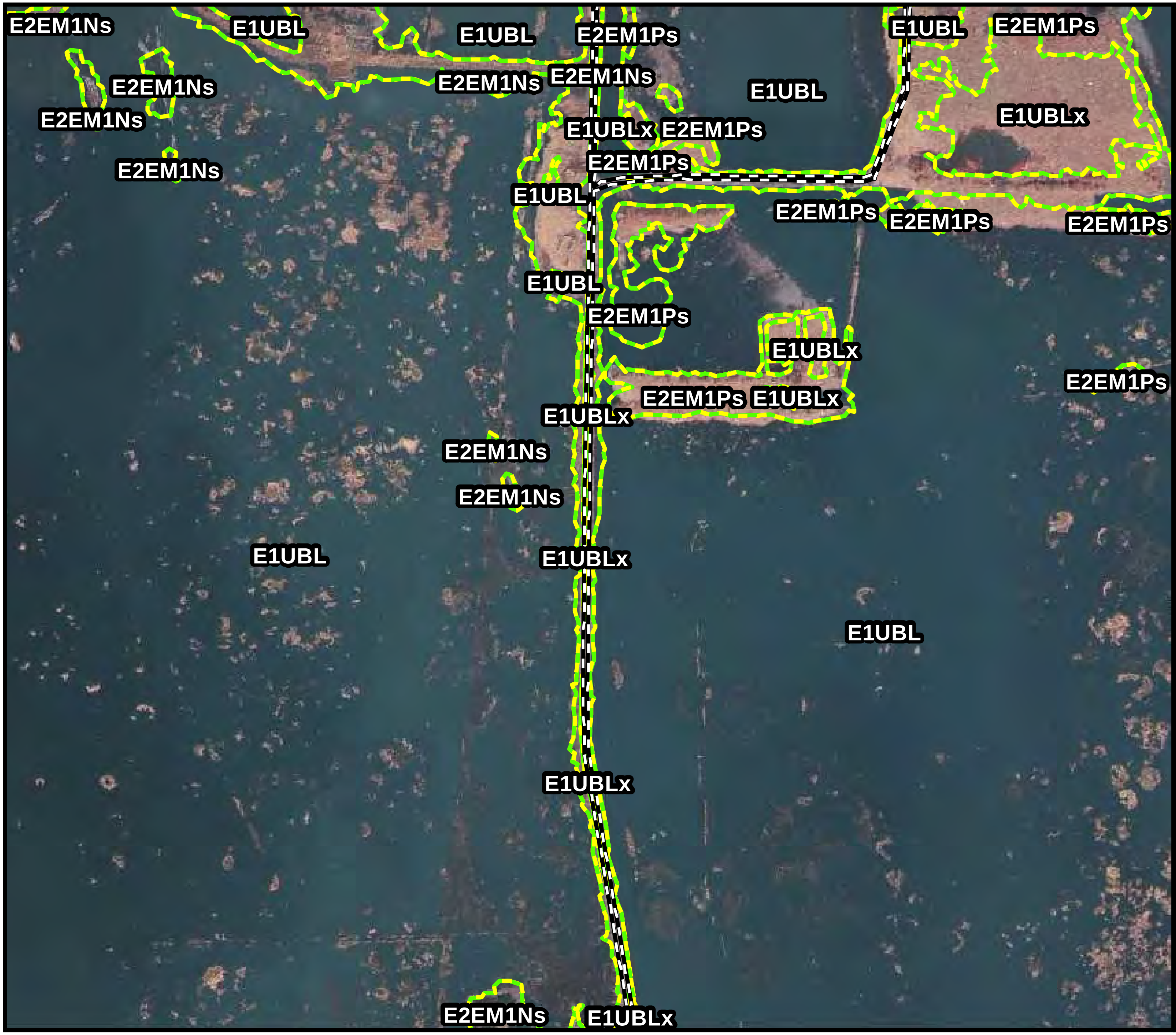
Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 62 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

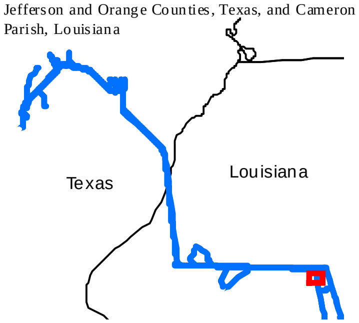
0 200 400 800
Feet

Legend

- ⬚ Survey Area
- ● Mile Marker
- ▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

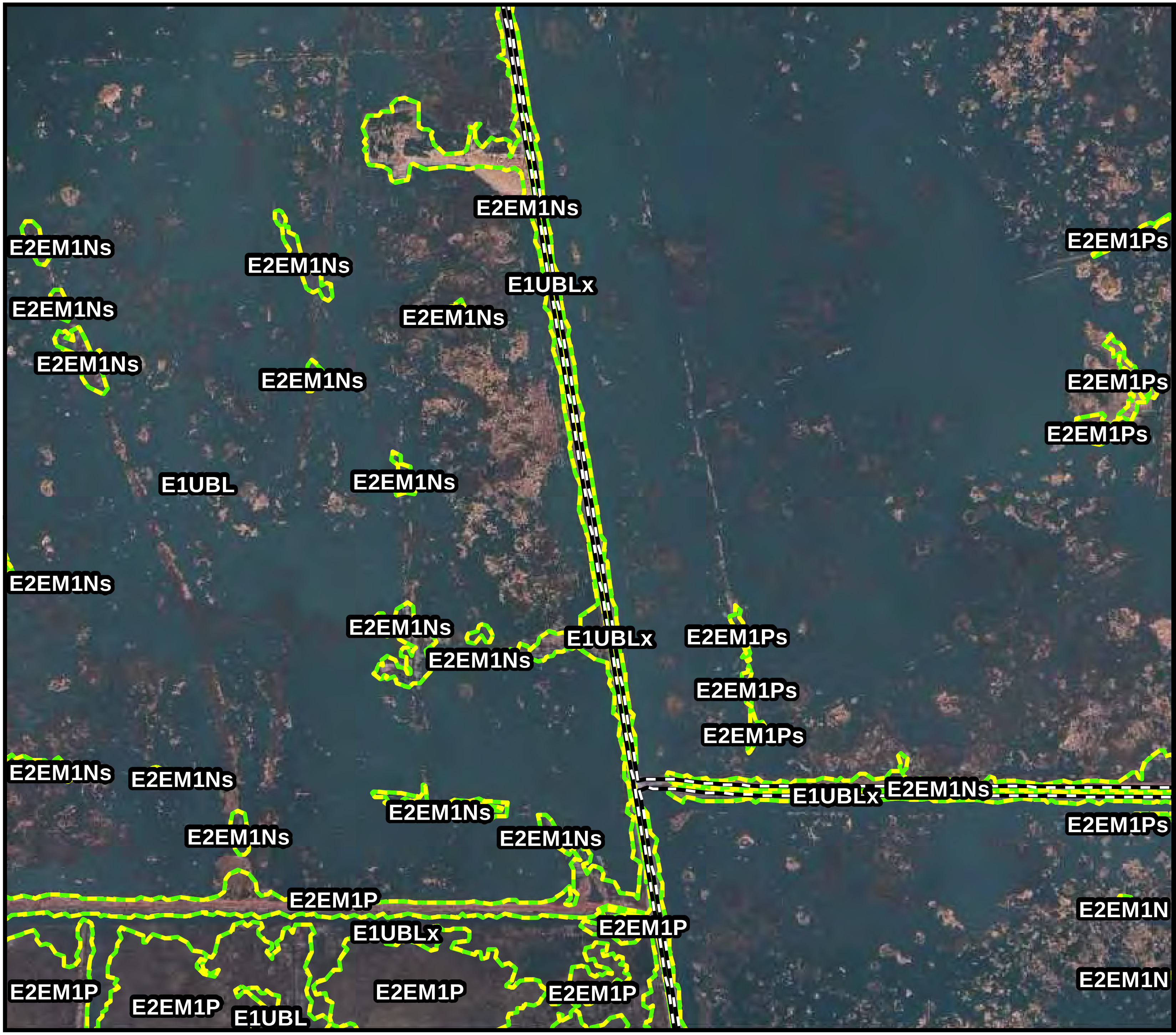
Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 63 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

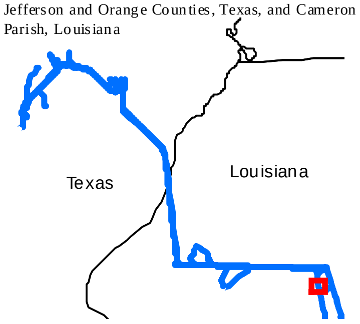
0 200 400 800
Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

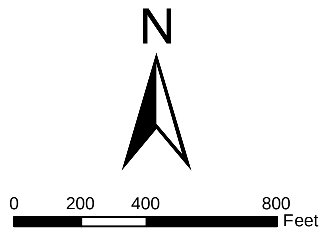
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 64 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

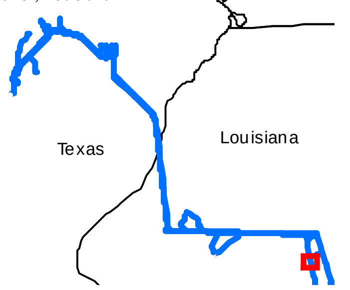
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron
Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

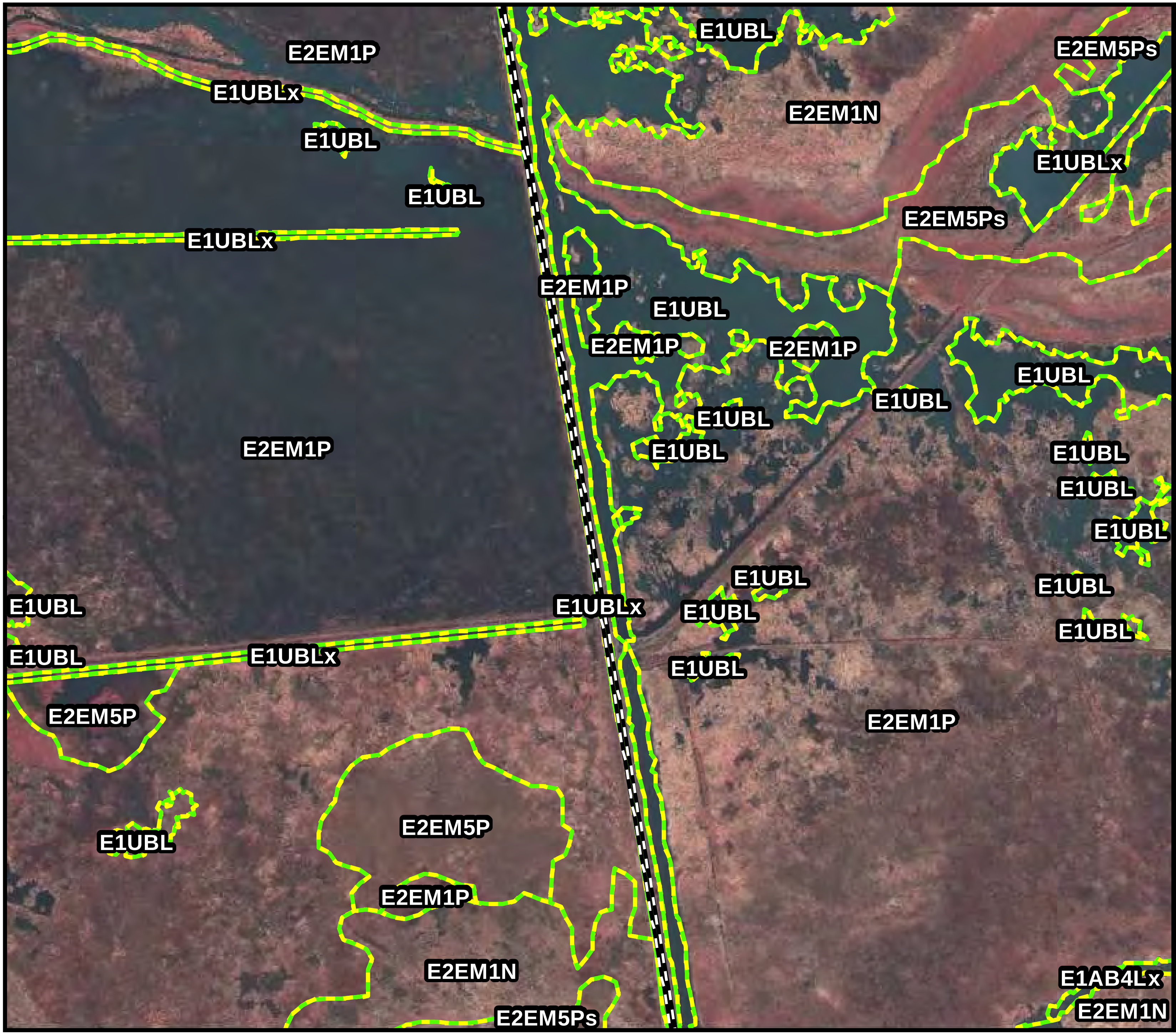
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 65 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



N

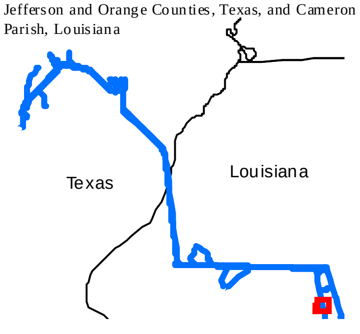
0 200 400 800
Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

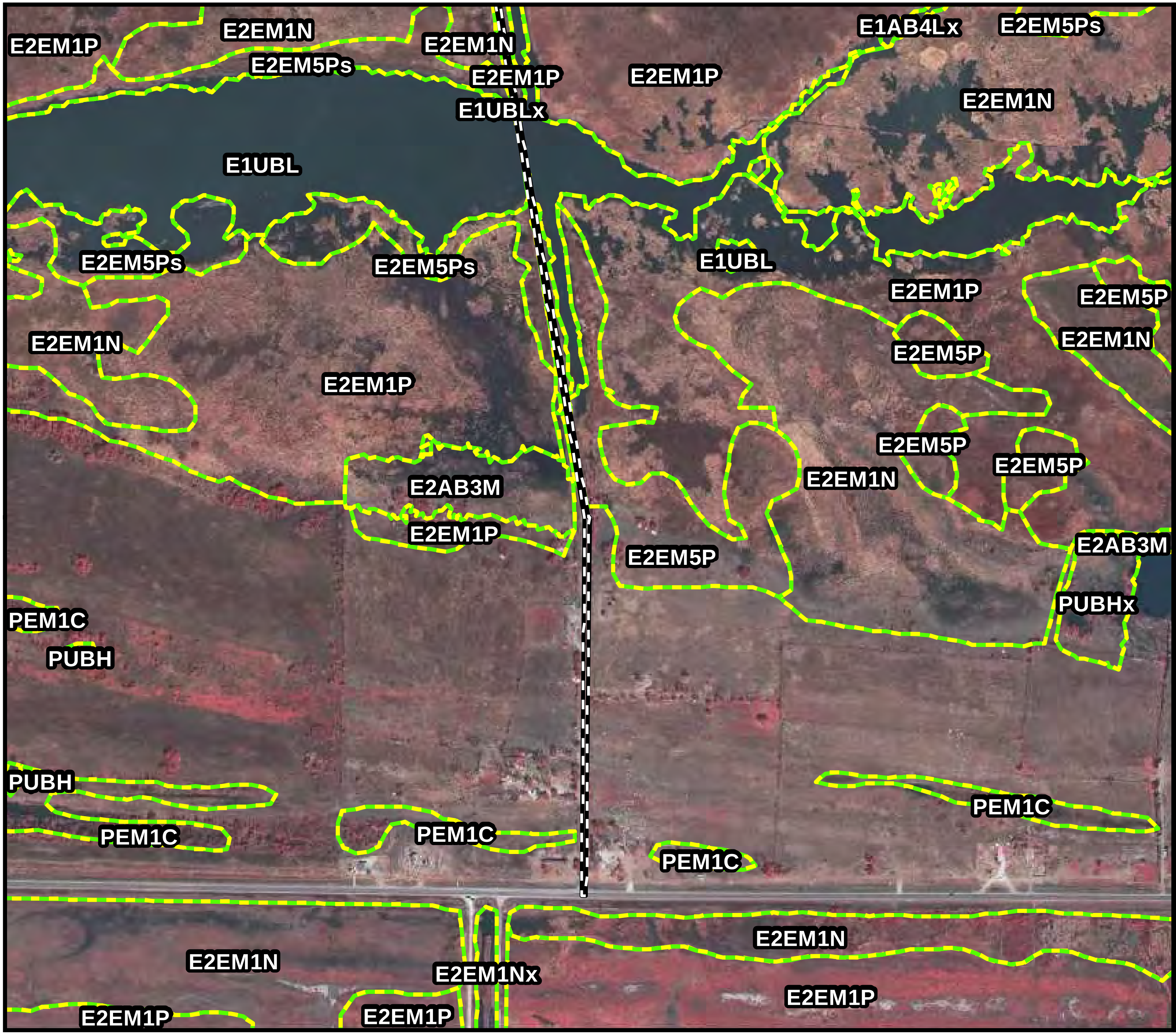
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 66 of 74)

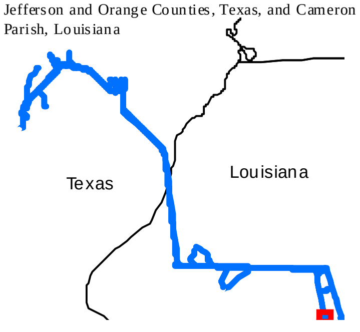


Legend

- Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 67 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

0 200 400 800
Feet

Legend

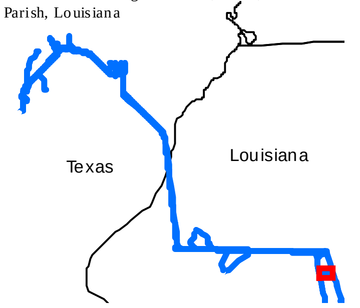
▭ Survey Area

● Mile Marker

▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 68 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

Legend

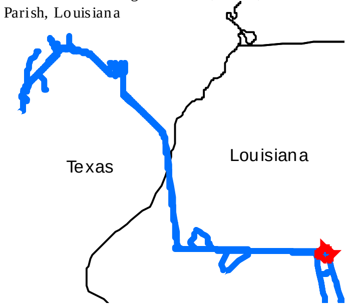
🔲 Survey Area

● Mile Marker

🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 69 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

N

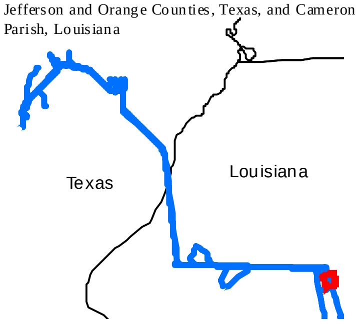
0 200 400 800
Feet

Legend

▭	Survey Area
●	Mile Marker
▨	NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

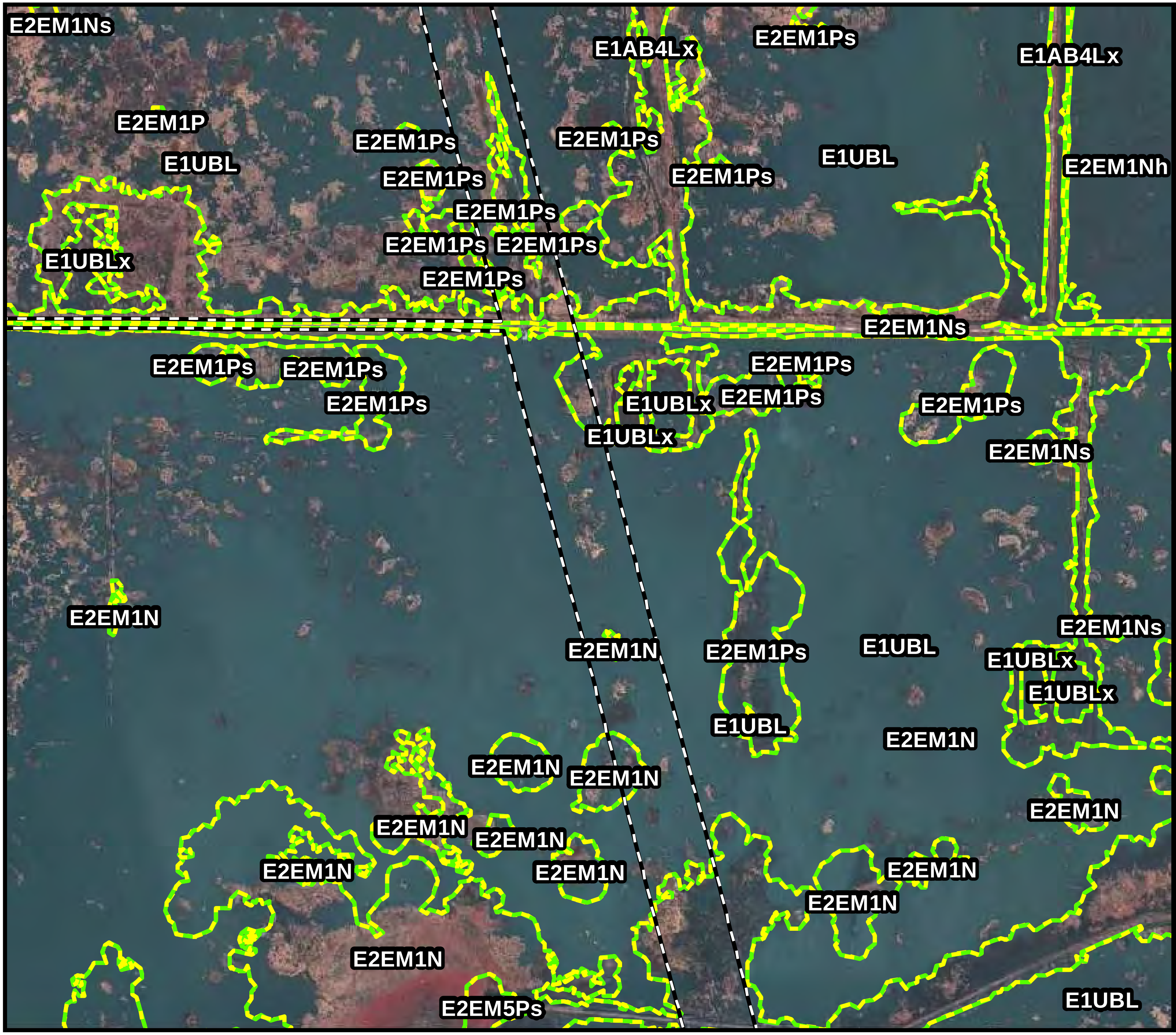
Blue Marlin Offshore Port LLC

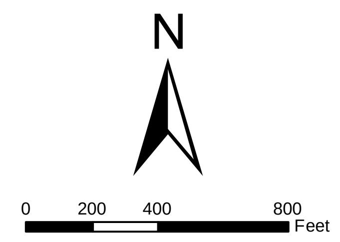
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 70 of 74)





Legend

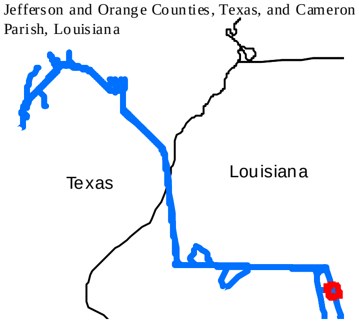
⬚ Survey Area

● Mile Marker

▨ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

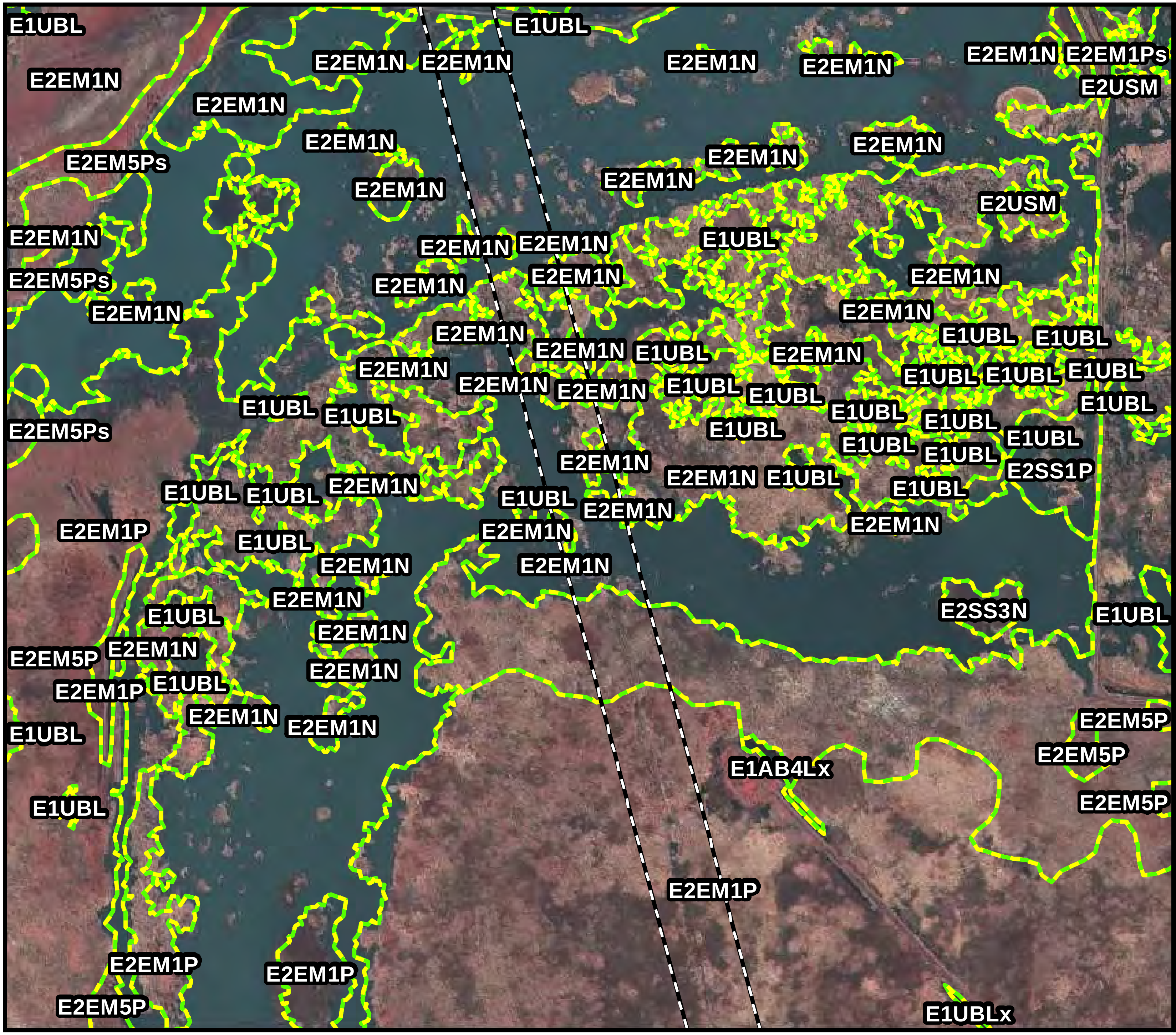
BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 71 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



Legend

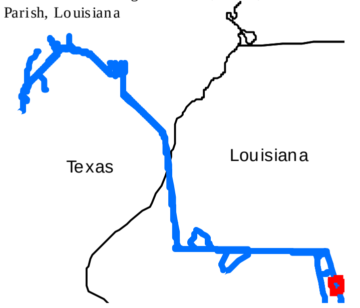
▭ Survey Area

● Mile Marker

▭ NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

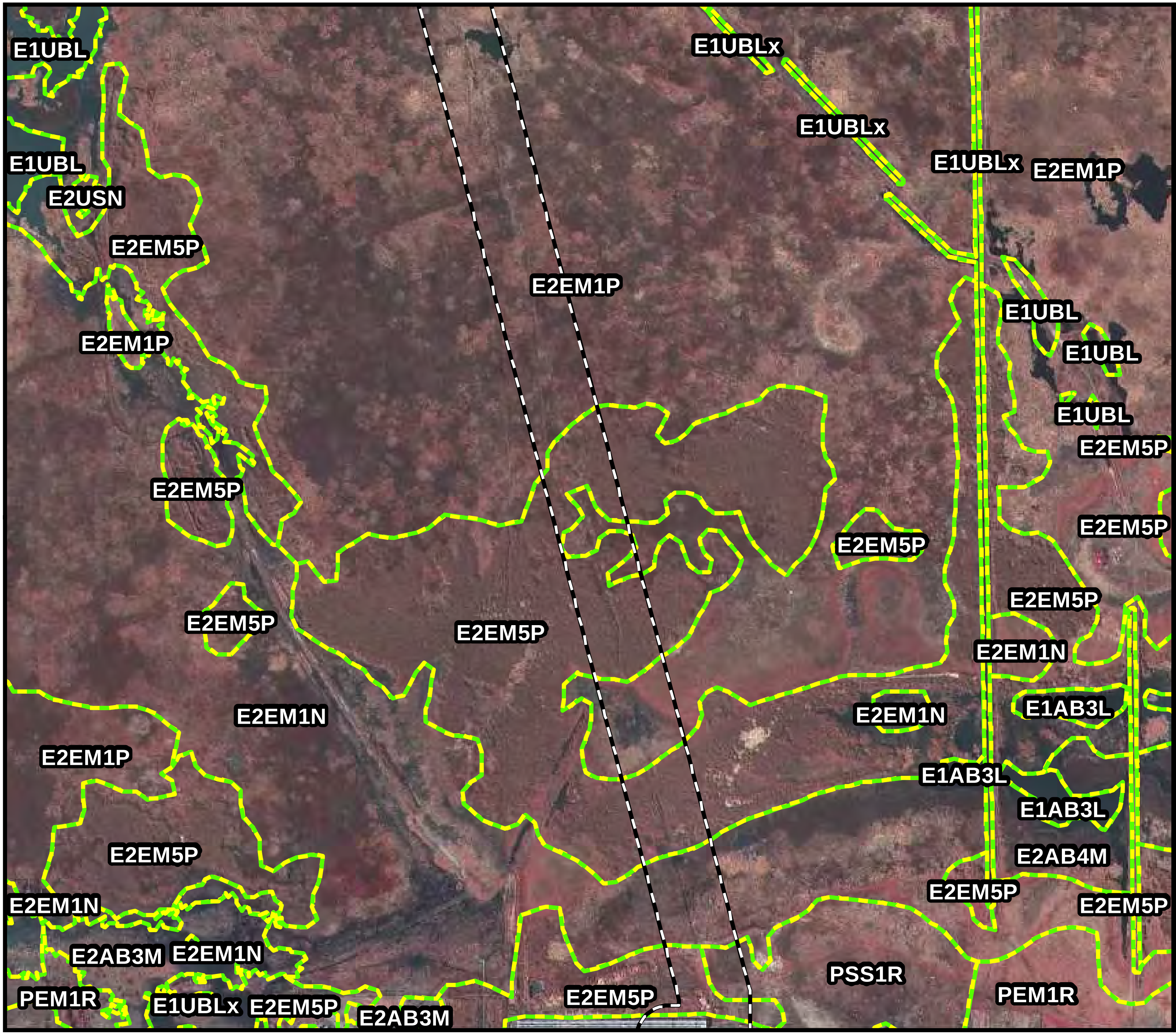
BESI
Benchmark
Ecological Services Inc.

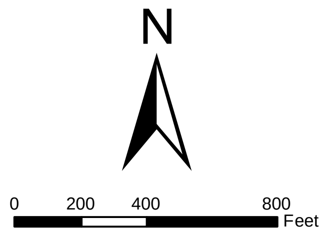
Project: 13004-014

Date: 7/1/2020

Figure 2
(Map 72 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd



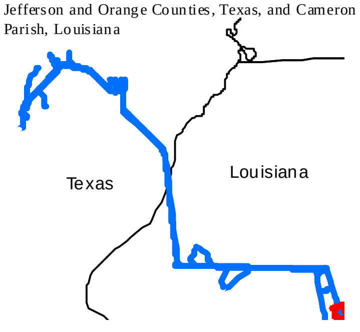


Legend

- ▭ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

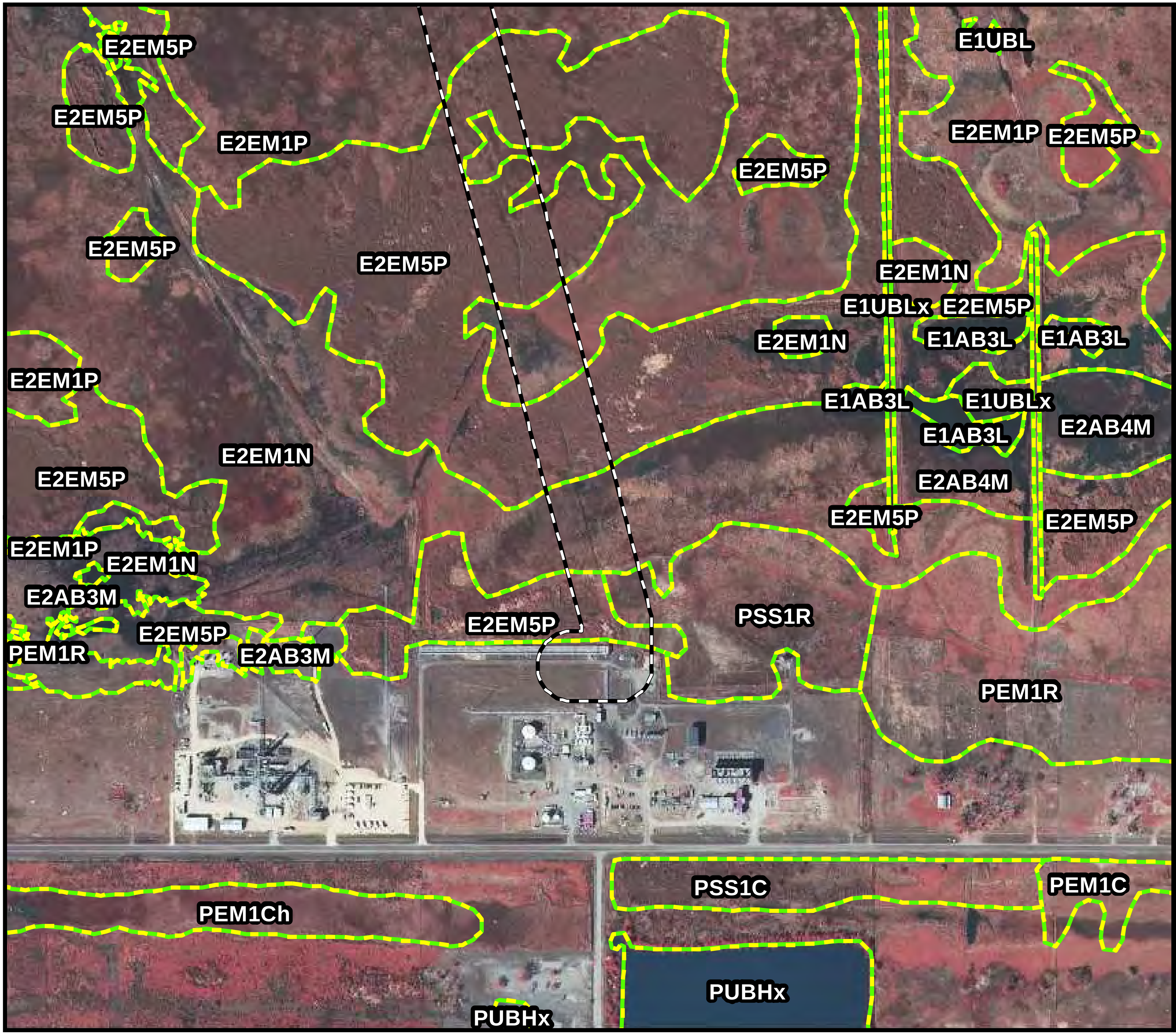
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 2
(Map 73 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

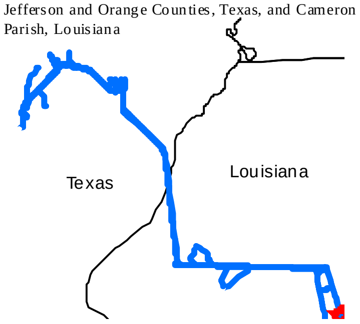


Legend

- ⬚ Survey Area
- ● Mile Marker
- 🟩 NWI Boundary

Notes

2018 NAIP Imagery and NWI Data
Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



NWI Map

Blue Marlin Offshore Port LLC

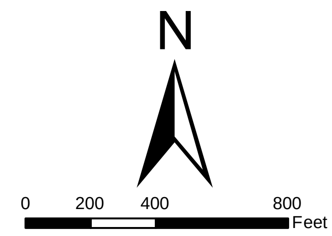
Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

BESI Benchmark Ecological Services, Inc.

Figure 2
(Map 74 of 74)

M:\13004\014\Arc\Figure2_NWI.mxd

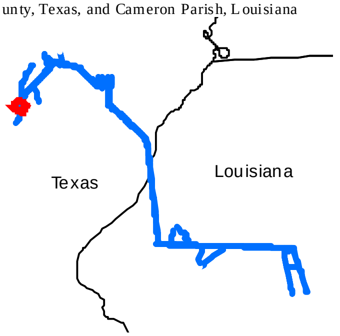


Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 1 of 74)

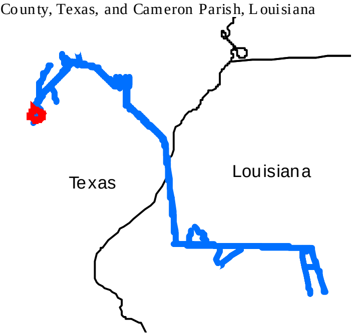
M:\13004\014\Arc\Figure3_Soils.mxd

Legend

- ⬚ Survey Area
- ▭ Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

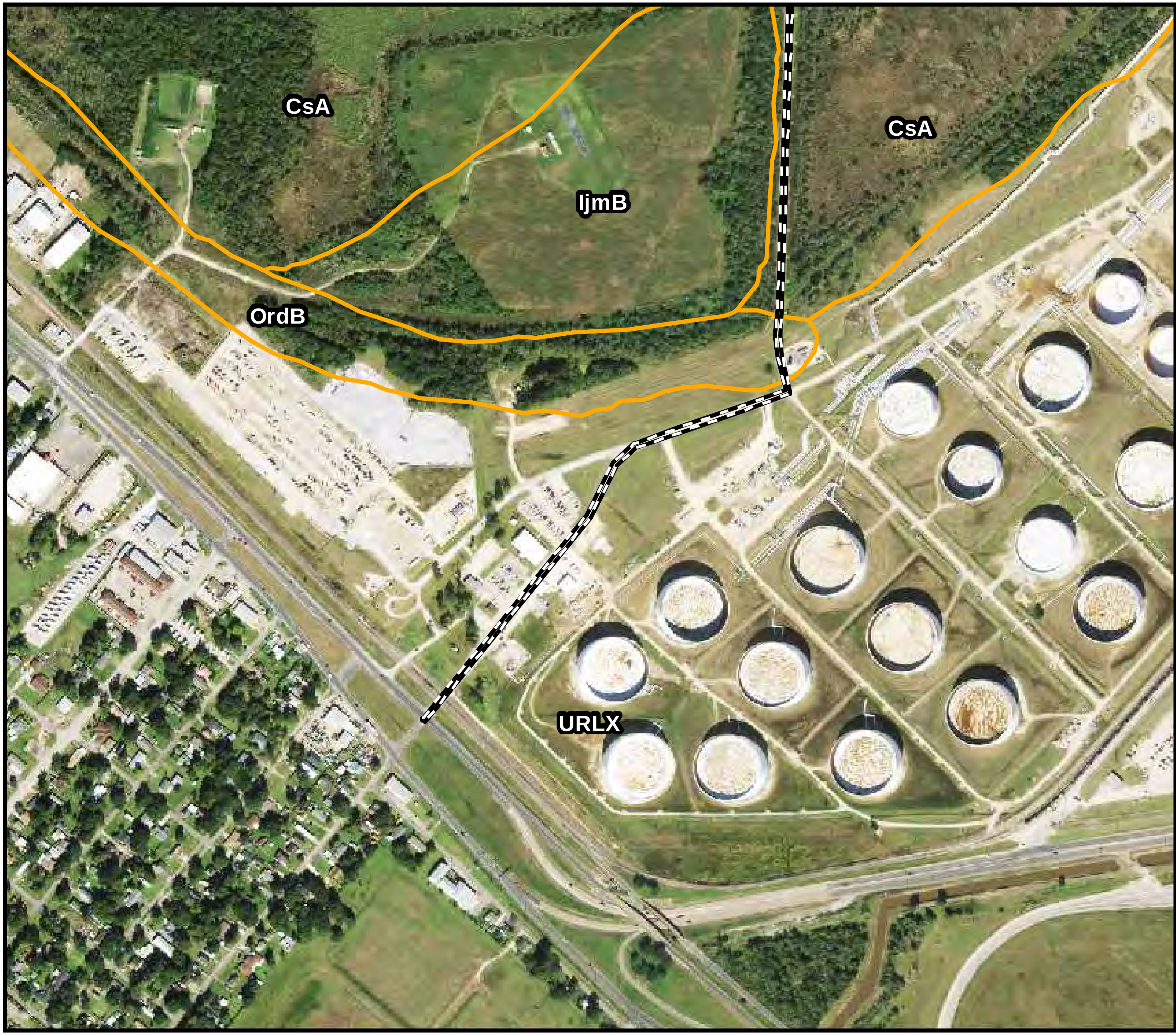
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 3
(Map 2 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



N

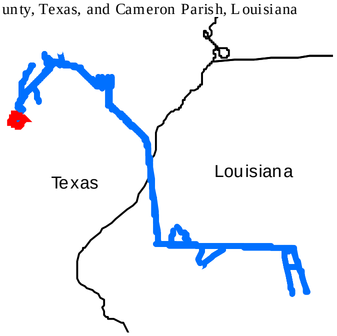
0 200 400 800
Feet

Legend

- ▭ Survey Area
- ▭ Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 3 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800
Feet

Legend

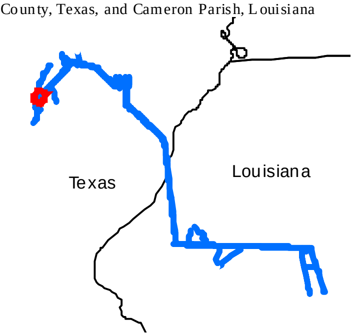
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 4 of 74)

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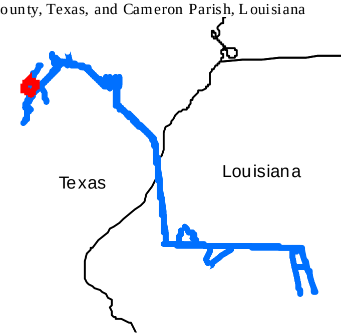
0 200 400 800 Feet

Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

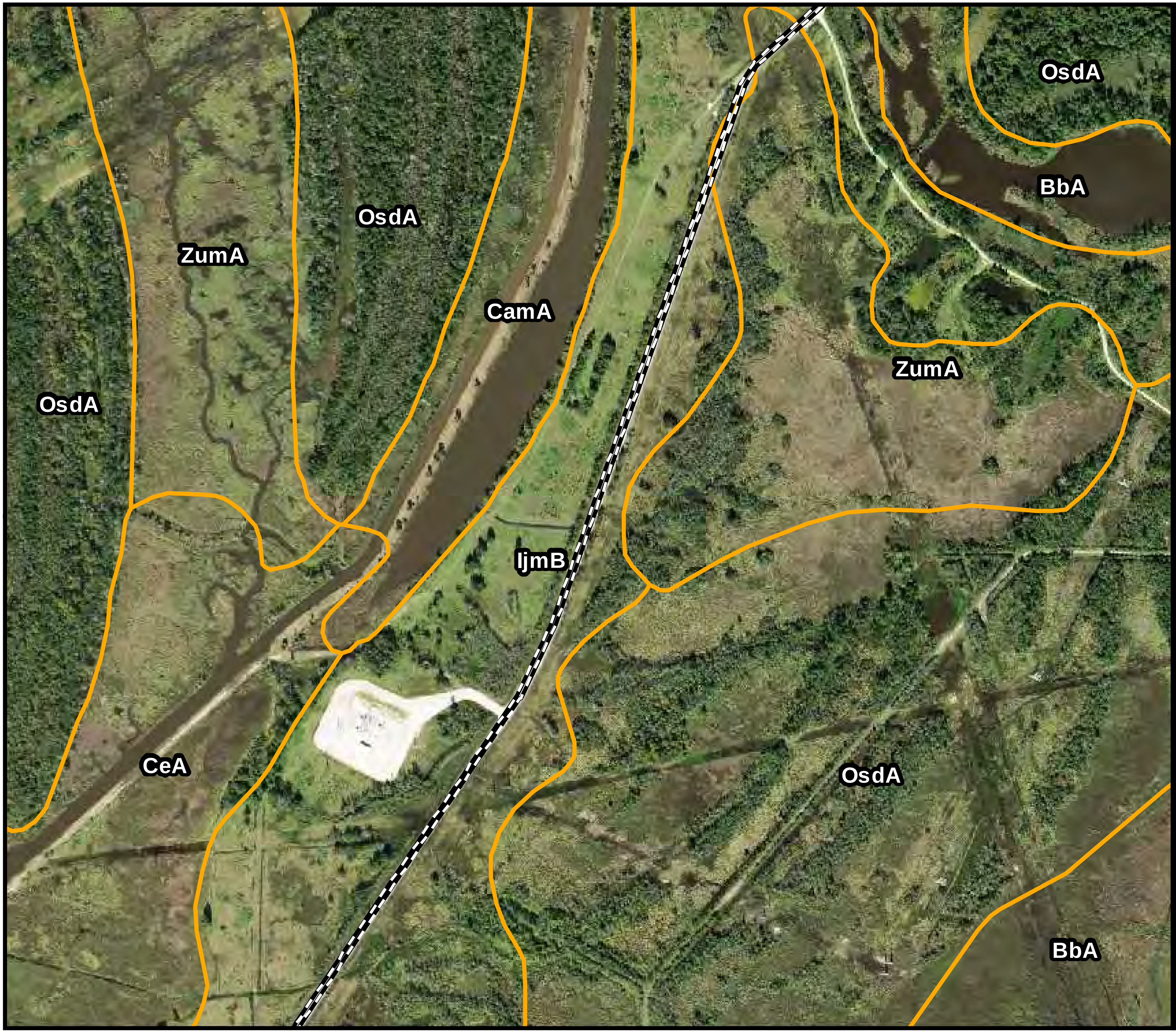
BESI Benchmark Ecological Services, Inc.

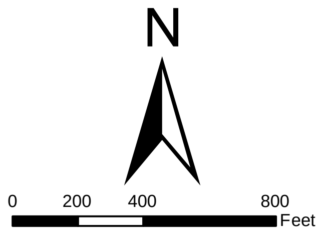
Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 5 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



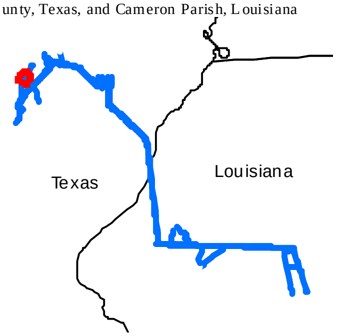


Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

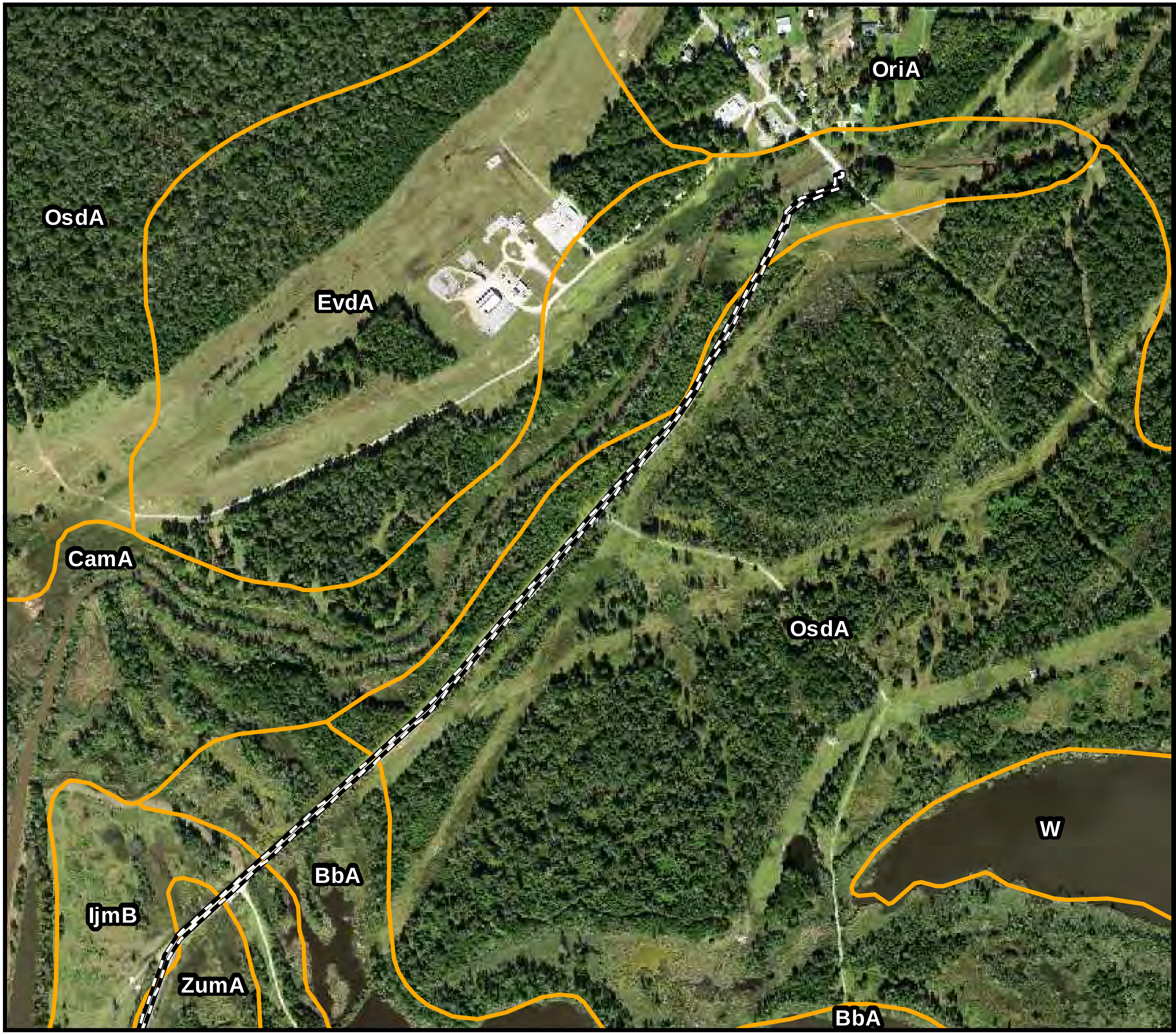
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 6 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

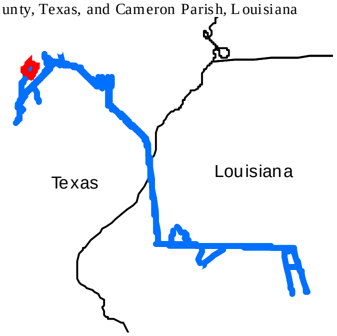


Legend

▭	Survey Area
▭	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 7 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

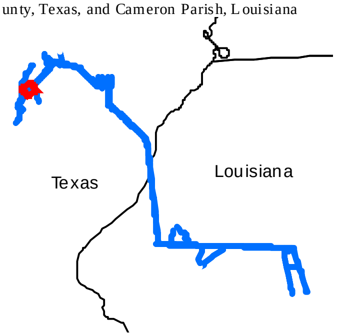
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 8 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

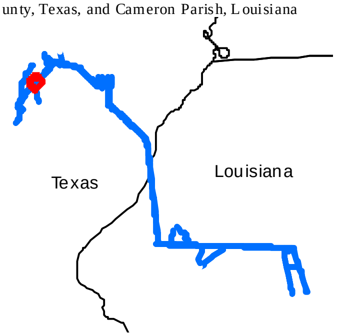
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

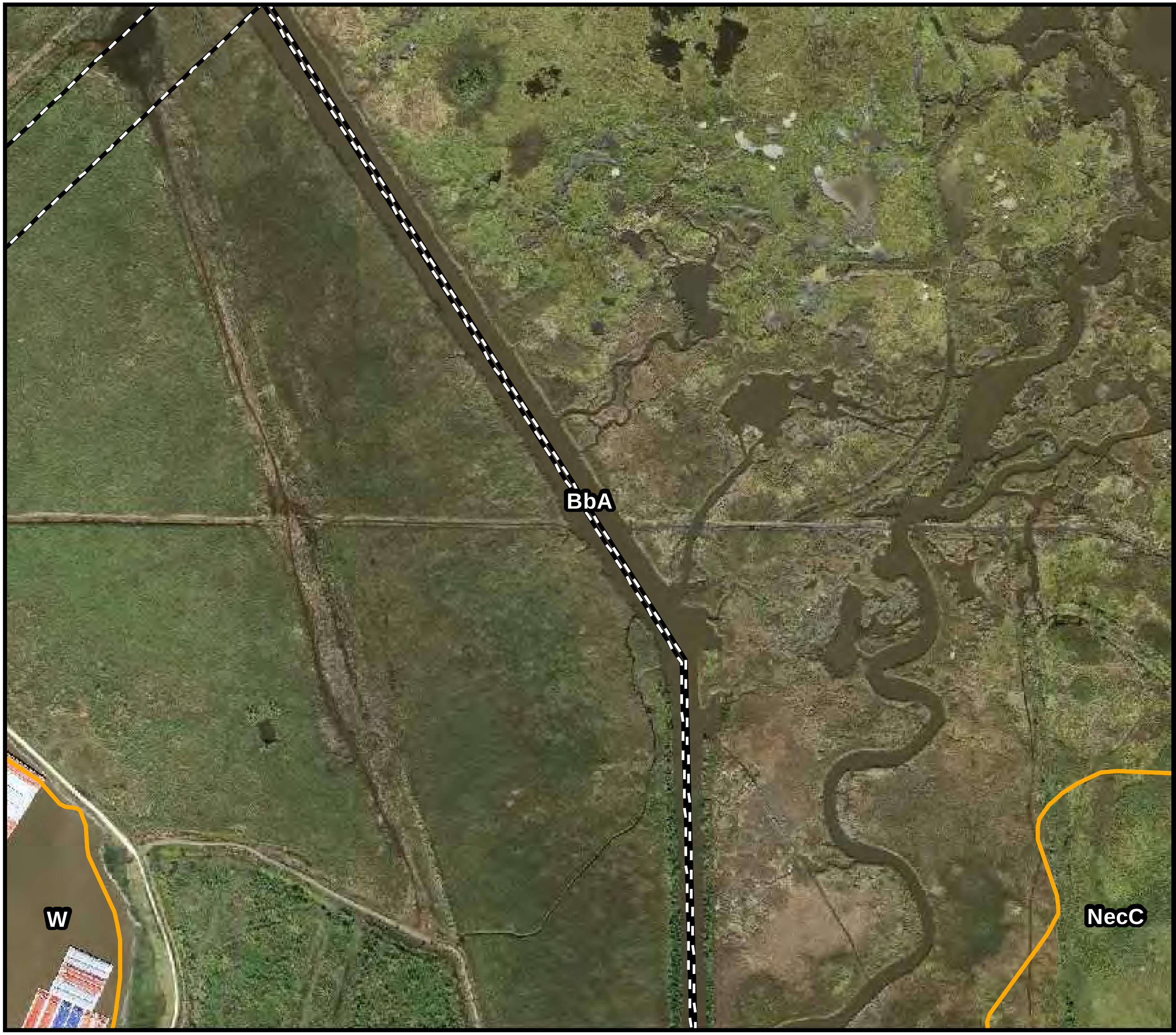
Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 9 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



N

0 200 400 800
Feet

Legend

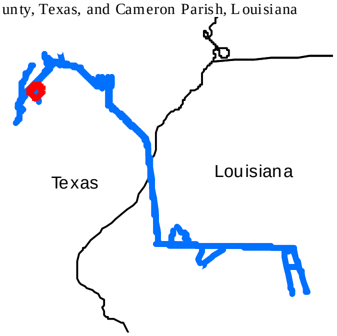
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 10 of 74)

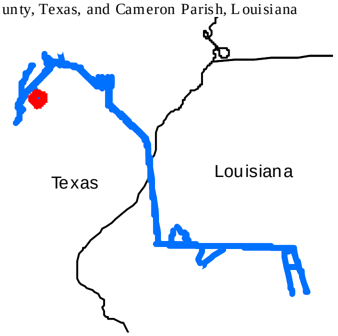
M:\13004\014\Arc\Figure3_Soils.mxd

Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 11 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

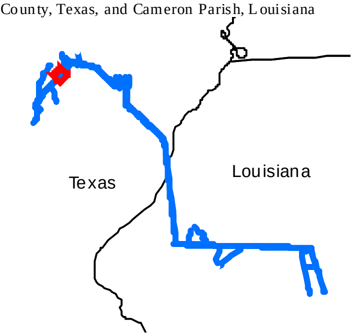
0 200 400 800
Feet

Legend

⬚	Survey Area
▭	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 12 of 74)

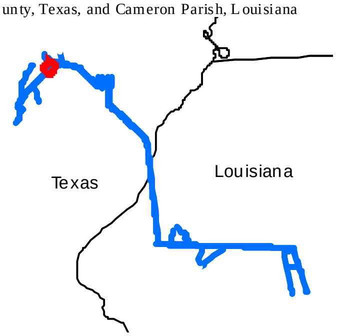
M:\13004\014\Arc\Figure3_Soils.mxd

Legend

▭	Survey Area
▭	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

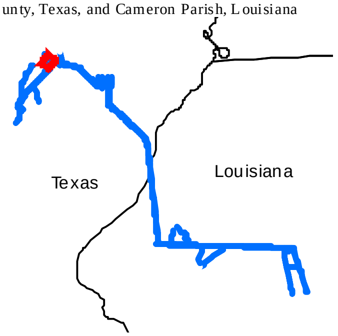
Date: 7/1/2020

Figure 3
(Map 13 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 14 of 74)

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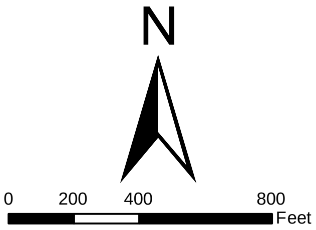


Legend

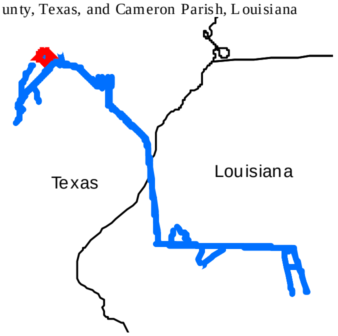
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 15 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800
Feet

Legend

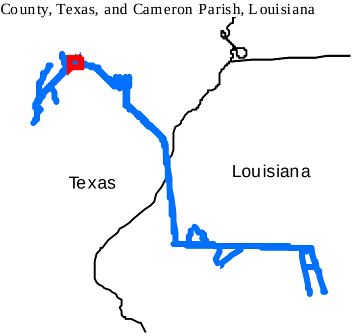
▨ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 16 of 74)

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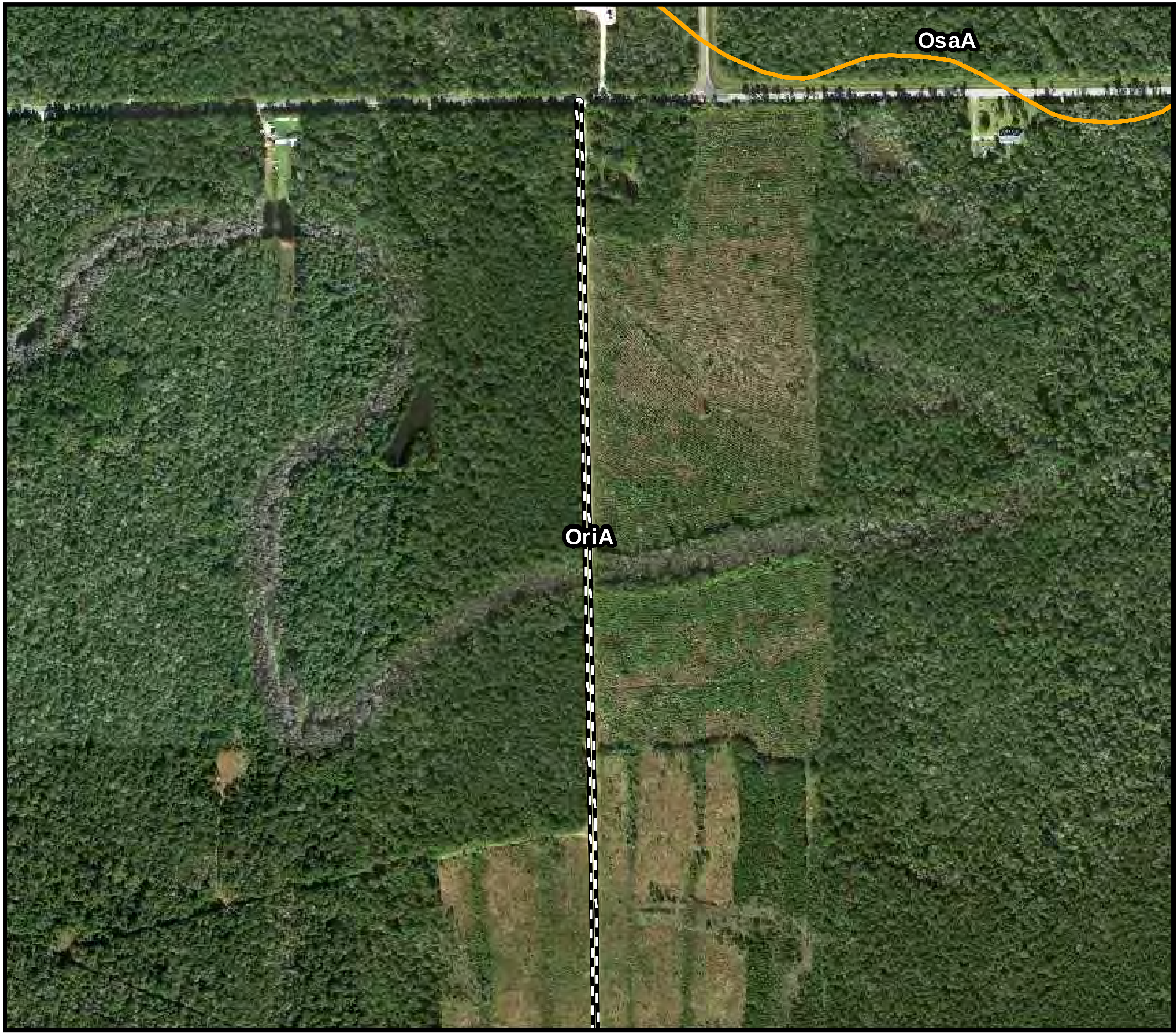
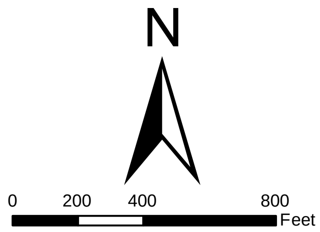




Legend

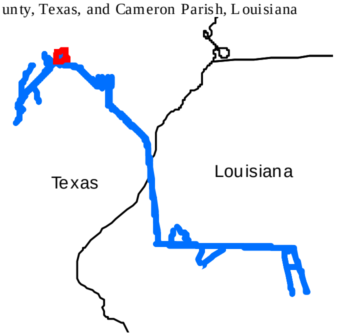
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 17 of 74)

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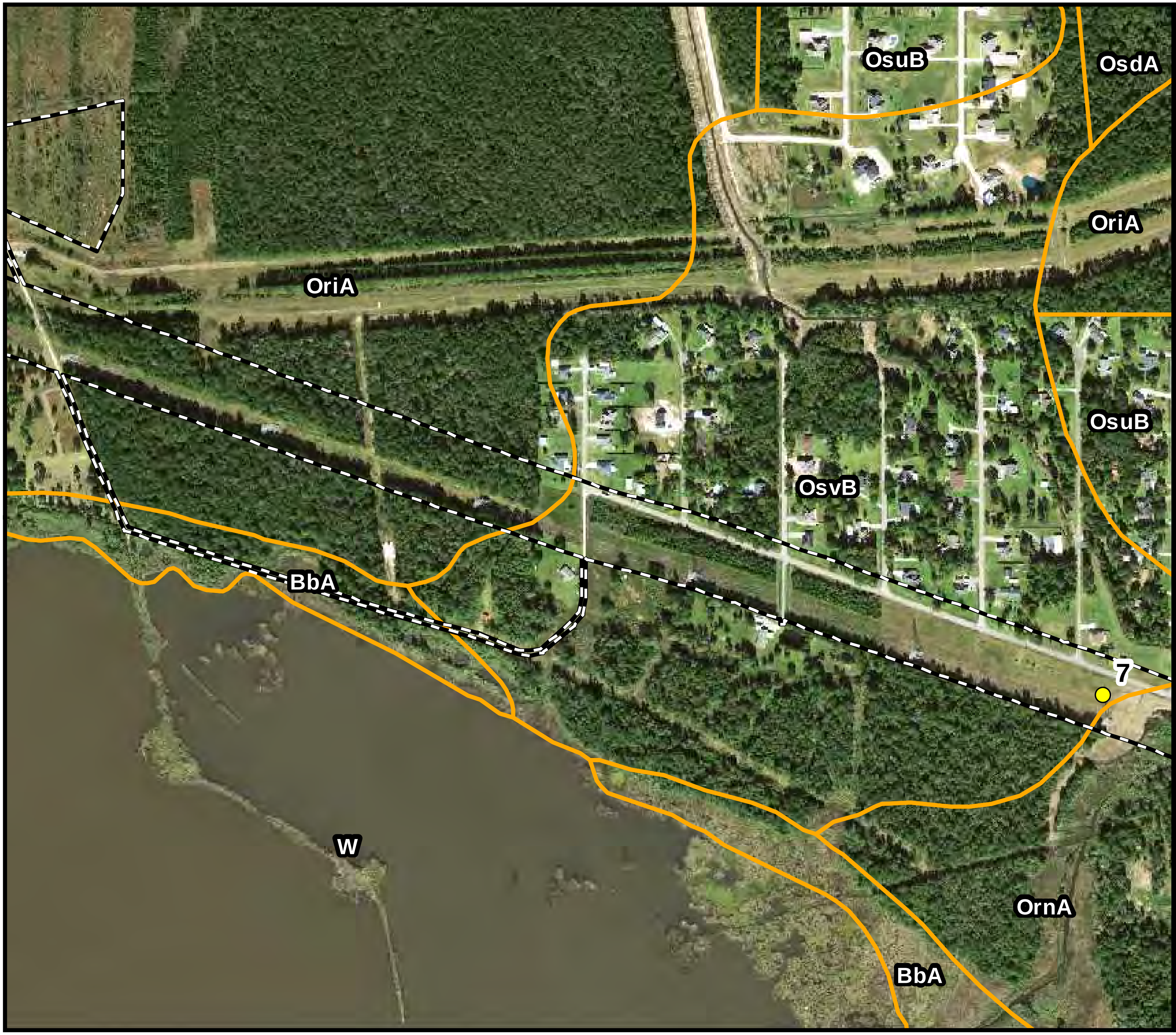


N

0 200 400 800
Feet

Legend

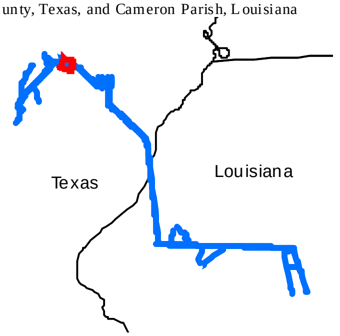
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 18 of 74)

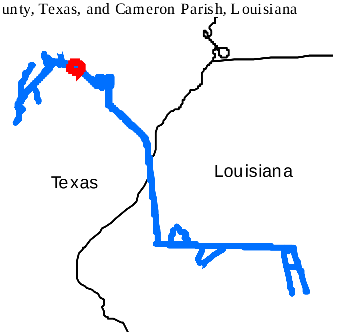
M:\13004\014\Arc\Figure3_Soils.mxd

Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 19 of 74)

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N

0 200 400 800 Feet

Legend

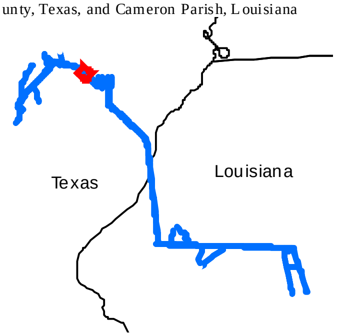
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 20 of 74)

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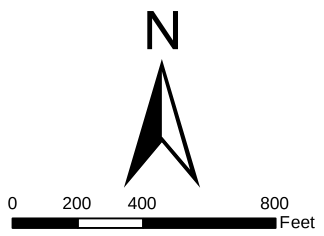


Legend

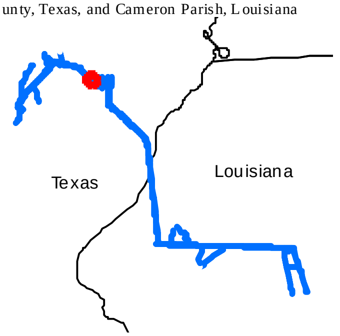
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

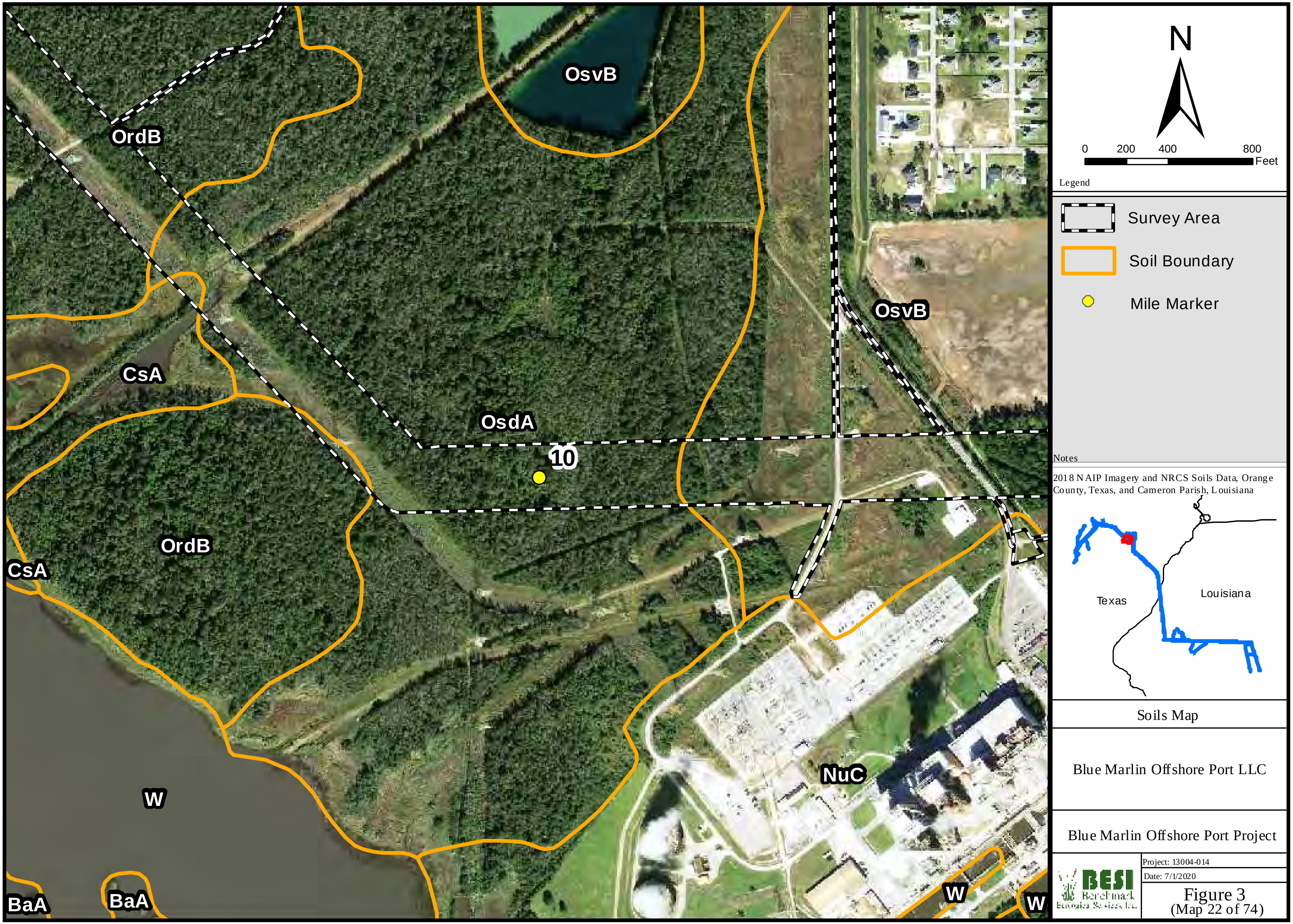
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 21 of 74)



Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana

Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 22 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

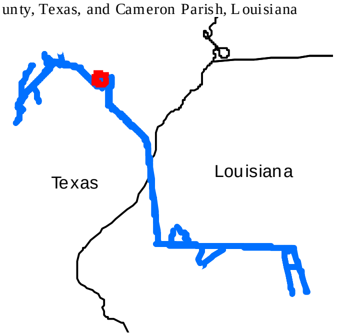
0 200 400 800
Feet

Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 23 of 74)

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Legend

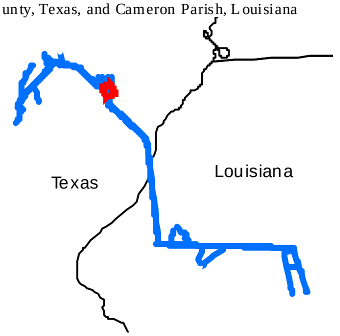
▨ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

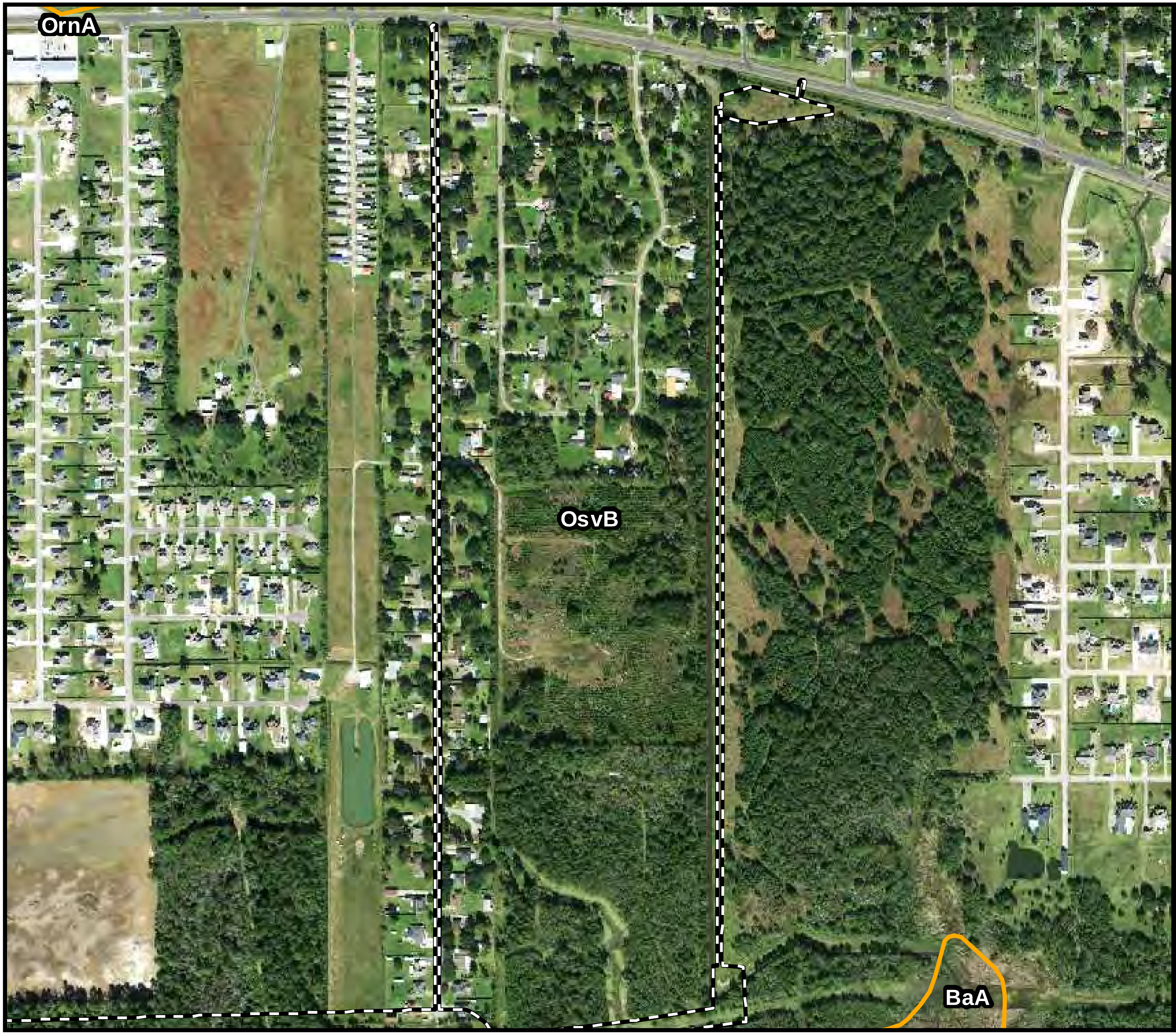
Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 24 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

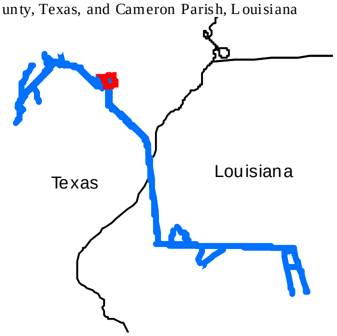


Legend

- ⬚ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 25 of 74)

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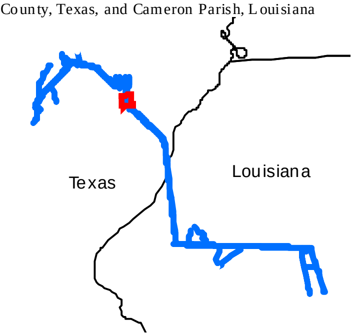
Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 26 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

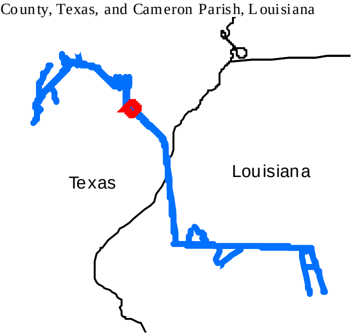
⬚ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 27 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

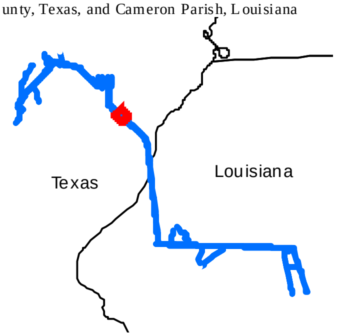
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 28 of 74)

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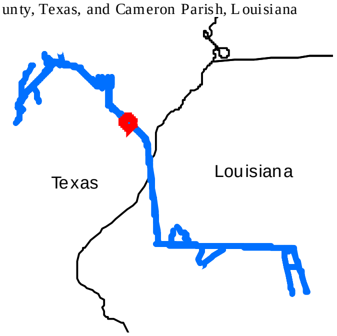
Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 29 of 74)

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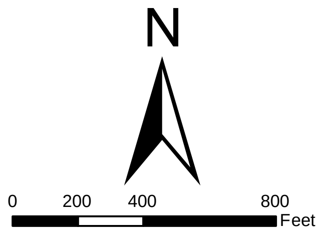


Legend

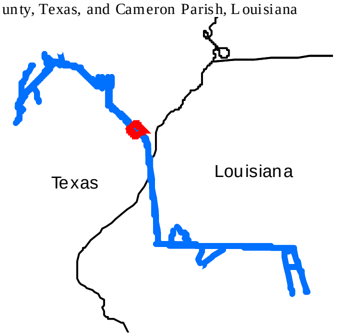
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 30 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

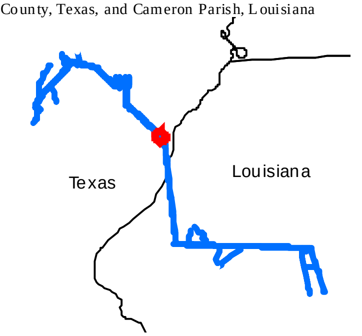
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 31 of 74)

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N

0 200 400 800
Feet

Legend

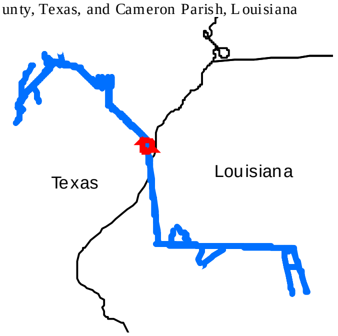
▭ Survey Area

▢ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 32 of 74)

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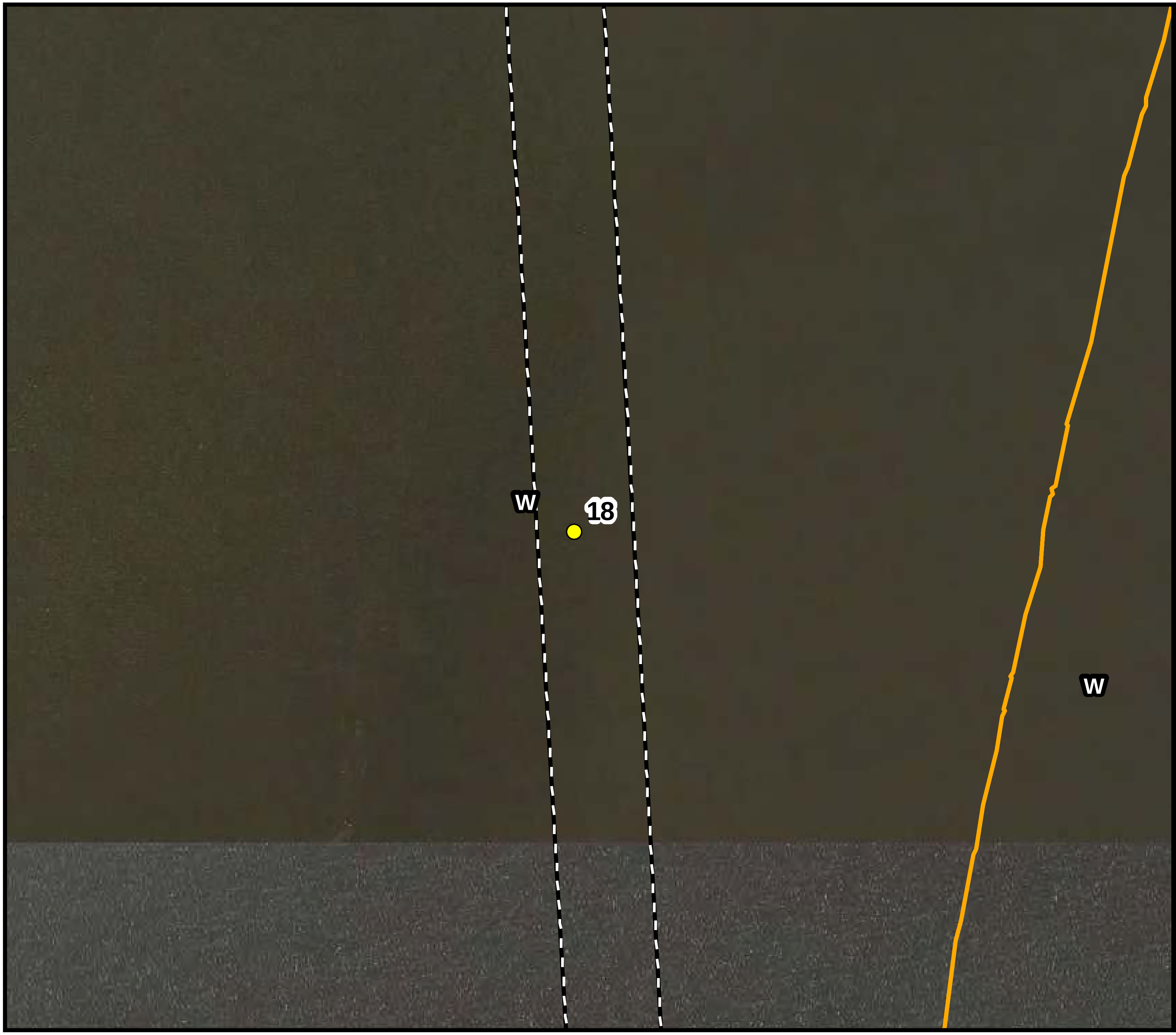
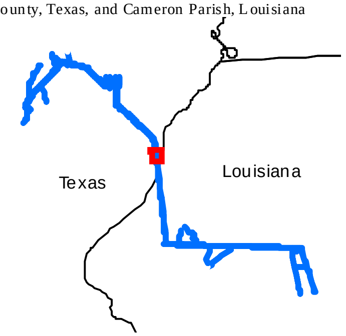


Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 33 of 74)

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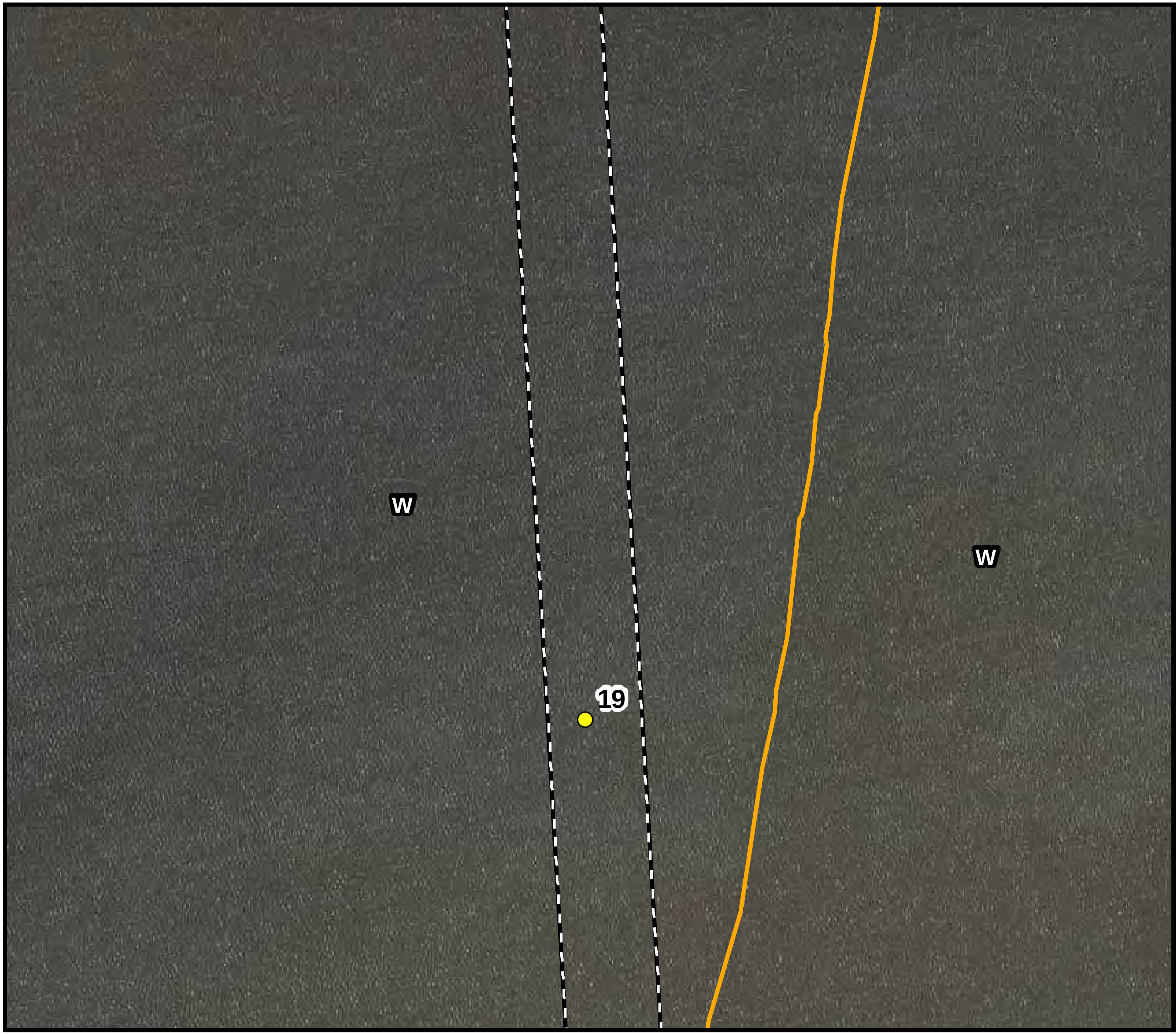
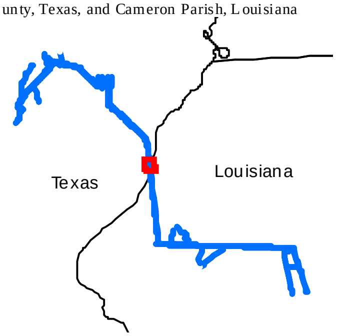


Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

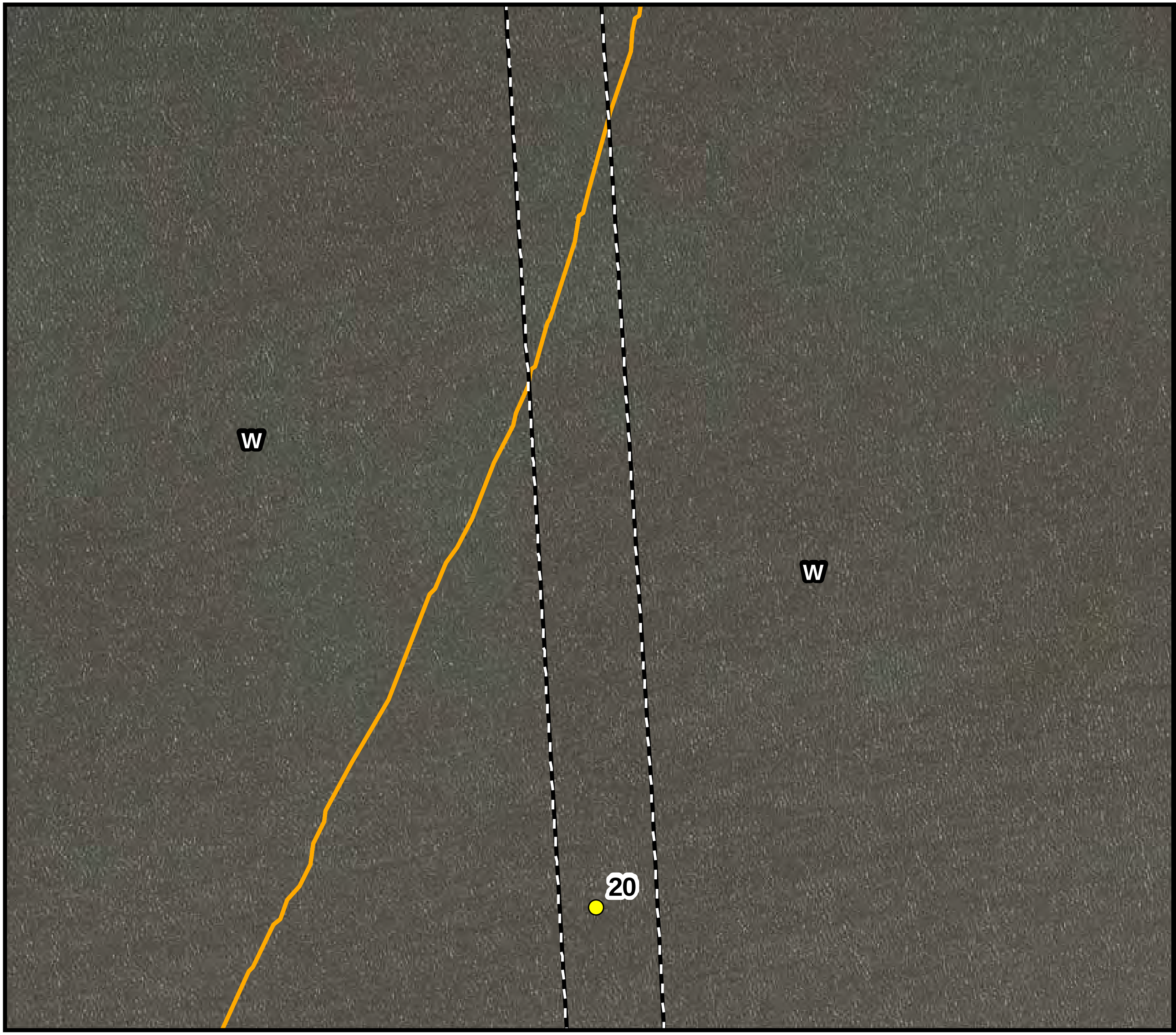
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 34 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



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Feet

Legend

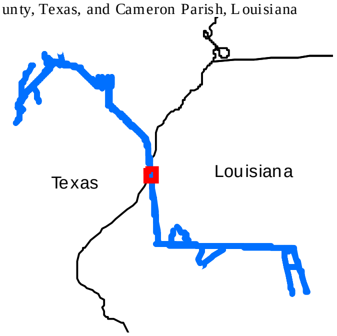
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 35 of 74)

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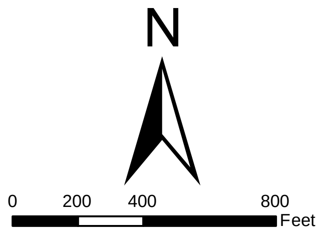
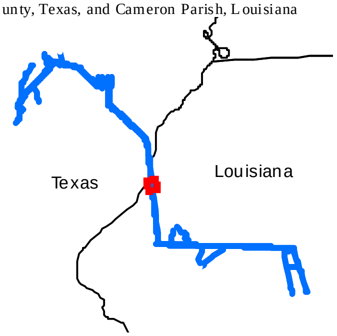


Legend

▭	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 36 of 74)

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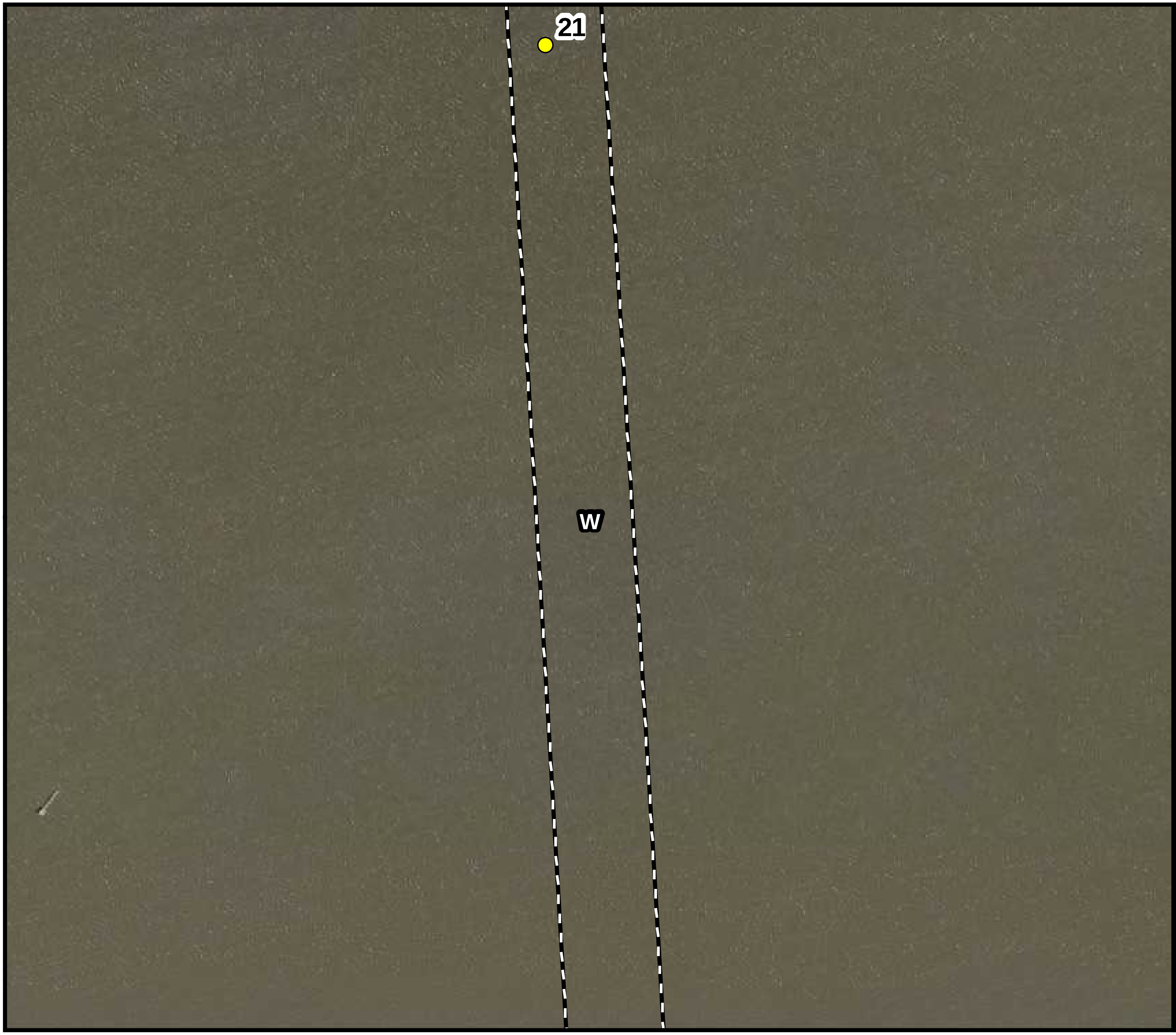

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0 200 400 800
Feet

Legend

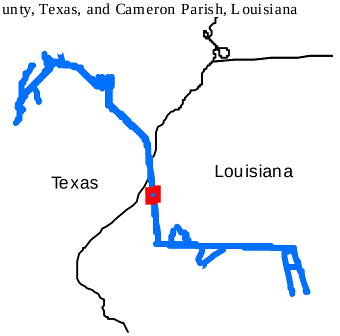
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

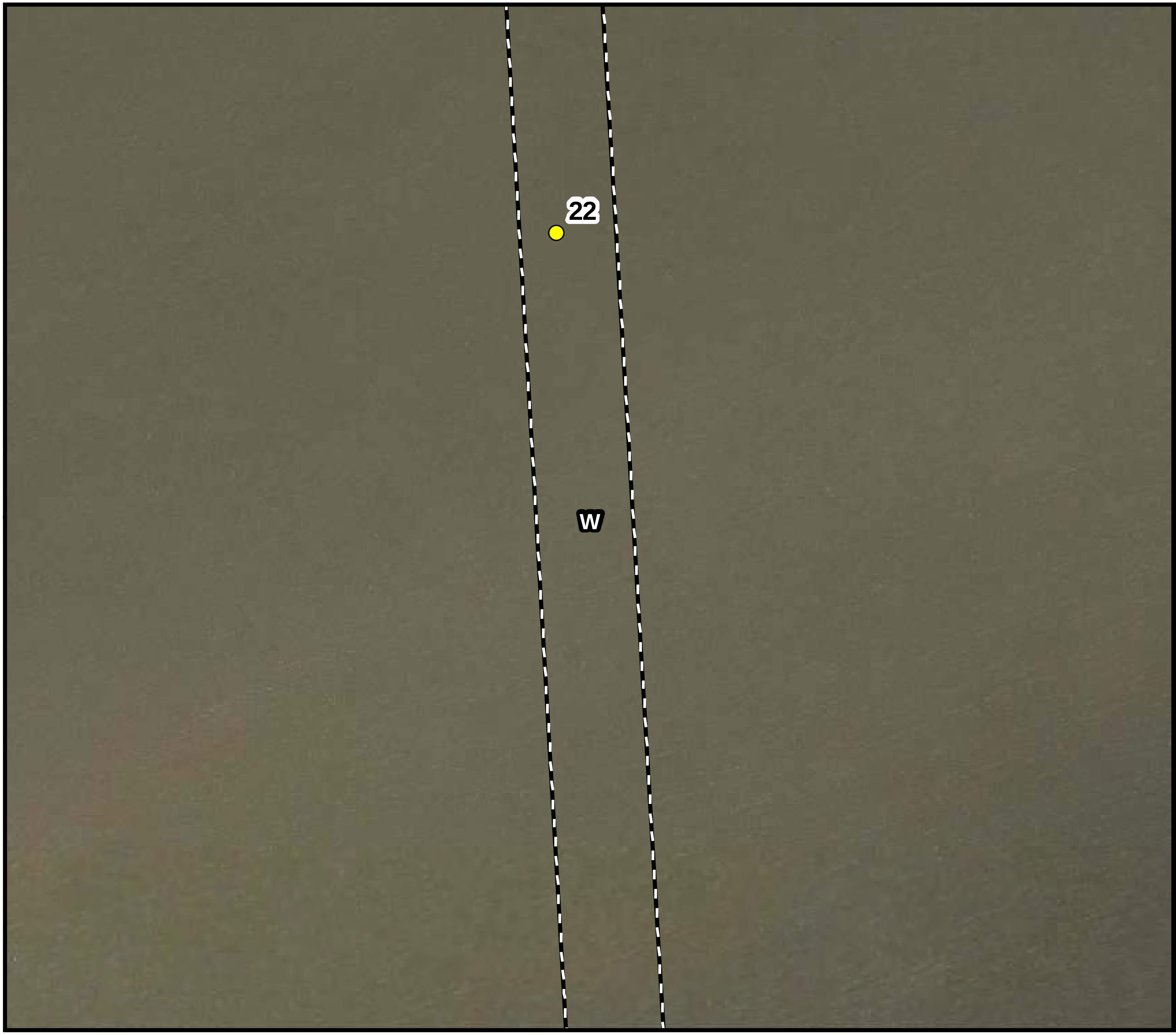
BESI Benchmark Ecological Services, Inc.

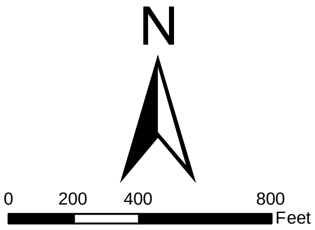
Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 37 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd





Legend

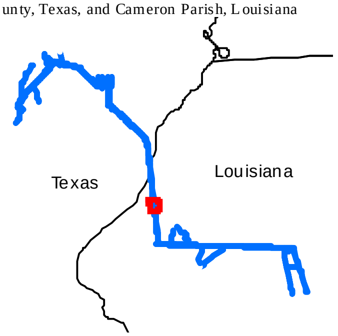
▭ Survey Area

□ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

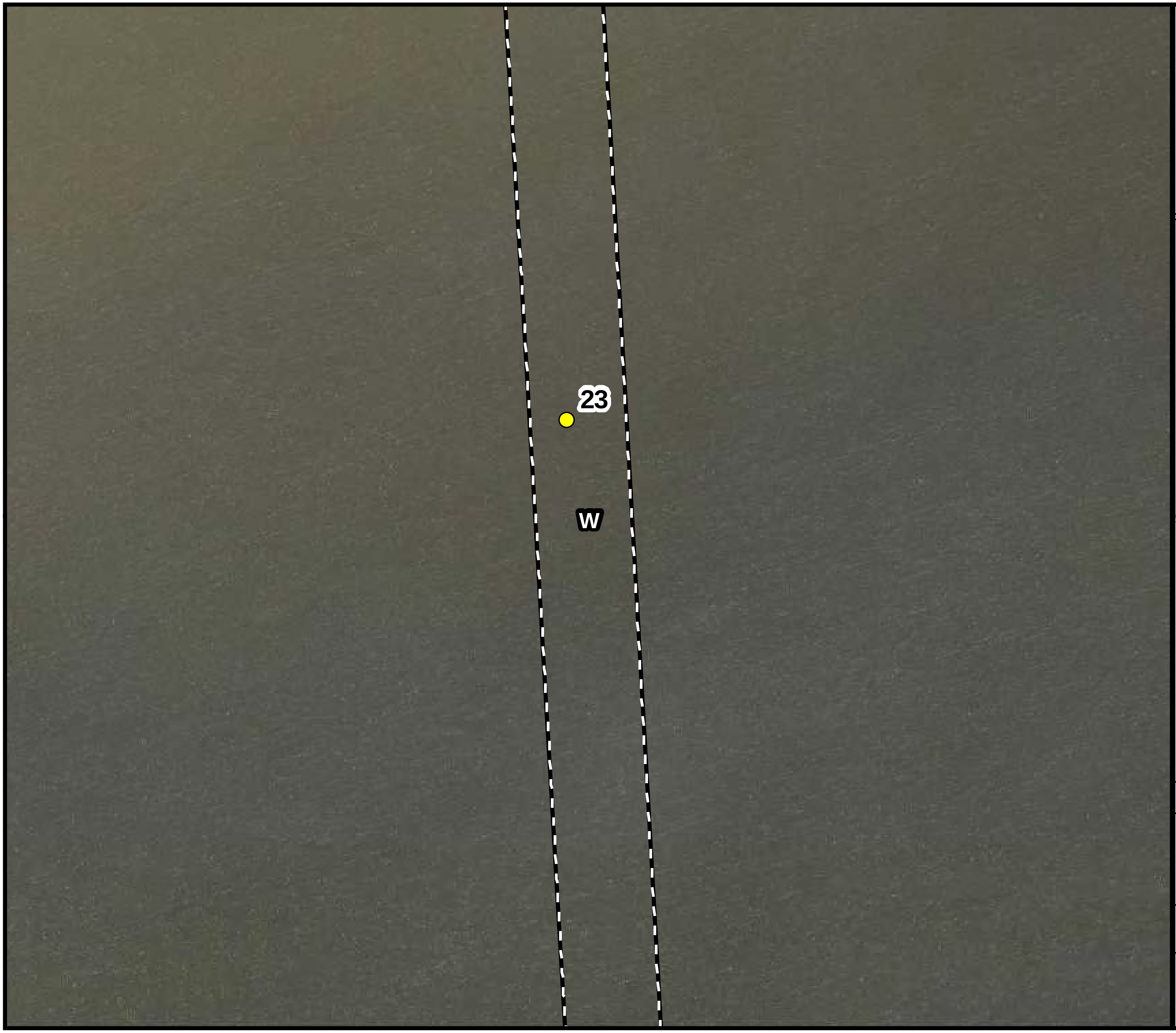
BESI Benchmark Ecological Services, Inc.

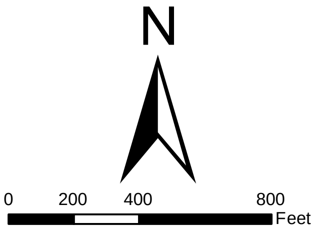
Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 38 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



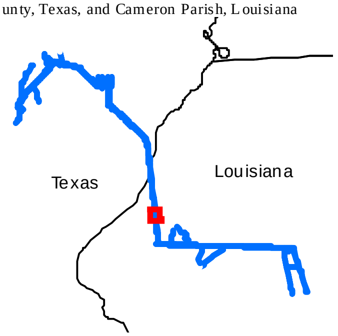


Legend

- ▭ Survey Area
- ▭ Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 39 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

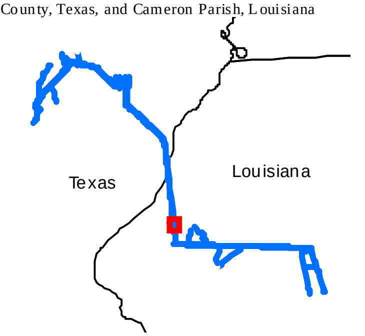
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 40 of 74)

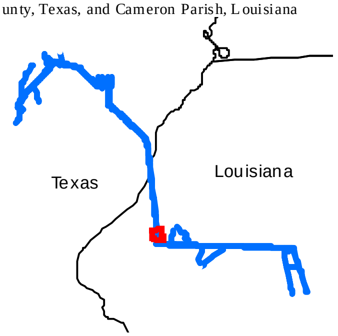
M:\13004\014\Arc\Figure3_Soils.mxd

Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

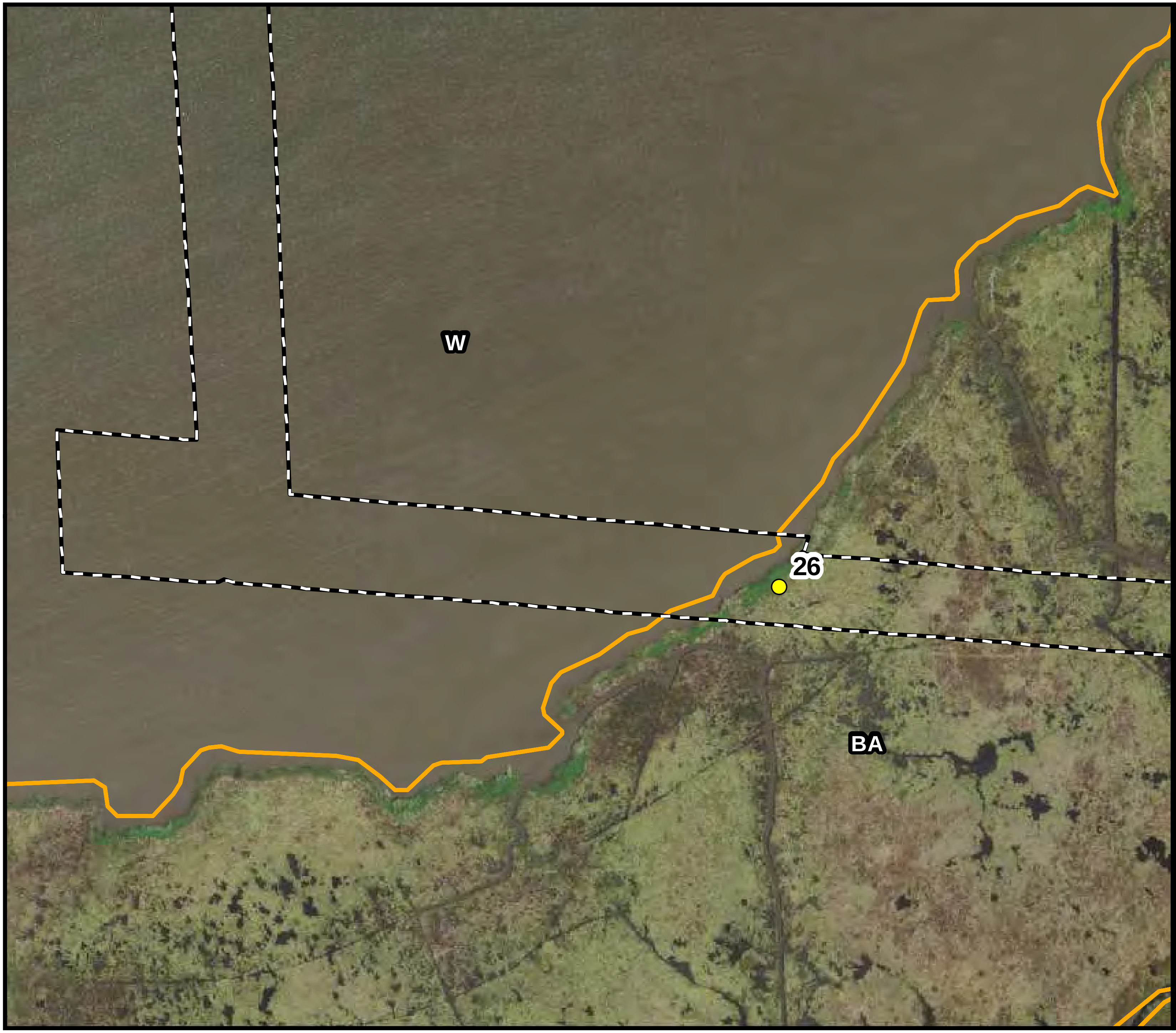
Blue Marlin Offshore Port Project

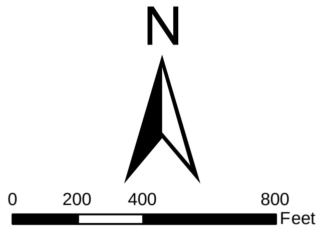
BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 41 of 74)





Legend

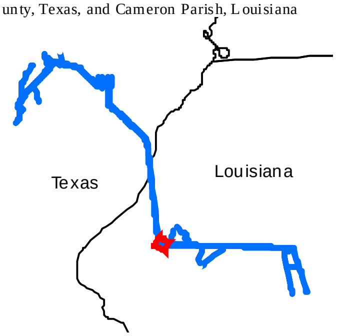
▨ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 42 of 74)

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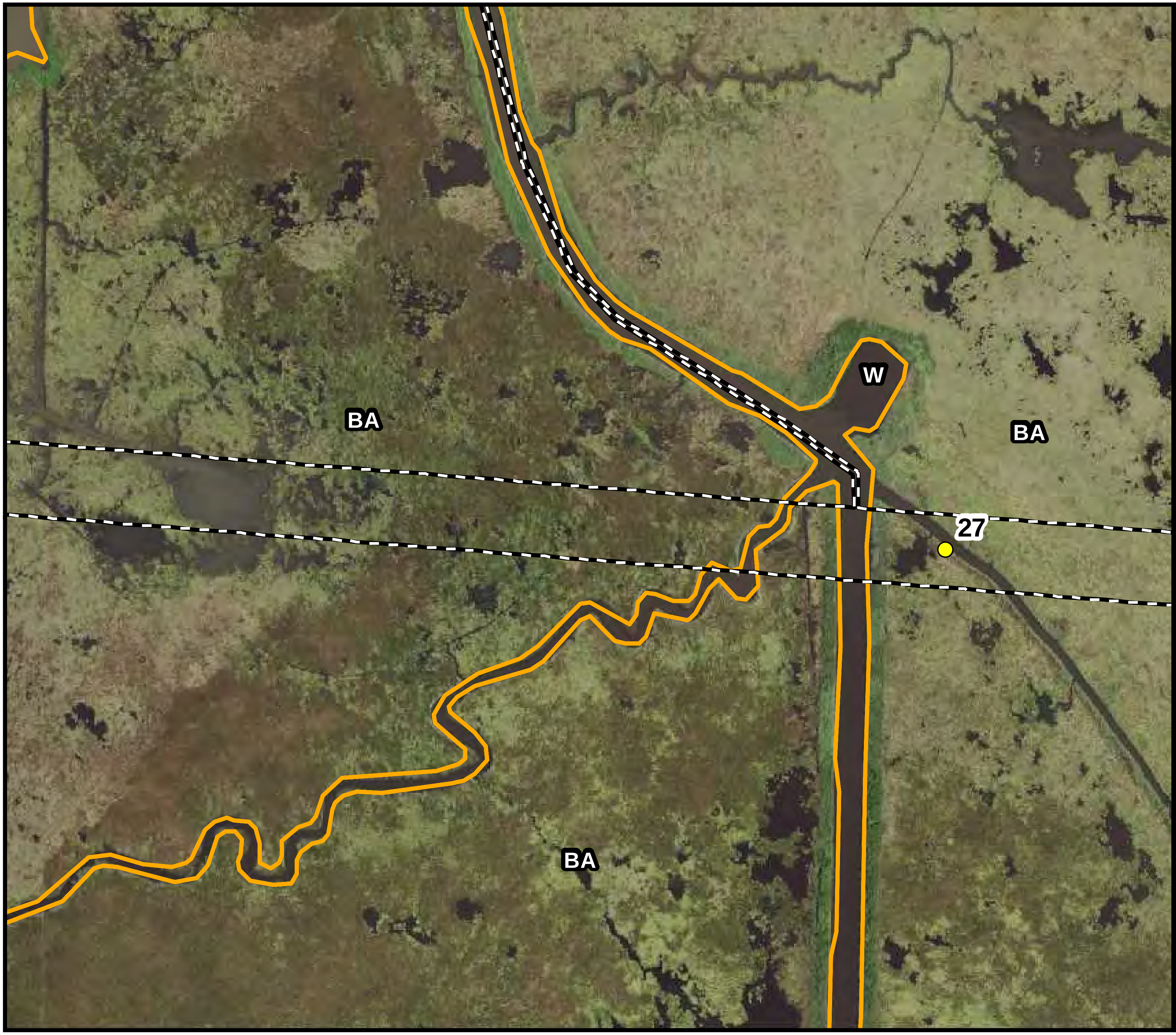
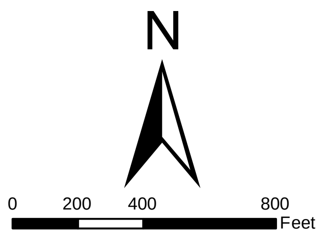




Legend

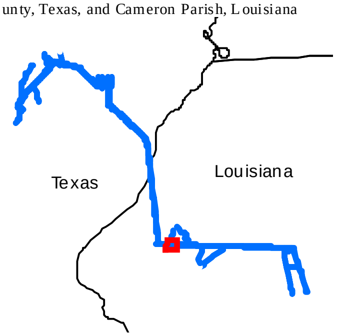
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 43 of 74)

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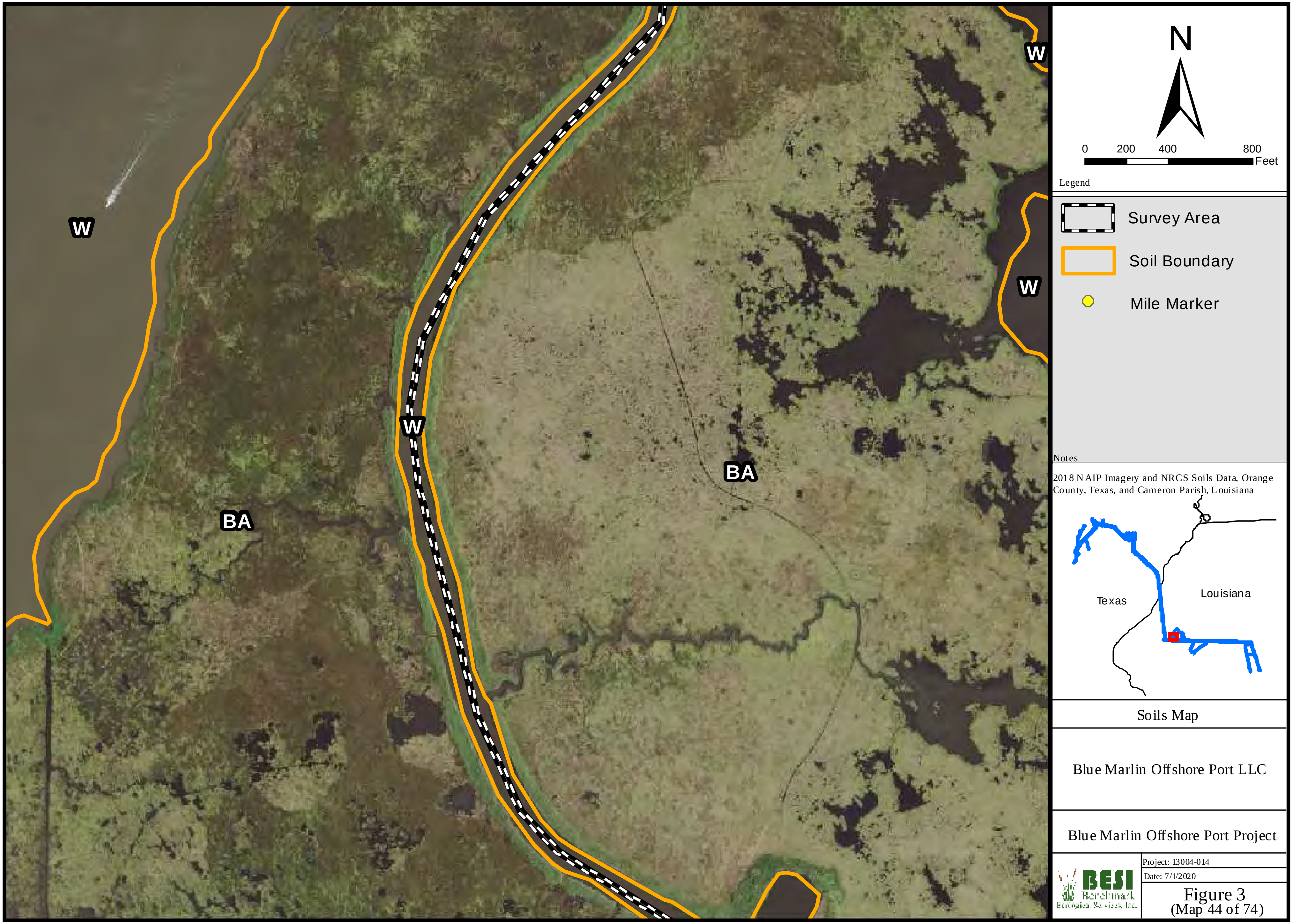

Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana

Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 44 of 74)

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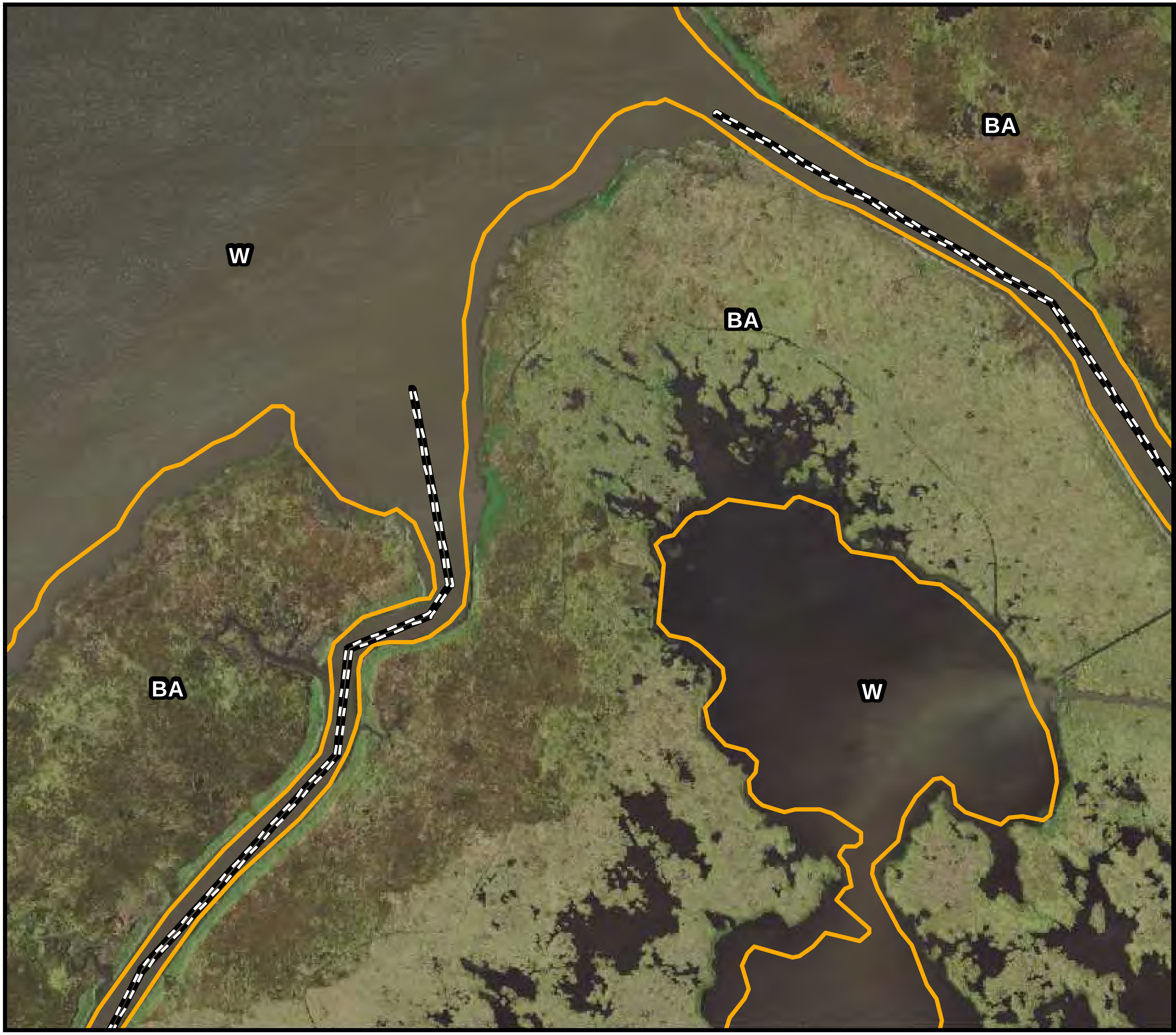
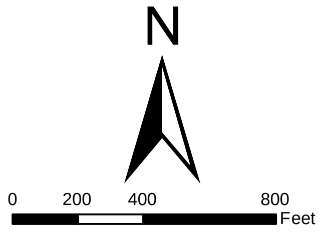


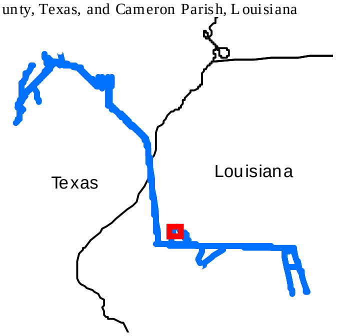


Legend

▨	Survey Area
▭	Soil Boundary
○	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 3
(Map 45 of 74)

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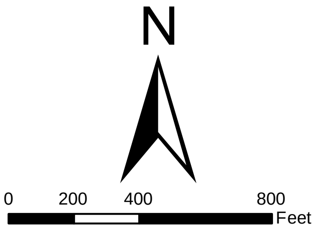


Legend

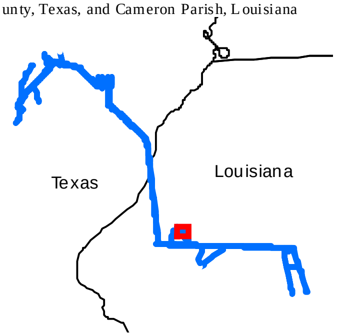
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 46 of 74)

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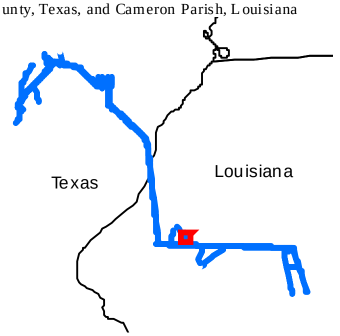
Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 47 of 74)

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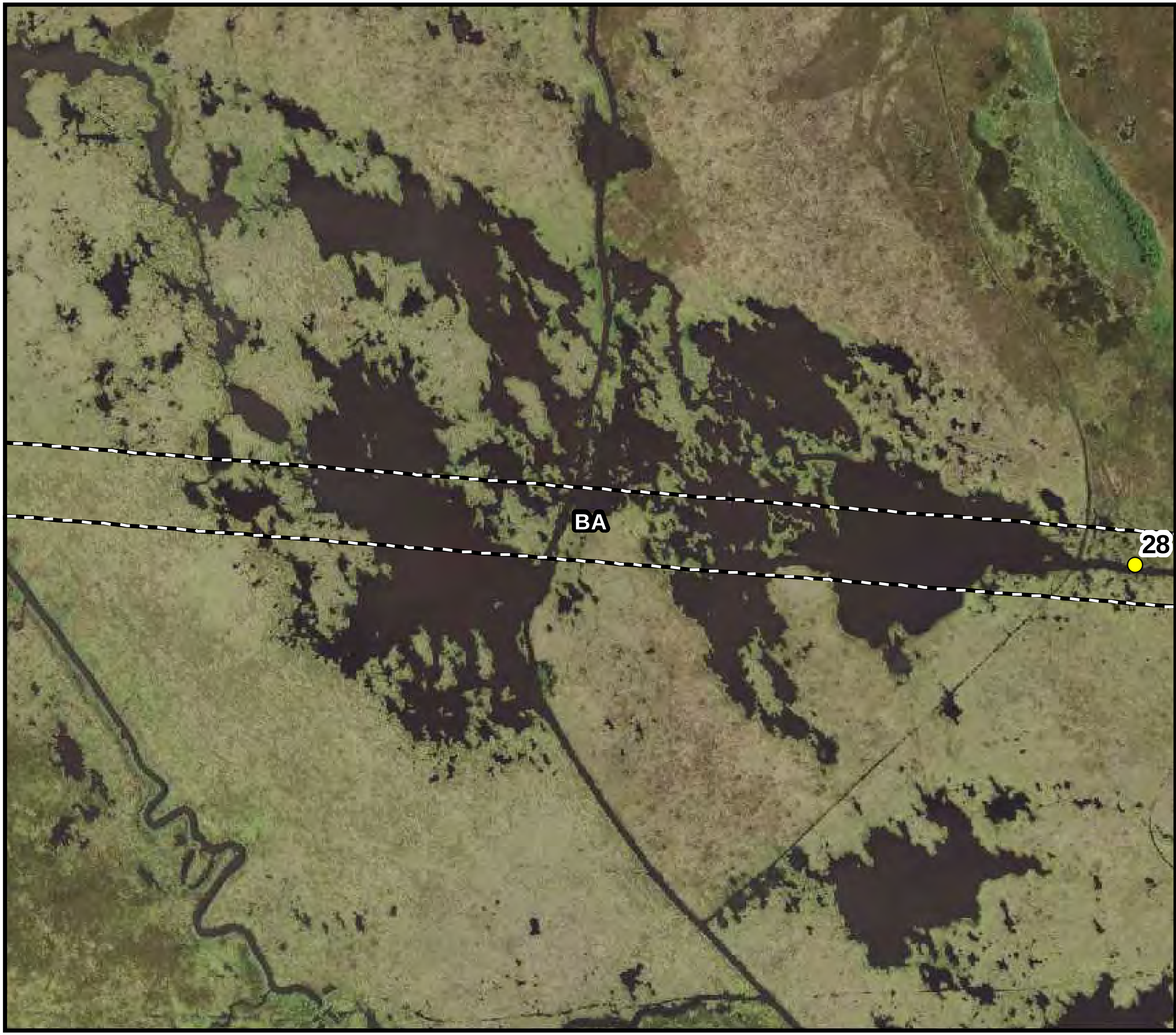


Legend

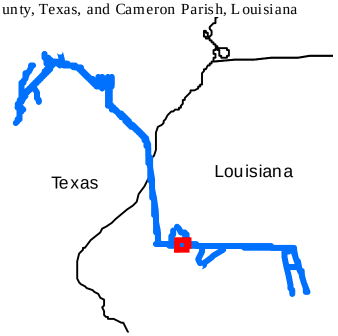
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 48 of 74)

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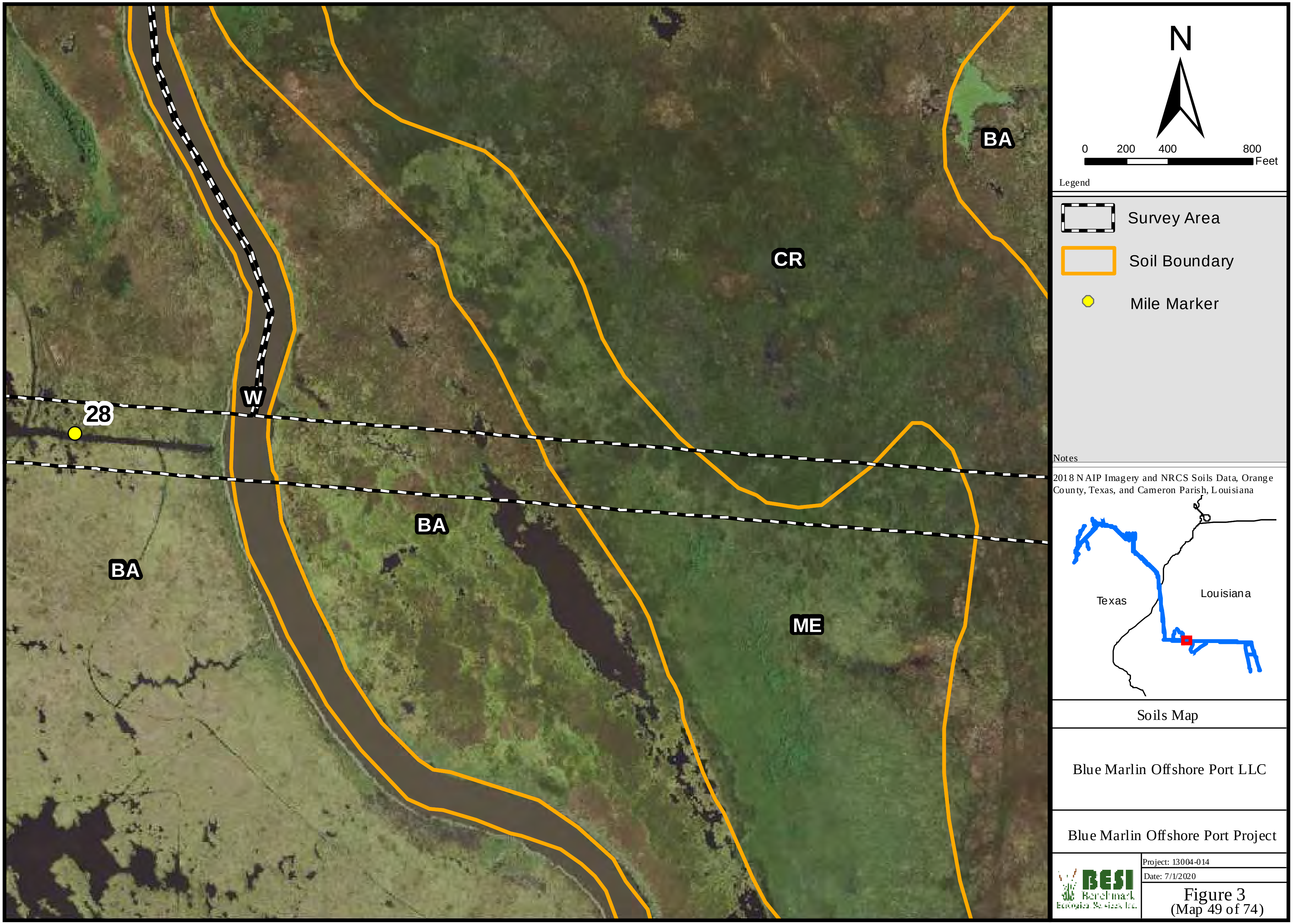

Legend

▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana

Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 49 of 74)

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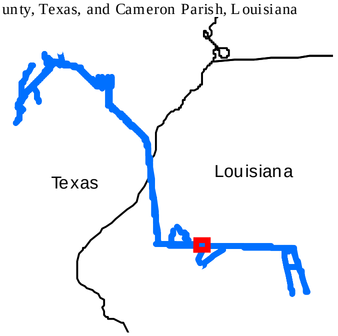
0 200 400 800
Feet

Legend

⬚	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 50 of 74)

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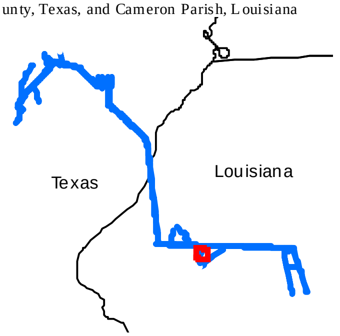
Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 51 of 74)

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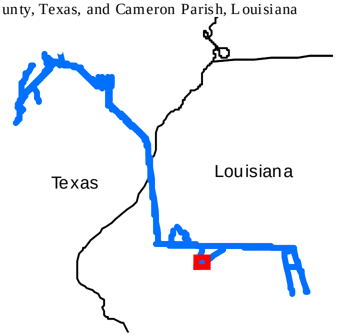
Legend

- Survey Area
- Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 52 of 74)

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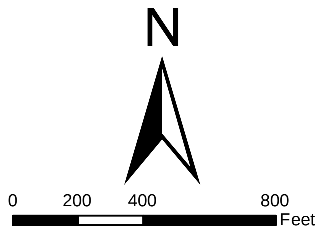


Legend

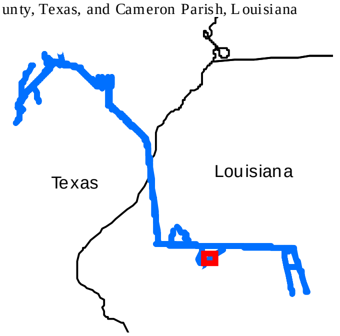
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 53 of 74)

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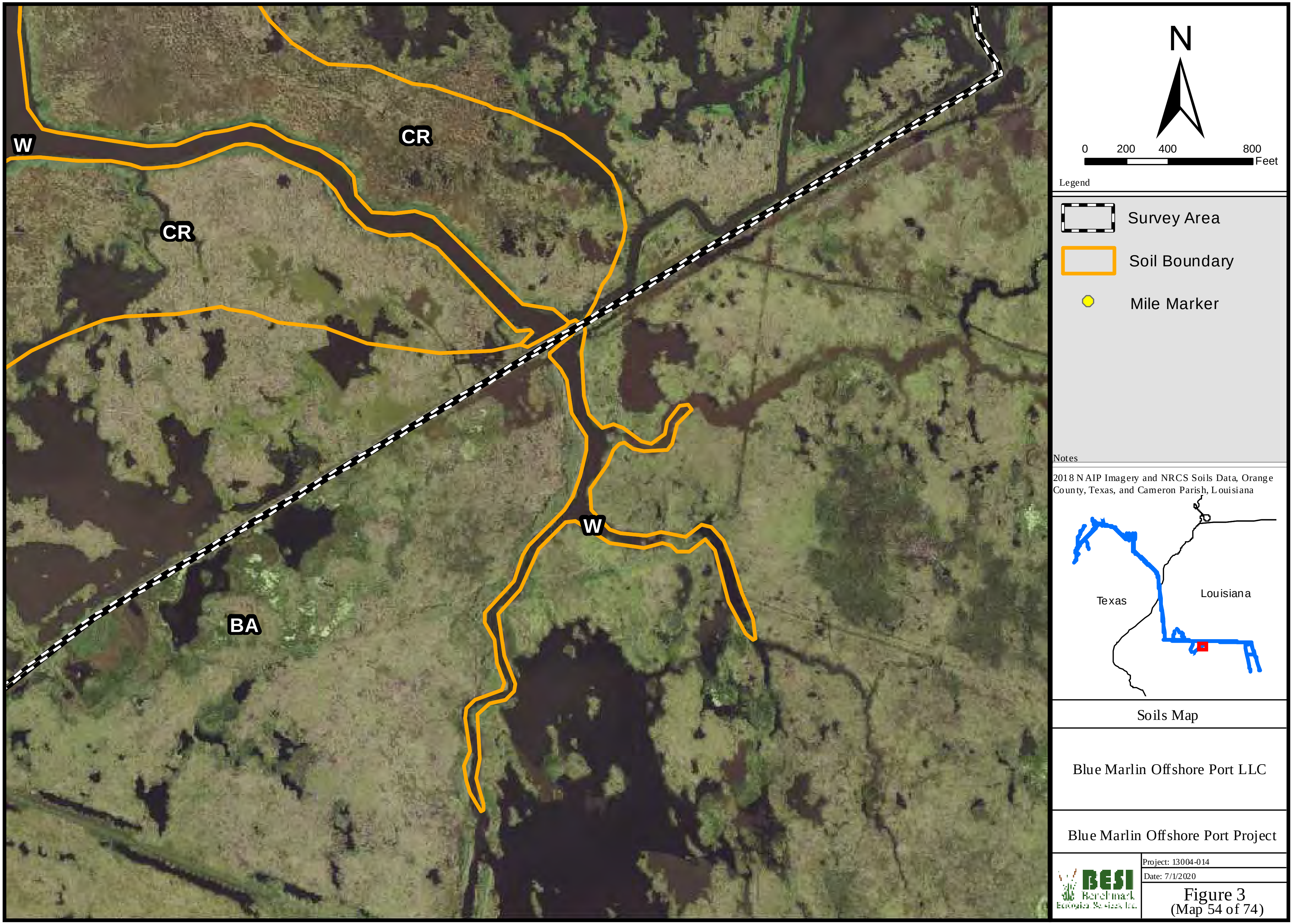

Legend

▨ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana

Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 54 of 74)

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Legend

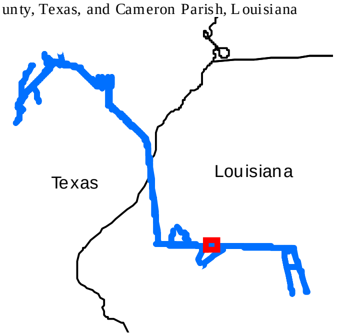
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 55 of 74)

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Legend

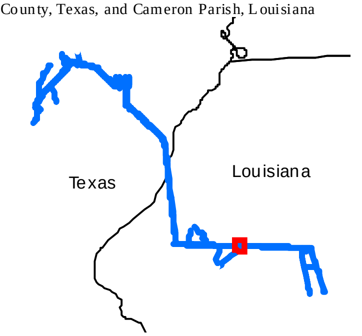
▨ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 56 of 74)

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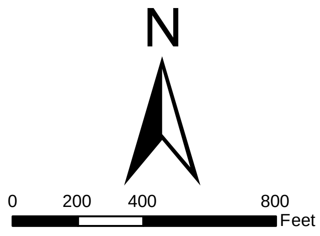


Legend

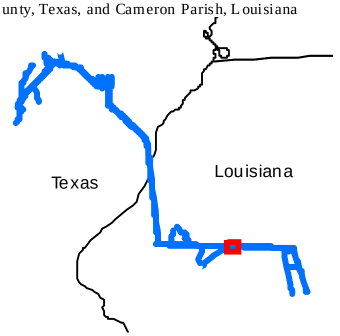
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
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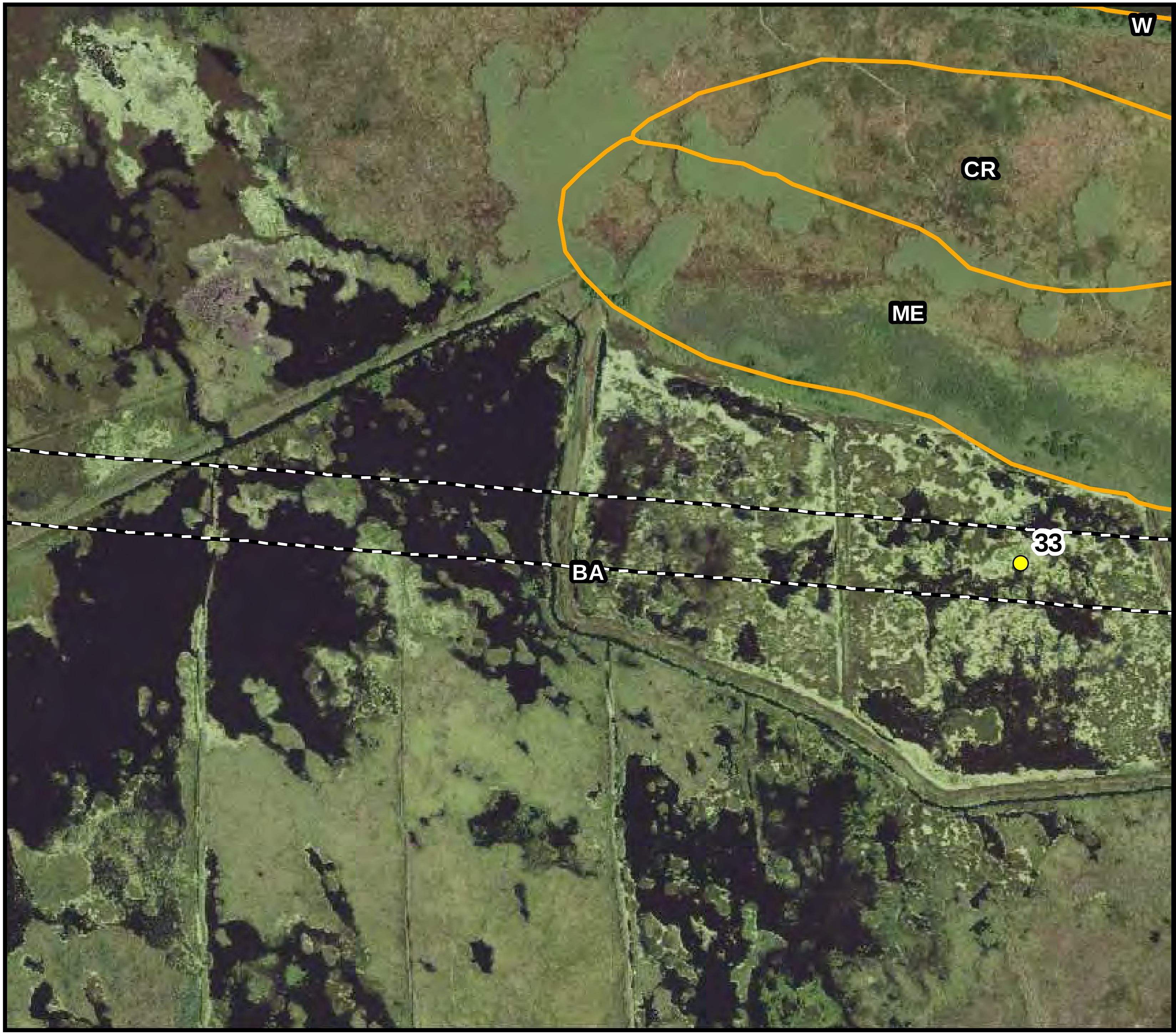

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Legend

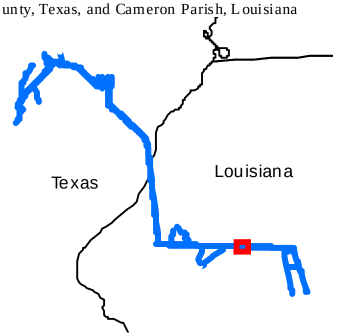
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 58 of 74)

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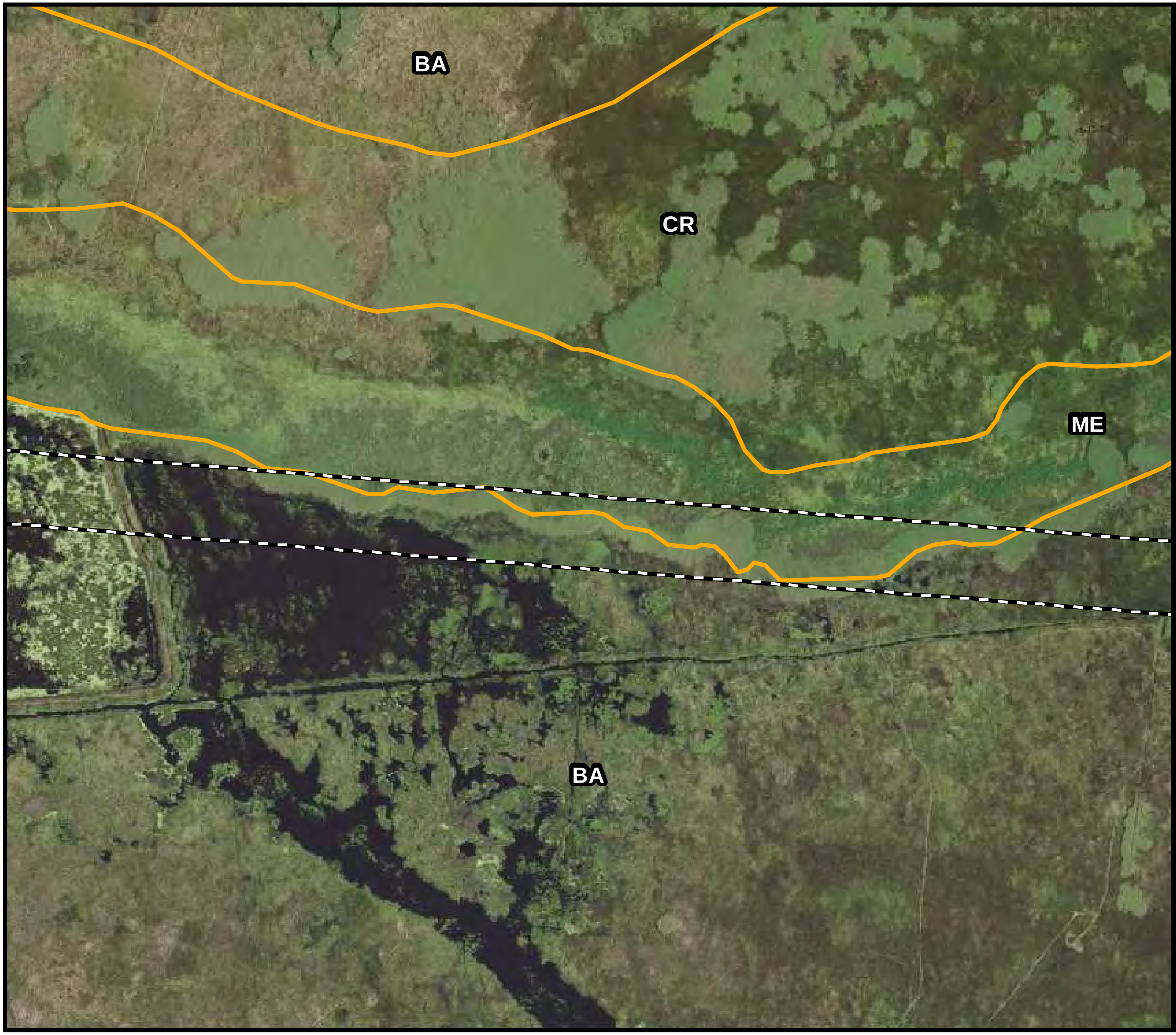
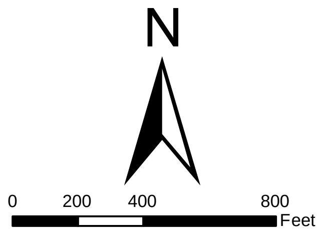




Legend

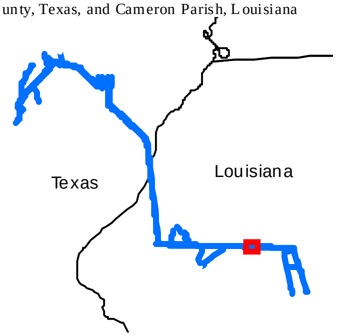
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 59 of 74)

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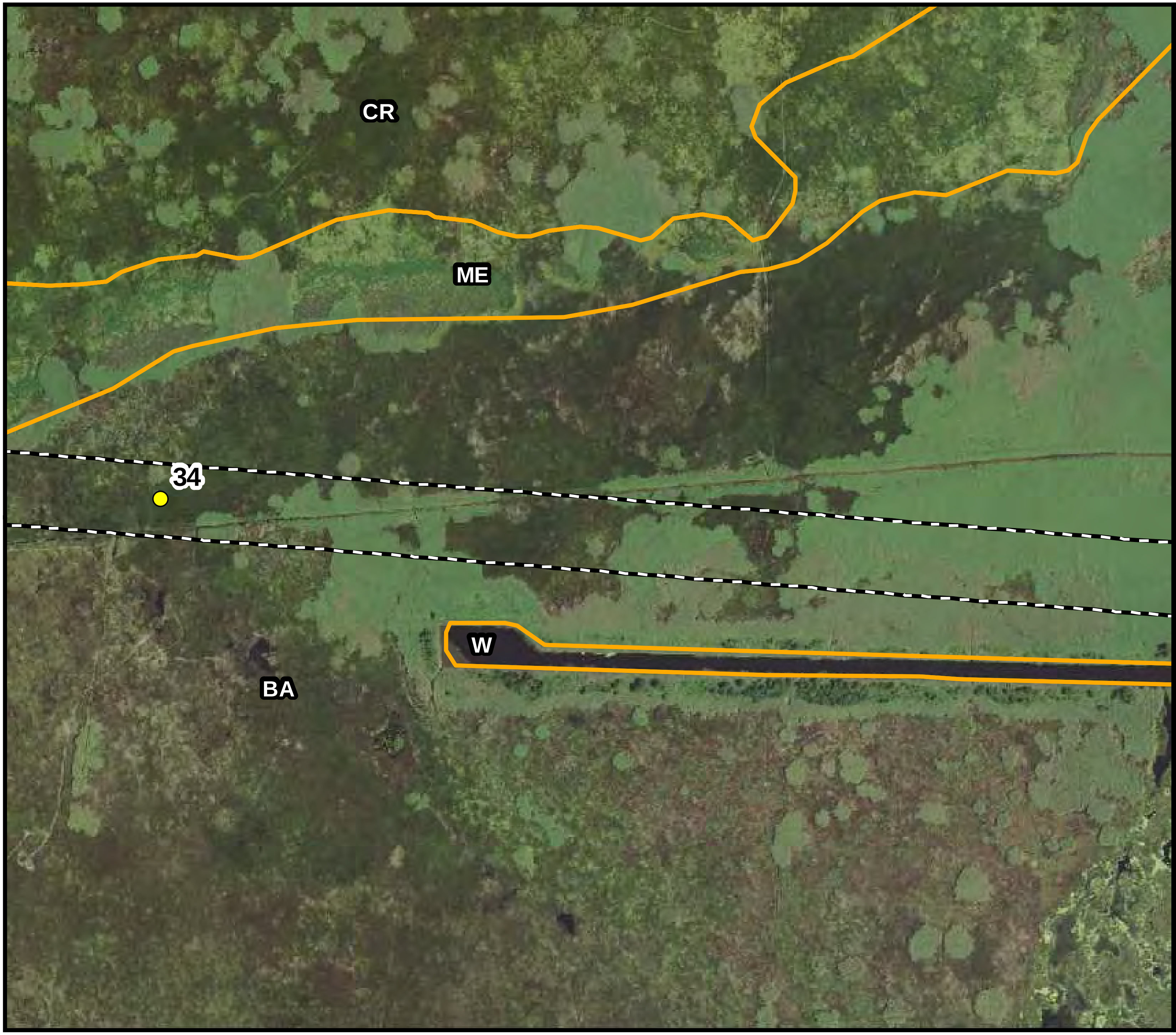
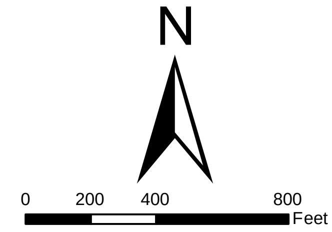




Legend

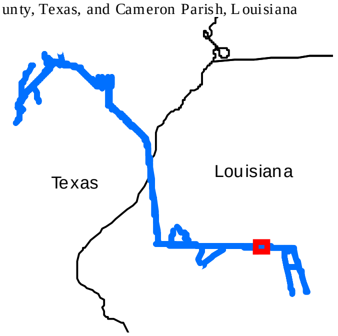
▨ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 60 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

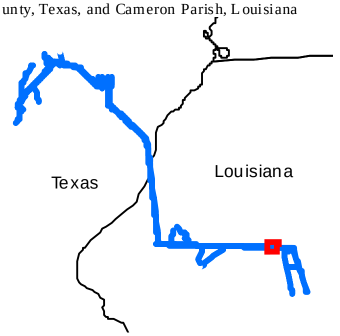
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 61 of 74)

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Feet

Legend

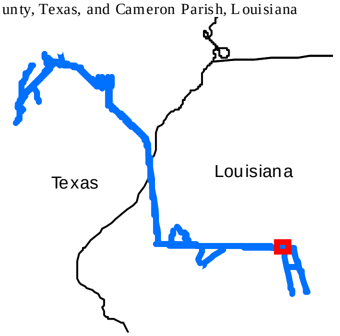
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 3
(Map 62 of 74)

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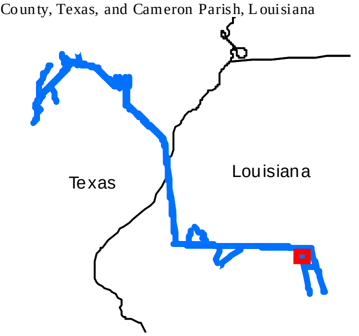
Legend

- ▨ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 63 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800 Feet

Legend

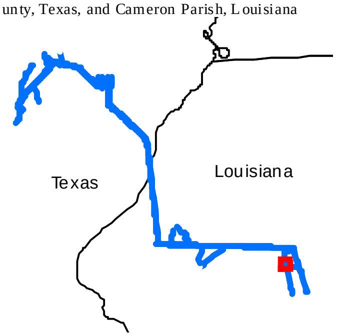
▢ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 64 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

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0 200 400 800
Feet

Legend

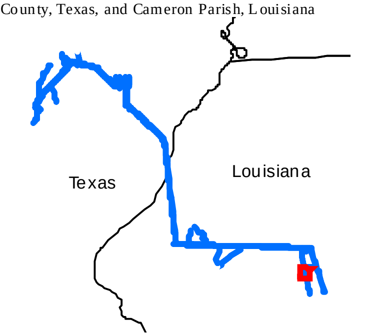
▭ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 65 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N
0 200 400 800
Feet

Legend

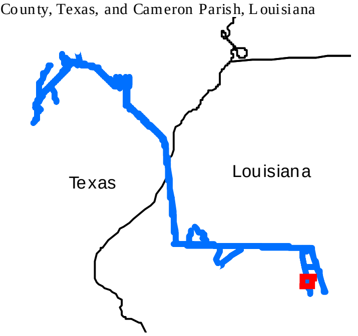
⬚ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 66 of 74)

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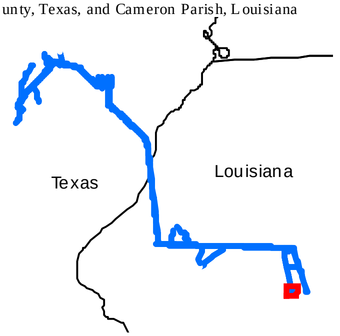
0 200 400 800
Feet

Legend

▨	Survey Area
🟧	Soil Boundary
●	Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 67 of 74)

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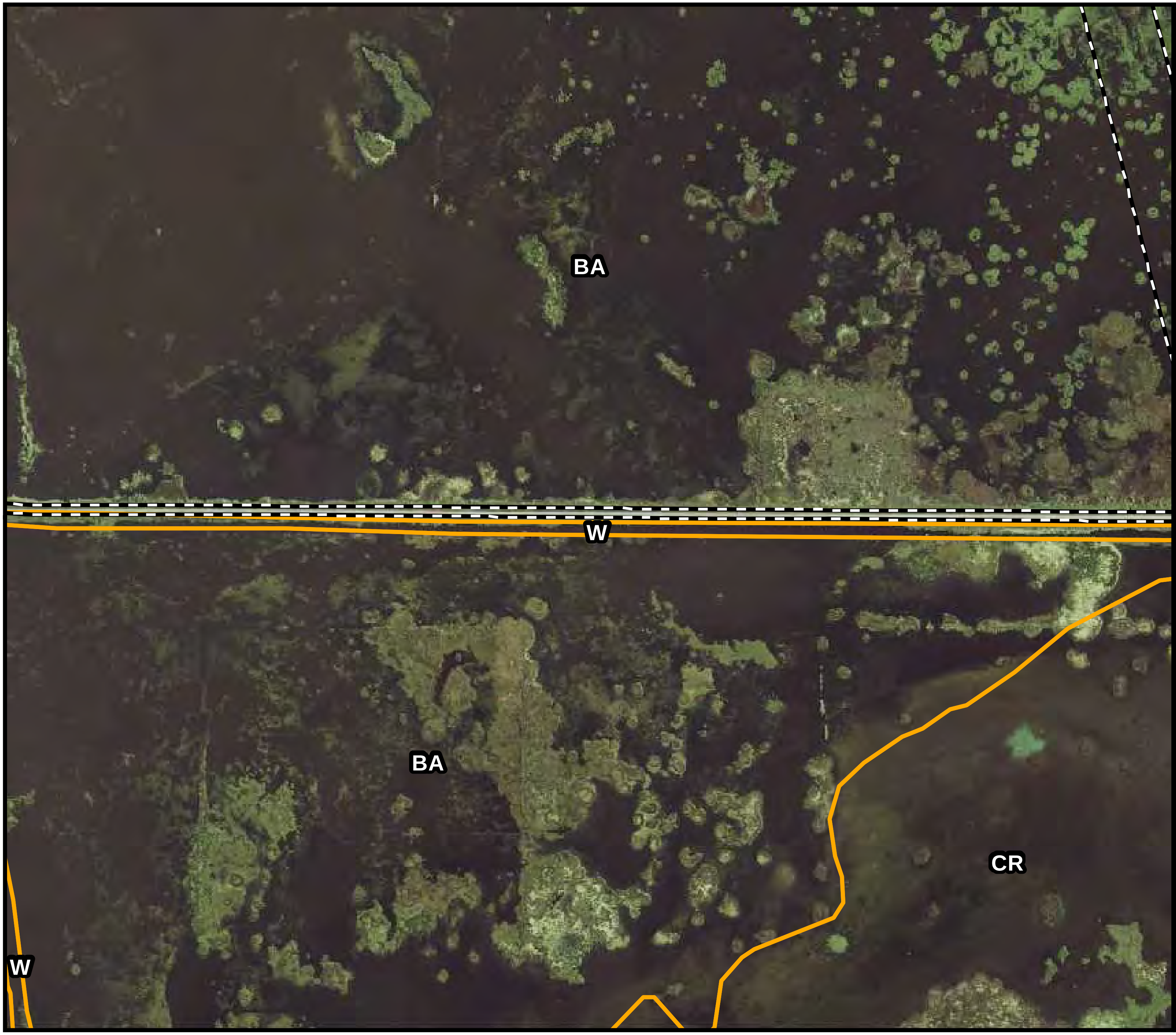
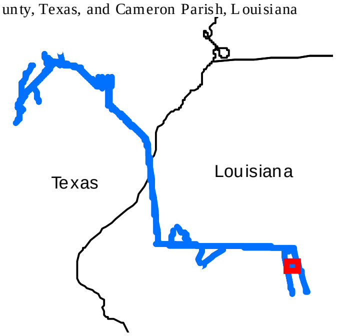


Legend

- ▭ Survey Area
- 🟧 Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 3
(Map 68 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800 Feet

Legend

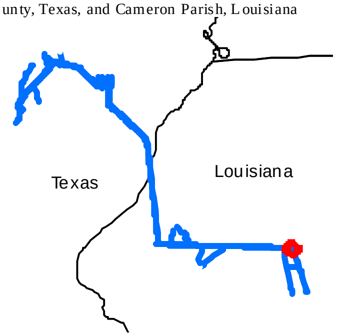
☐ Survey Area

☐ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 69 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800
Feet

Legend

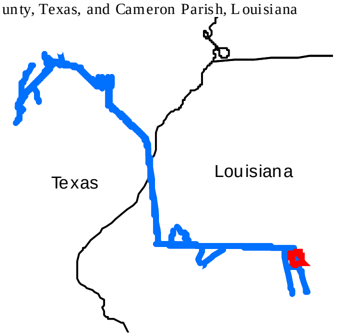
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 70 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

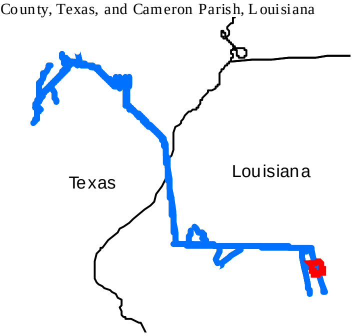
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 71 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

N

0 200 400 800
Feet

Legend

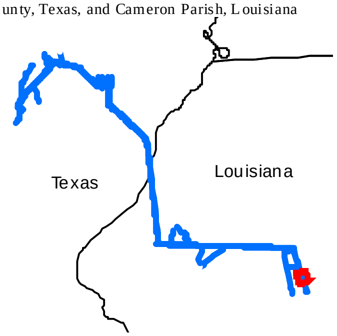
▭ Survey Area

🟧 Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 72 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

Legend

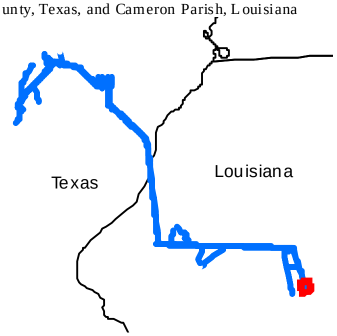
⬚ Survey Area

▭ Soil Boundary

● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

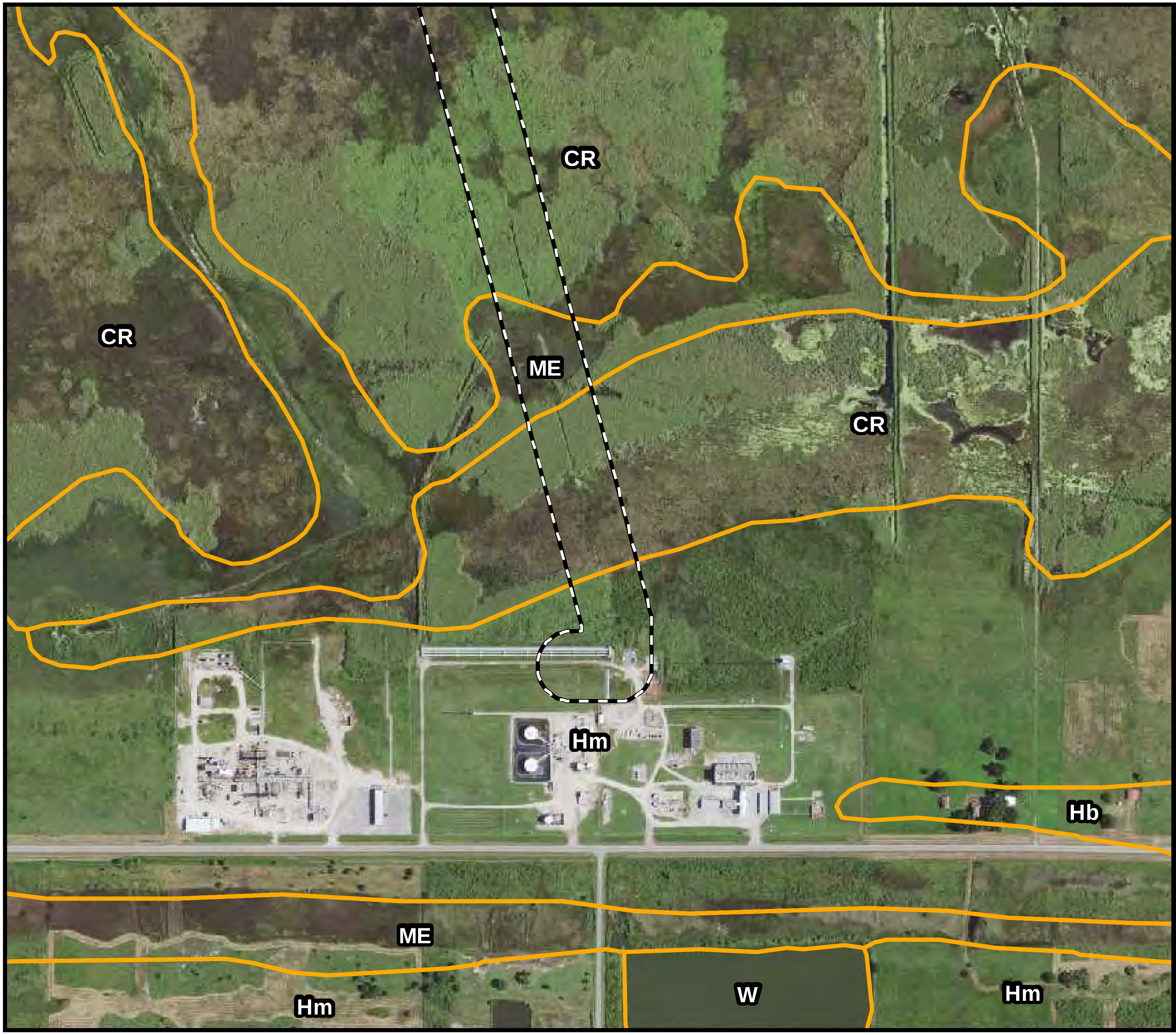
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 3
(Map 73 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd

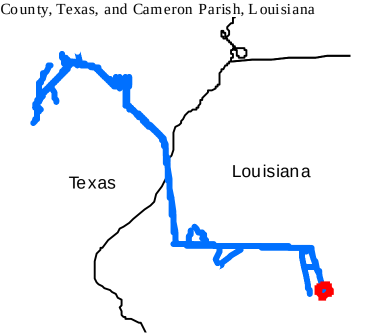


Legend

- ▭ Survey Area
- ▭ Soil Boundary
- ● Mile Marker

Notes

2018 NAIP Imagery and NRCS Soils Data, Orange County, Texas, and Cameron Parish, Louisiana



Soils Map

Blue Marlin Offshore Port LLC

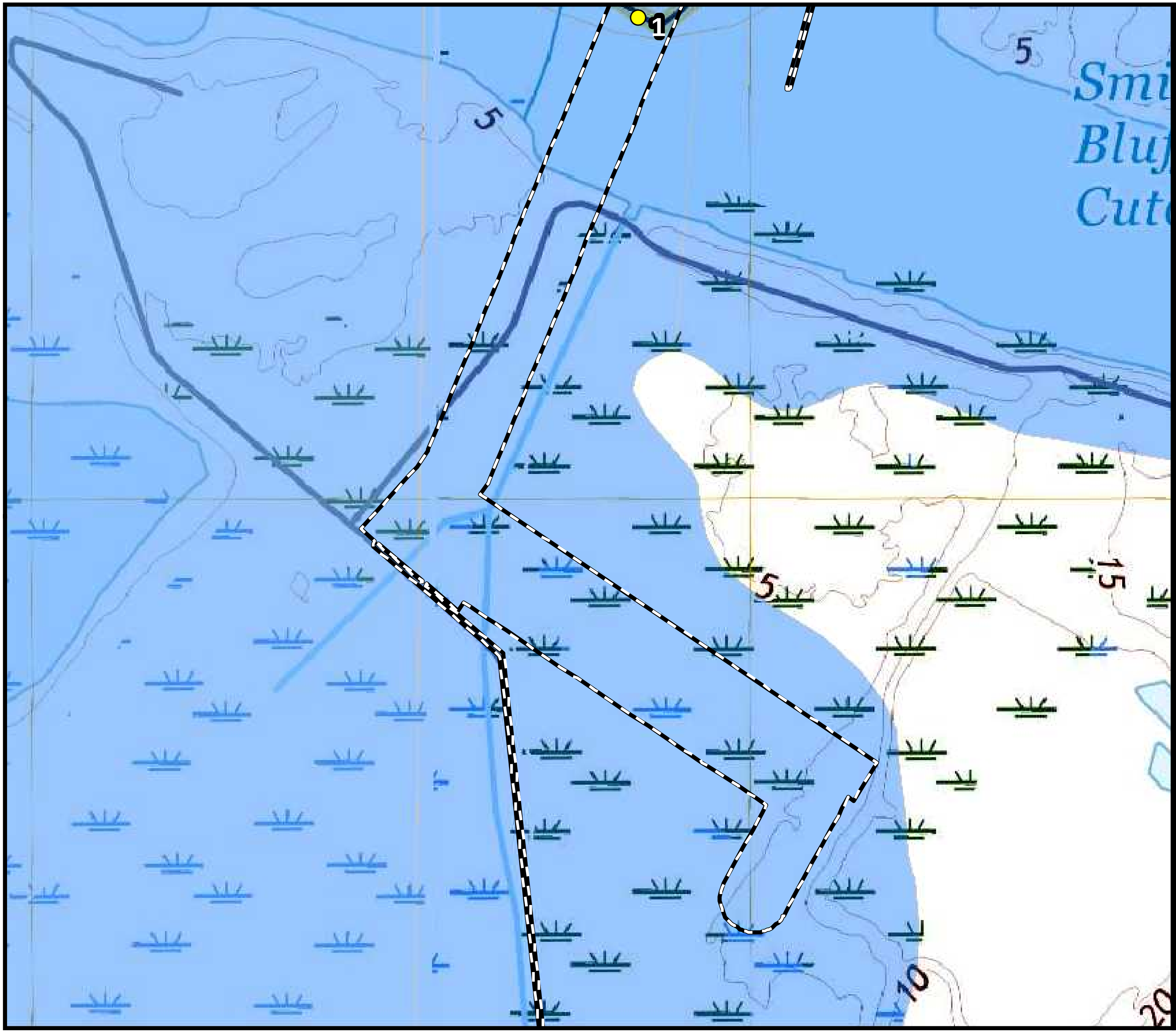
Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 3
(Map 74 of 74)

M:\13004\014\Arc\Figure3_Soils.mxd



N

0 200 400 800
Feet

Legend

▭ Survey Area

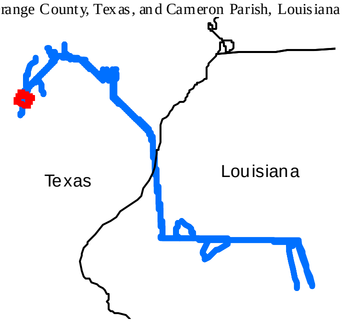
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

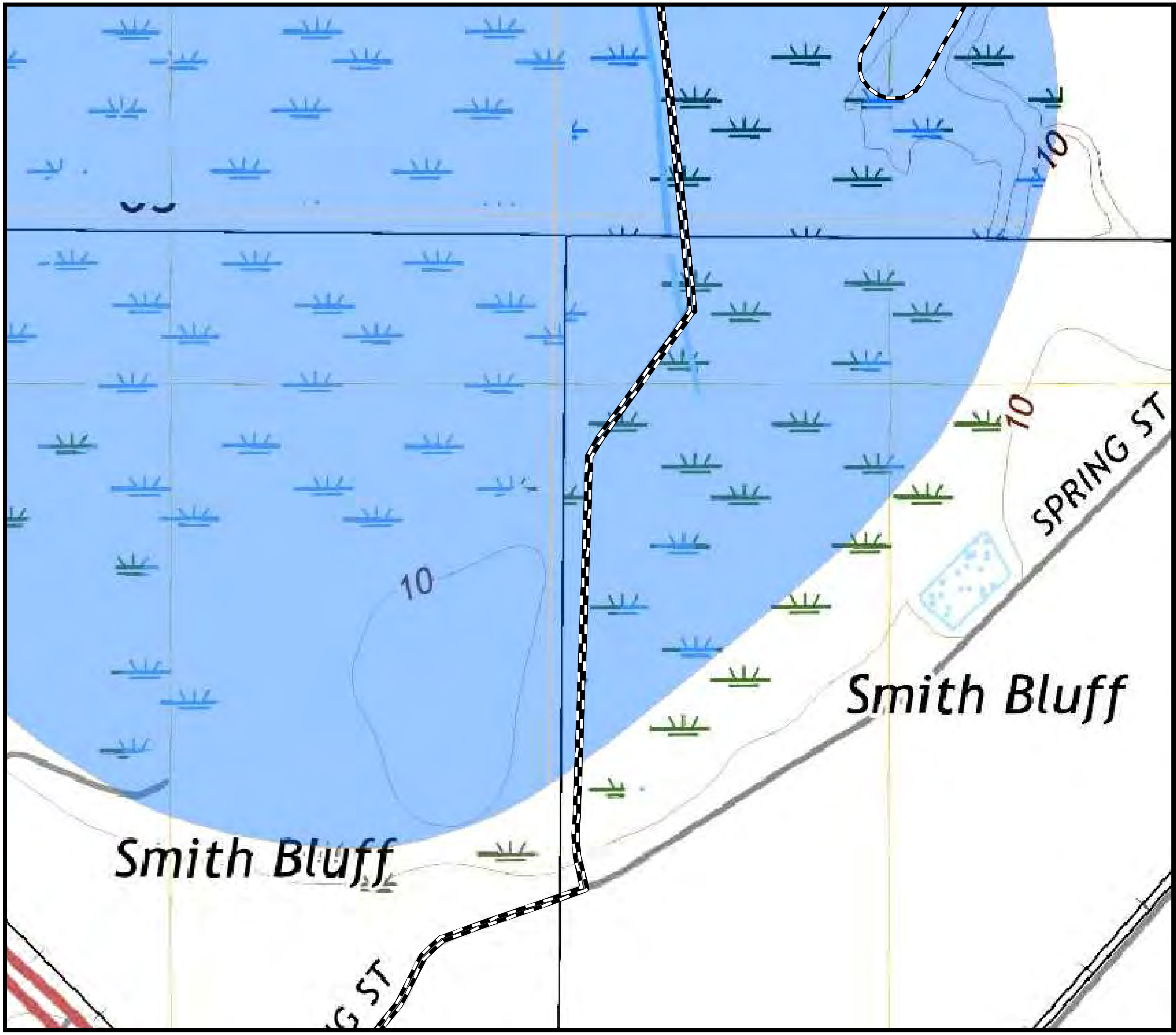
Blue Marlin Offshore Port Project

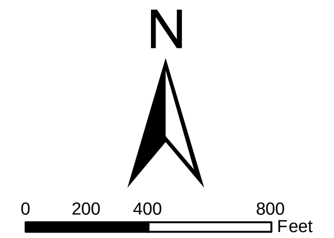
BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 1 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





Legend

▭ Survey Area

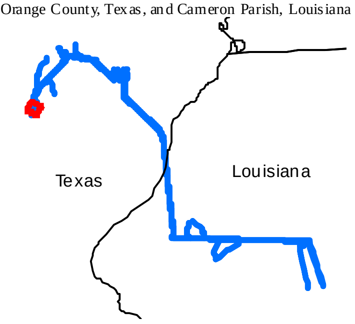
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

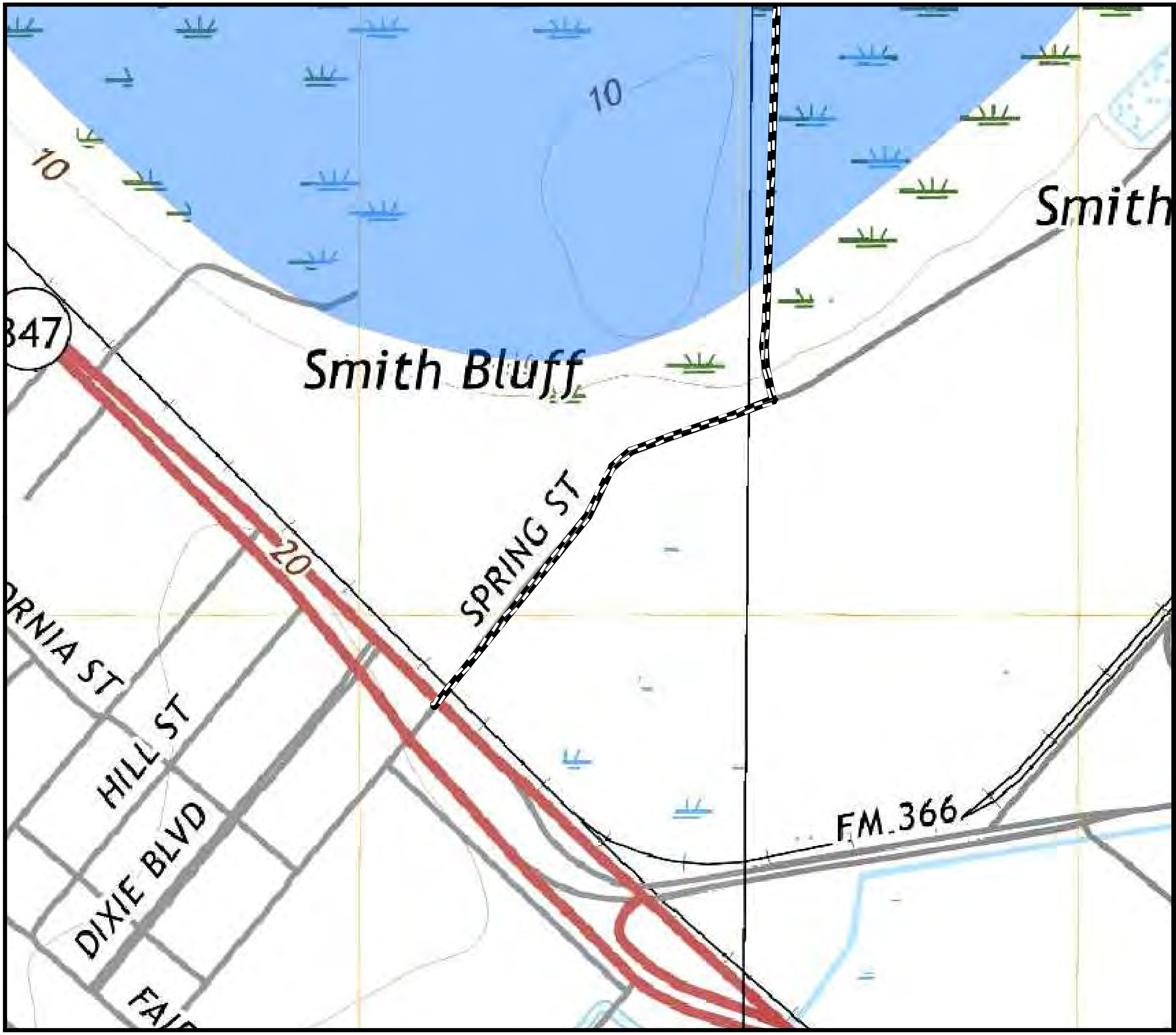
Blue Marlin Offshore Port LLC

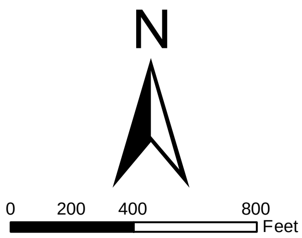
Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 2 of 74)





Legend

▭ Survey Area

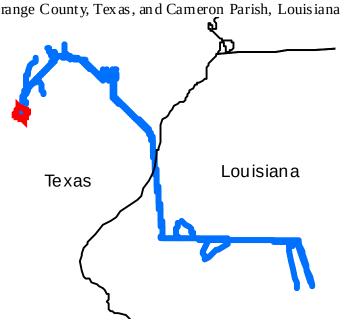
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 3 of 74)

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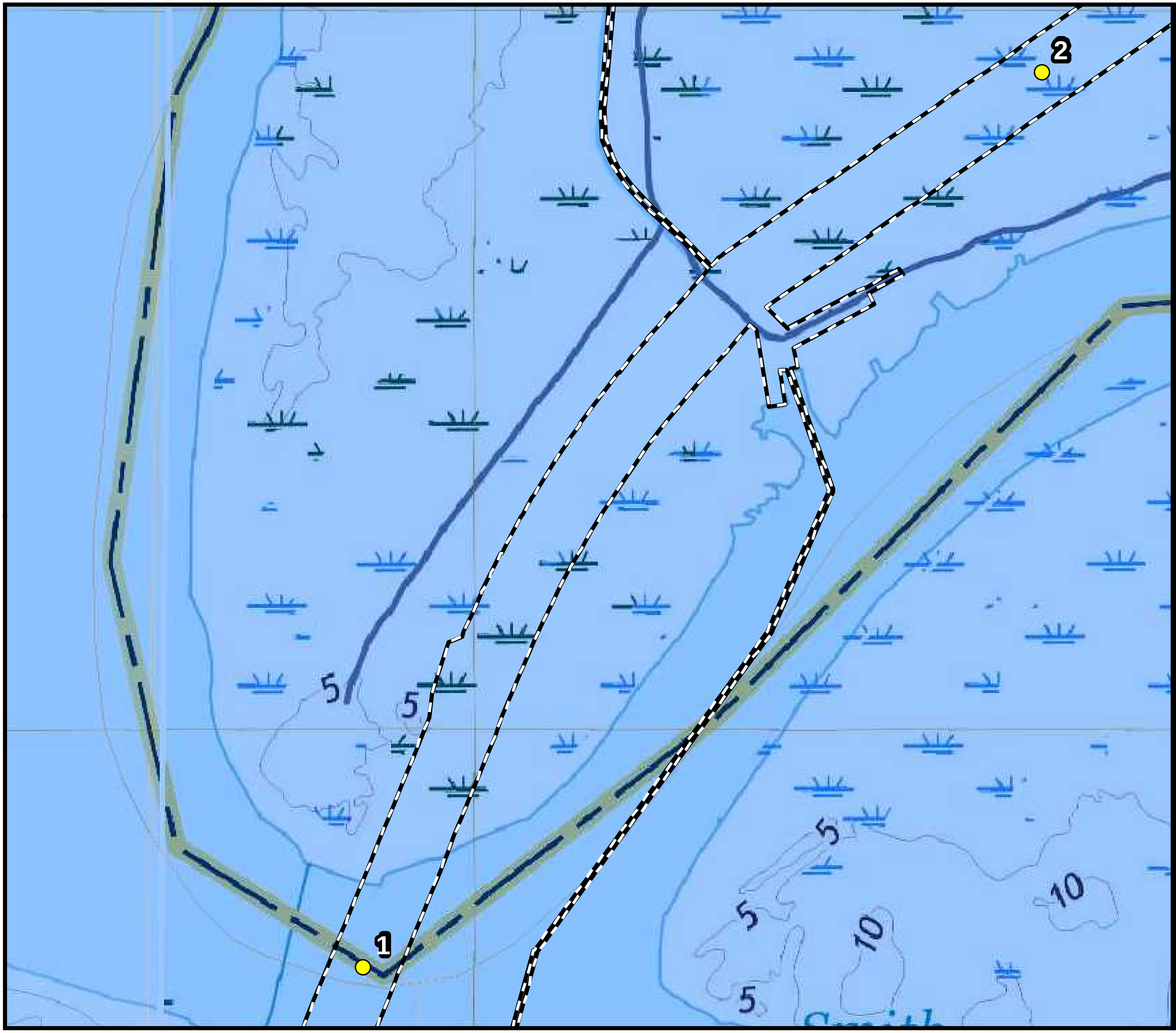


N

0 200 400 800 Feet

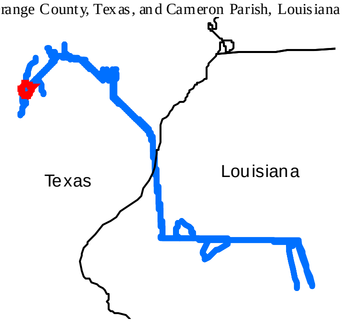
Legend

▭	Survey Area
🟦	100 Year Floodplain
●	Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 4 of 74)

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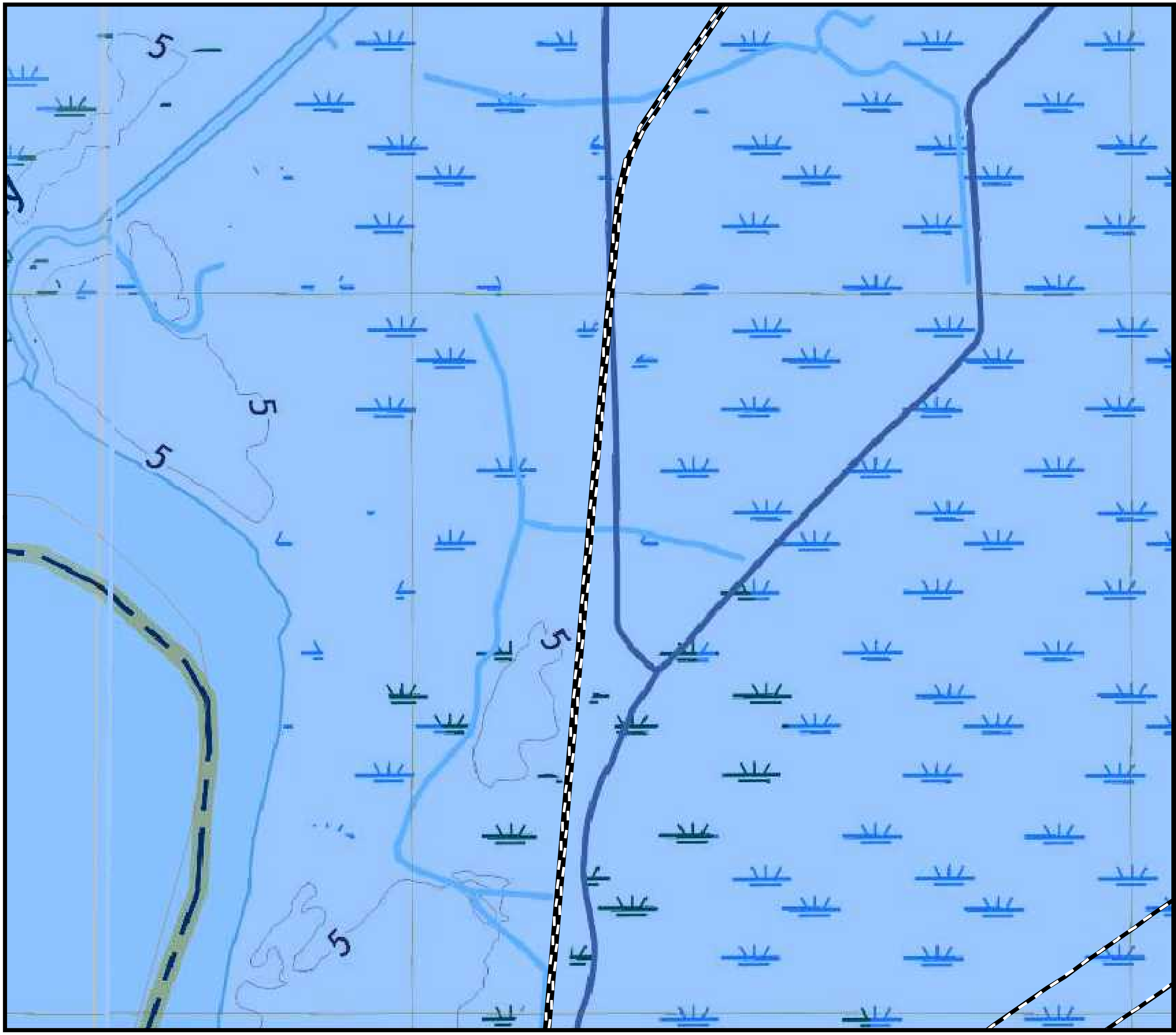


Legend

▭ Survey Area

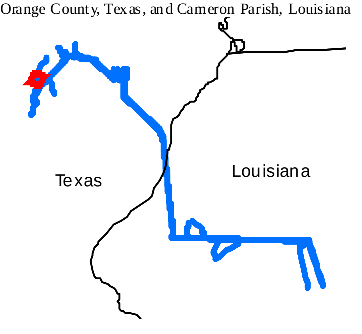
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 5 of 74)

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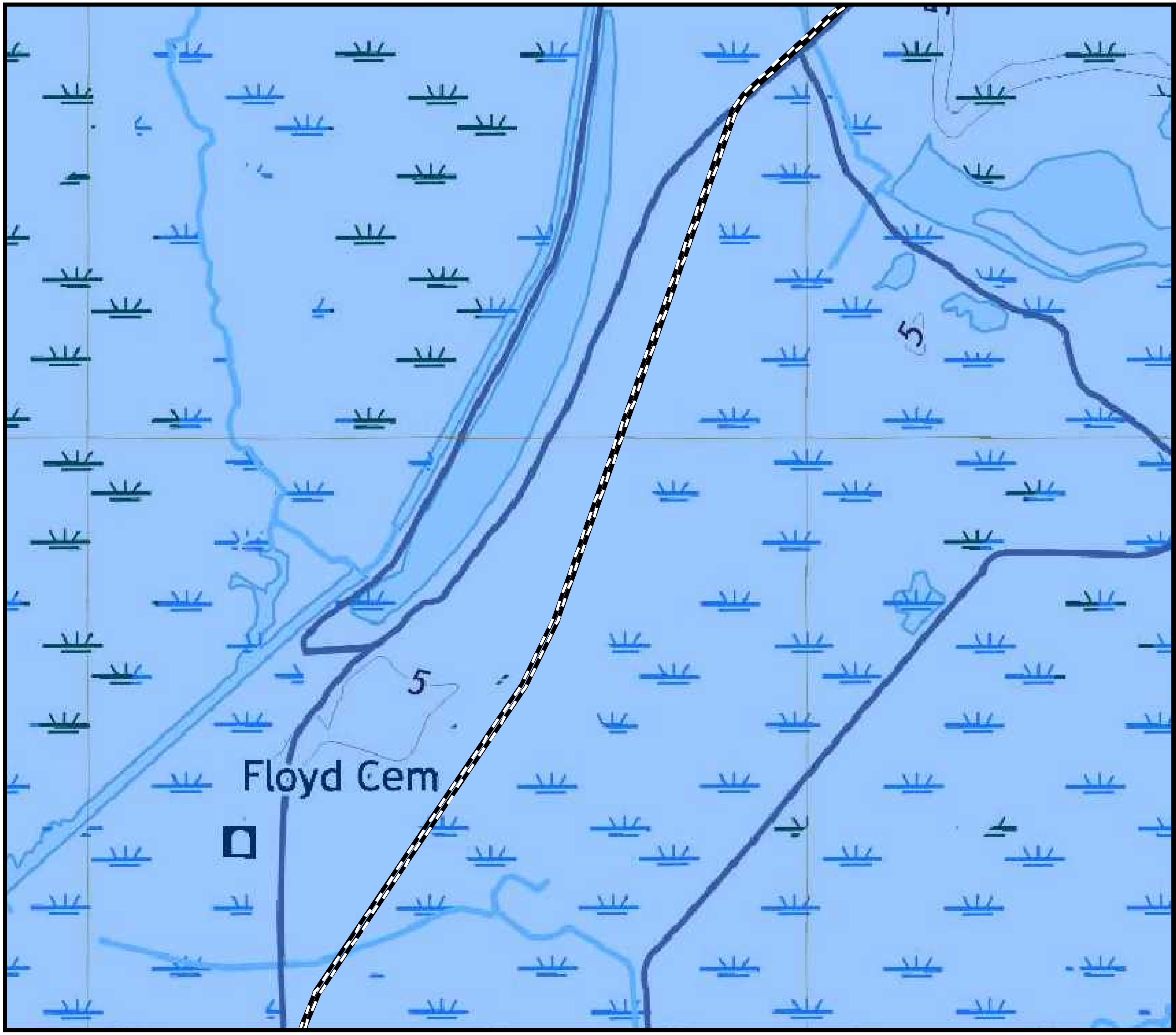
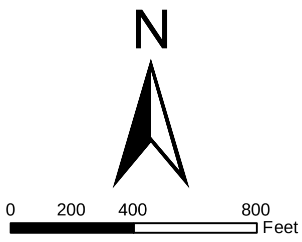




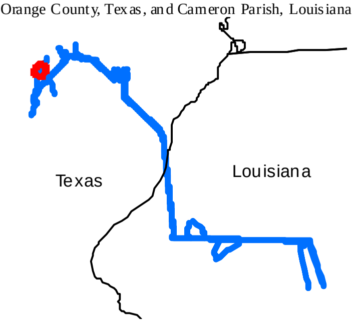
Legend

- ▭ Survey Area
- 🟦 100 Year Floodplain
- ● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 6 of 74)

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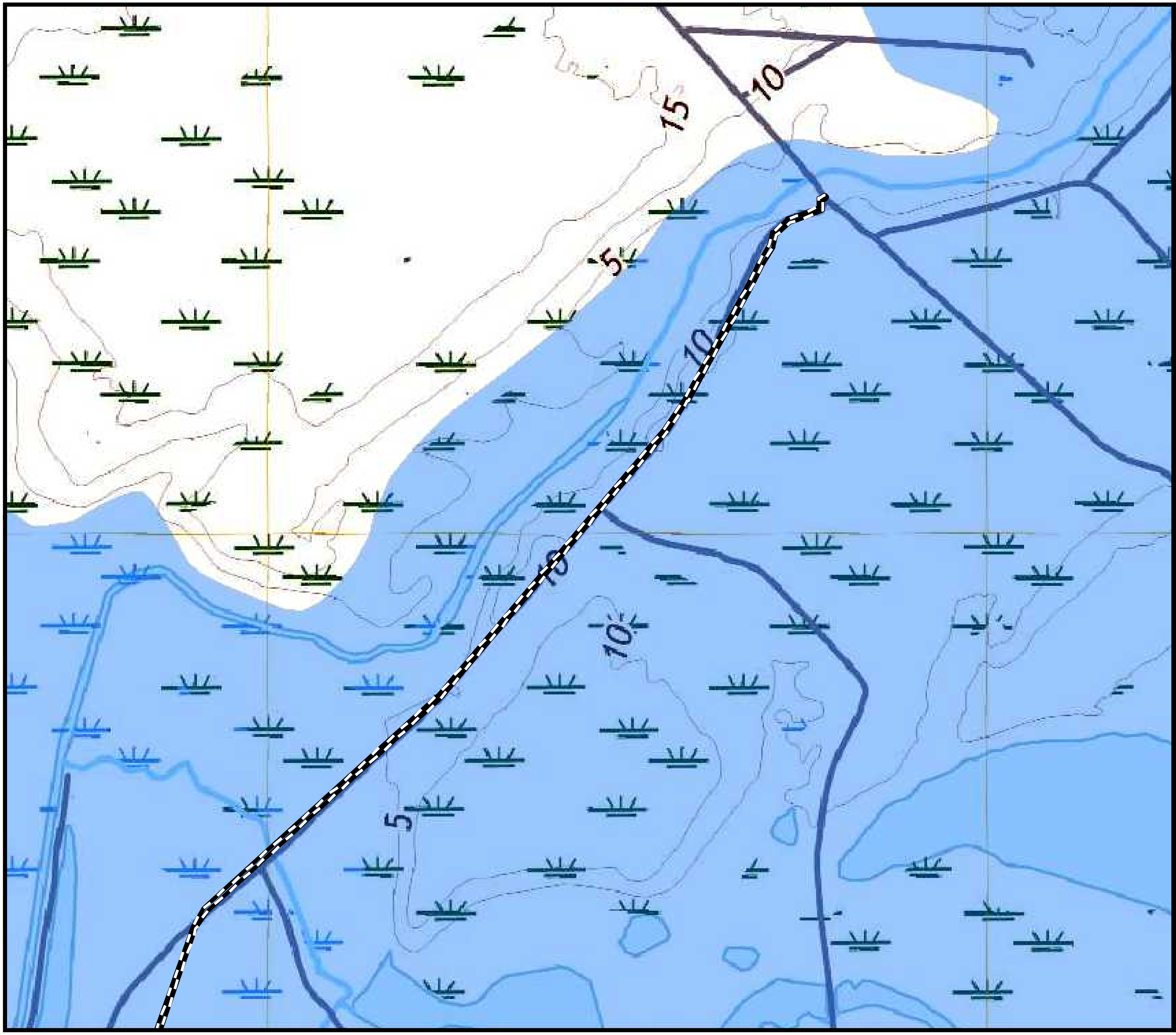


Legend

▭ Survey Area

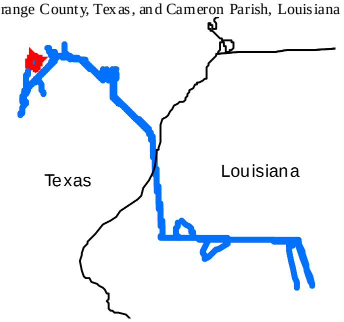
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 7 of 74)

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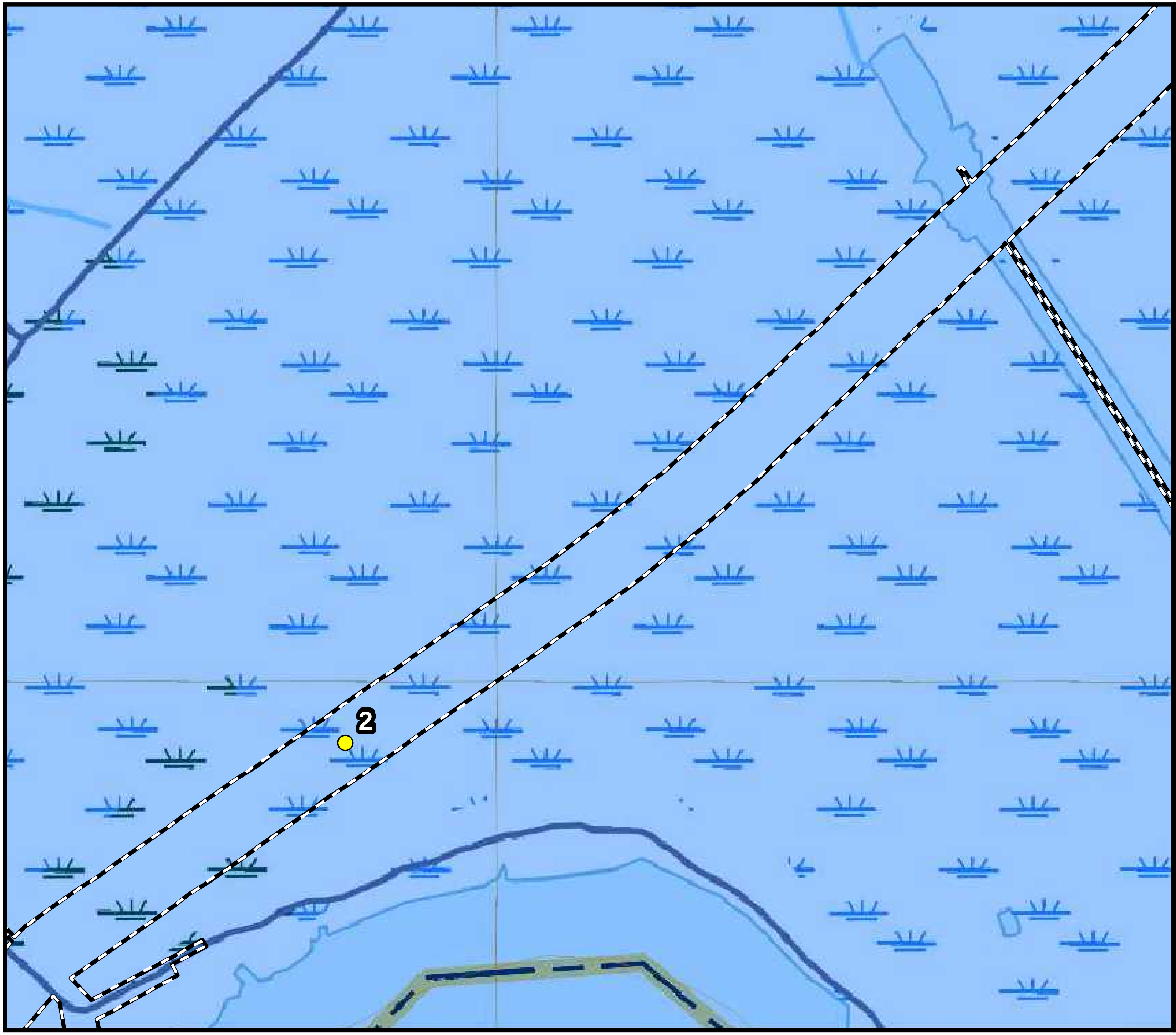


N

0 200 400 800
Feet

Legend

▭ Survey Area

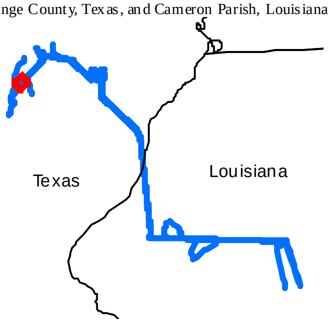
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 8 of 74)

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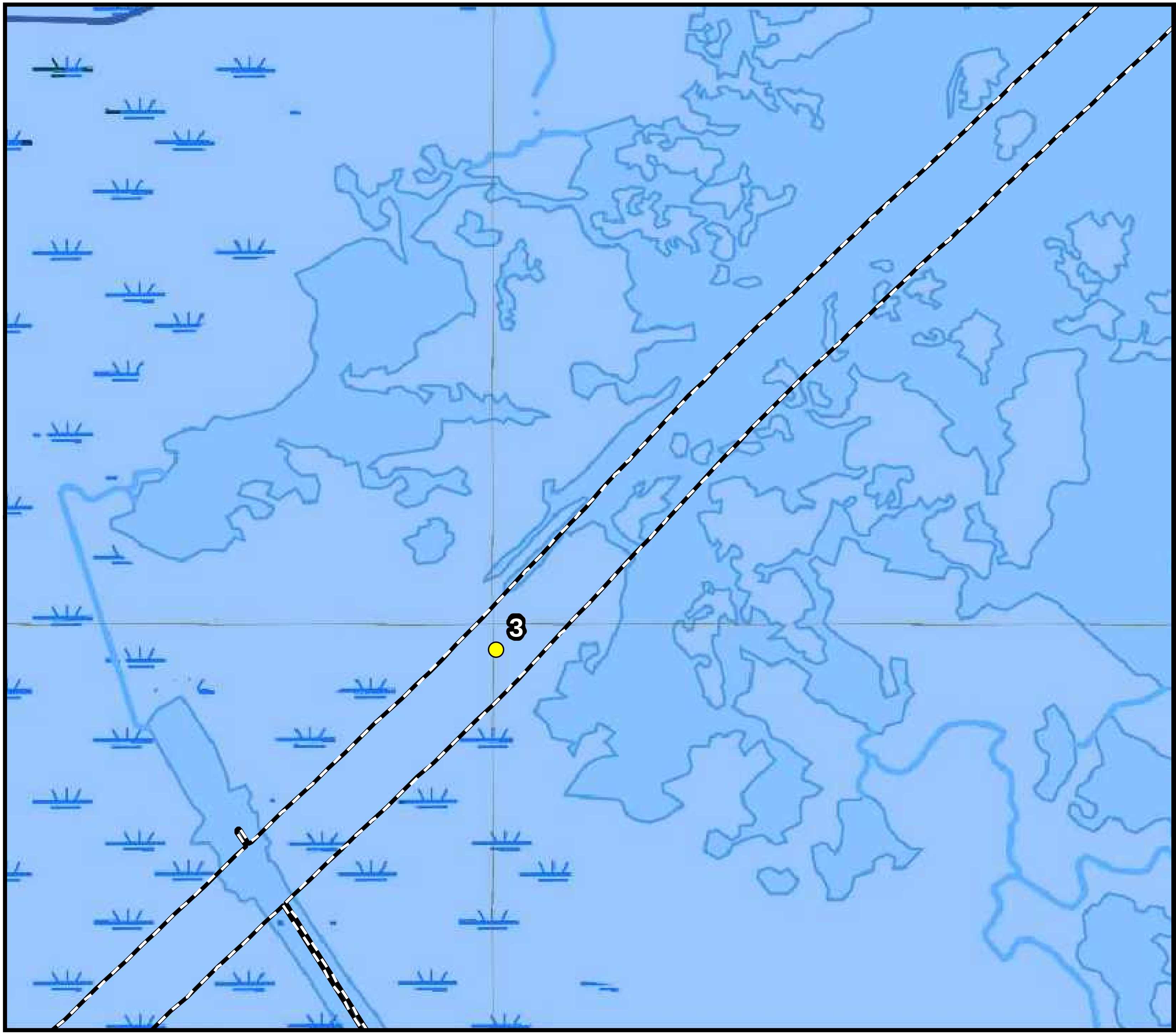
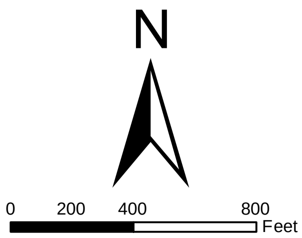




Legend

▨ Survey Area

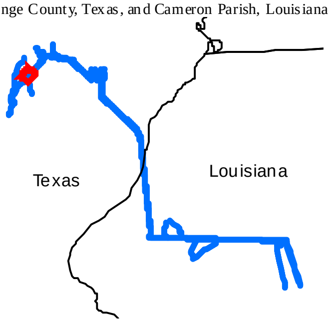
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 9 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800
Feet

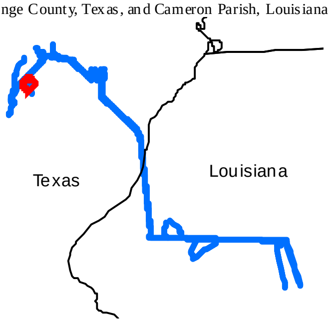
Legend

▭	Survey Area
🟦	100 Year Floodplain
○	Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 10 of 74)

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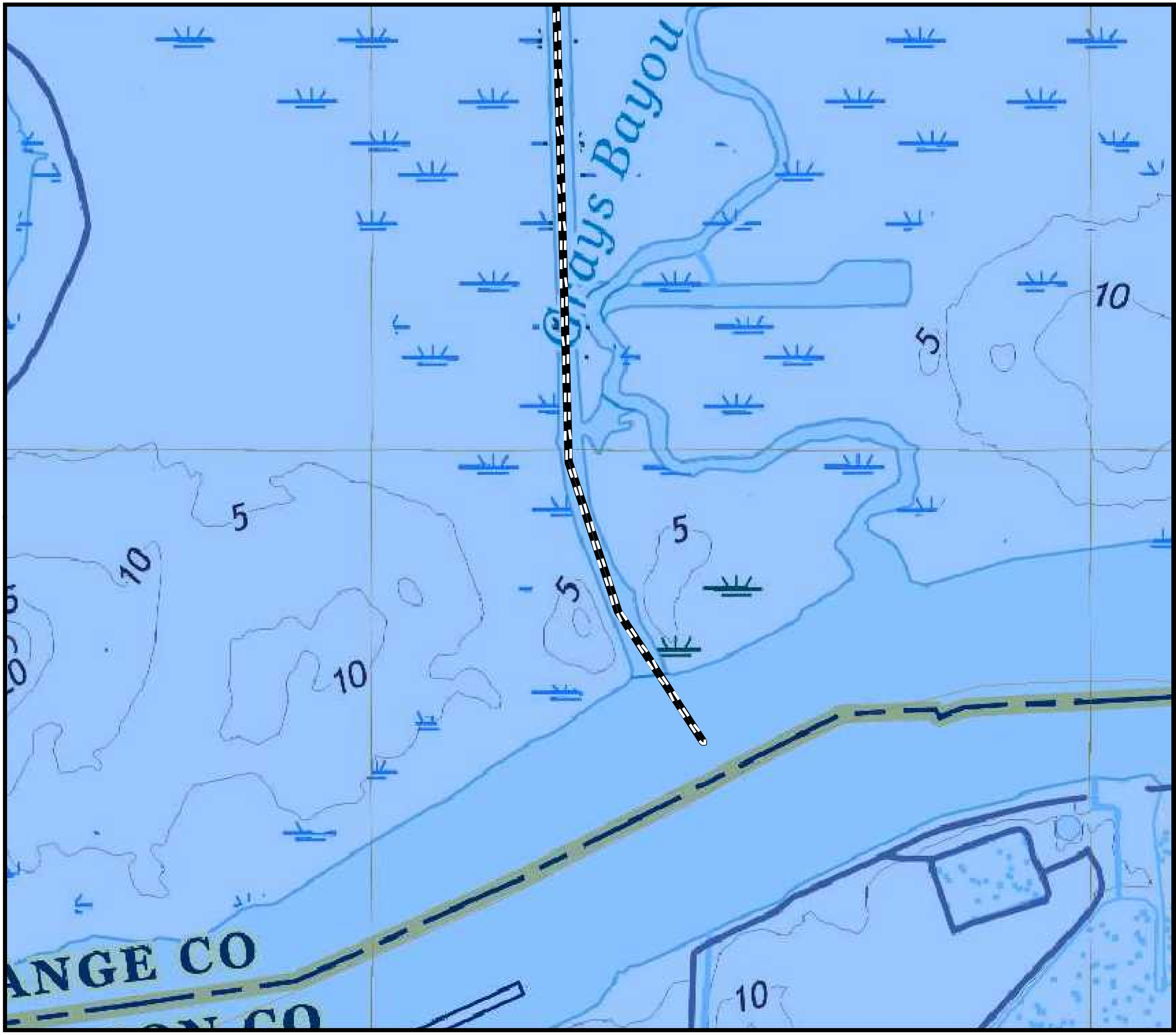


N

0 200 400 800
Feet

Legend

▭ Survey Area

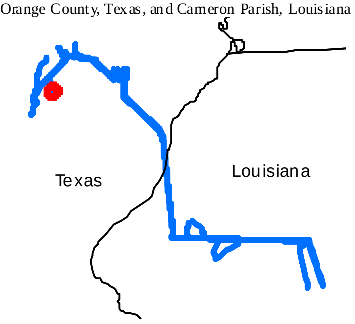
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 11 of 74)

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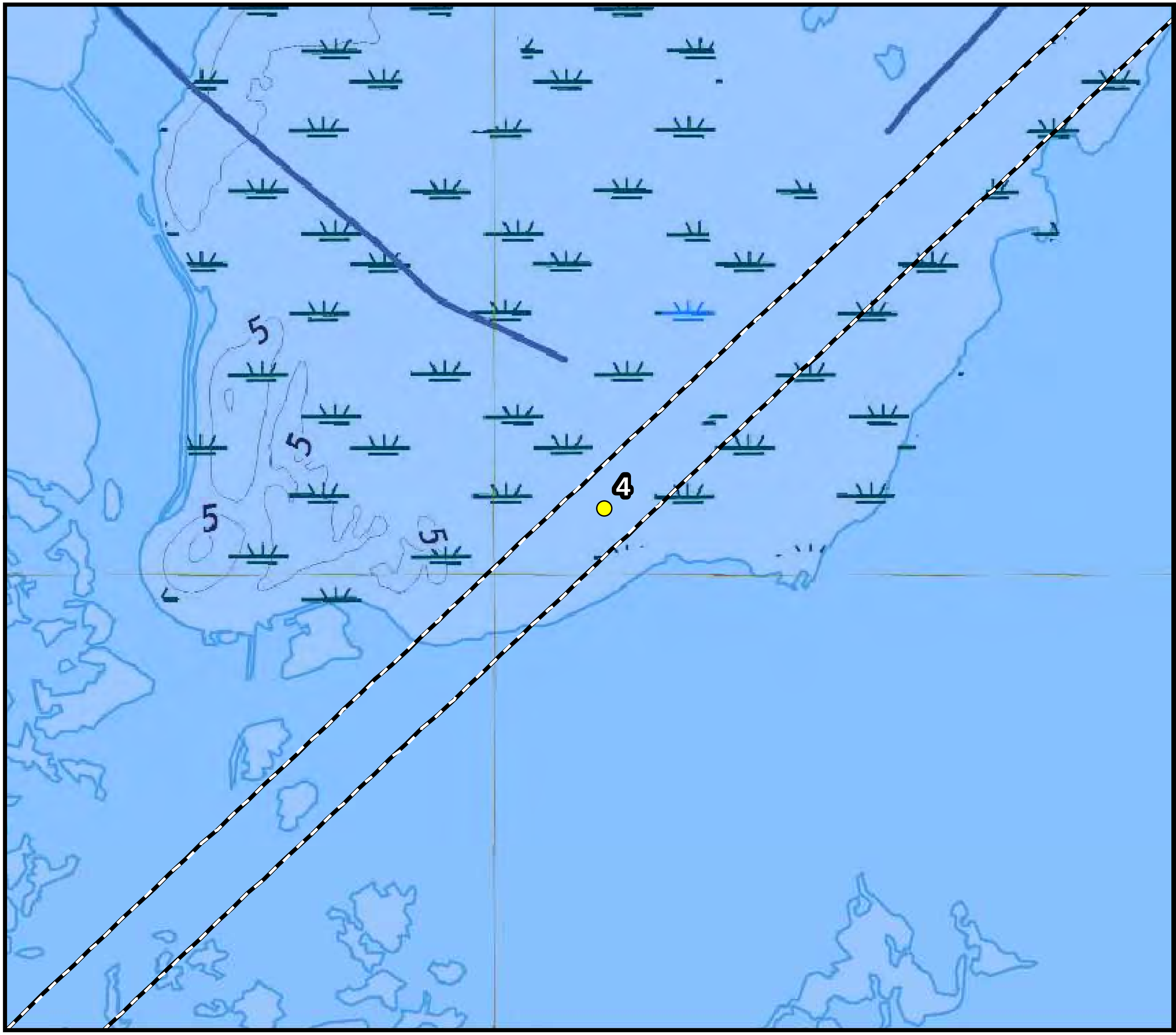


N

0 200 400 800
Feet

Legend

☐ Survey Area

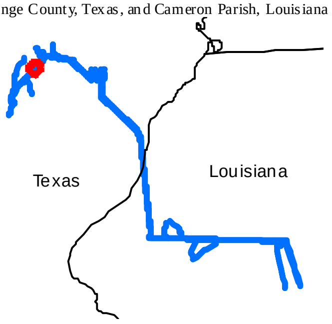
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

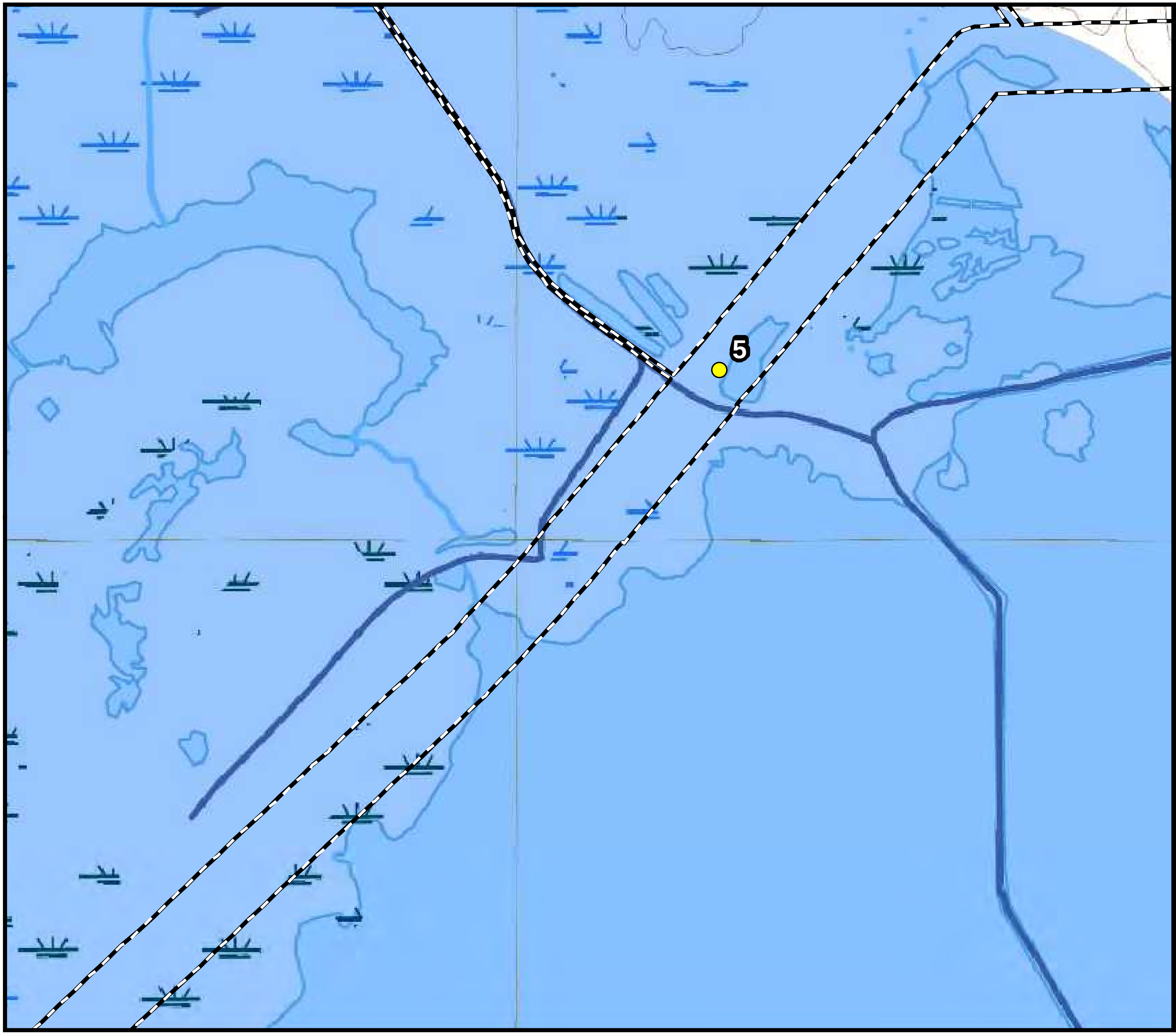
BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 12 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd



Legend

▭ Survey Area

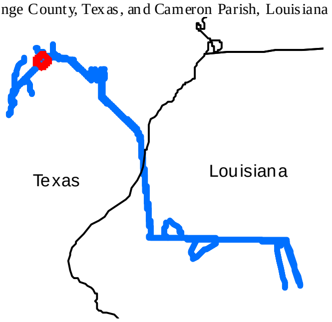
▨ 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

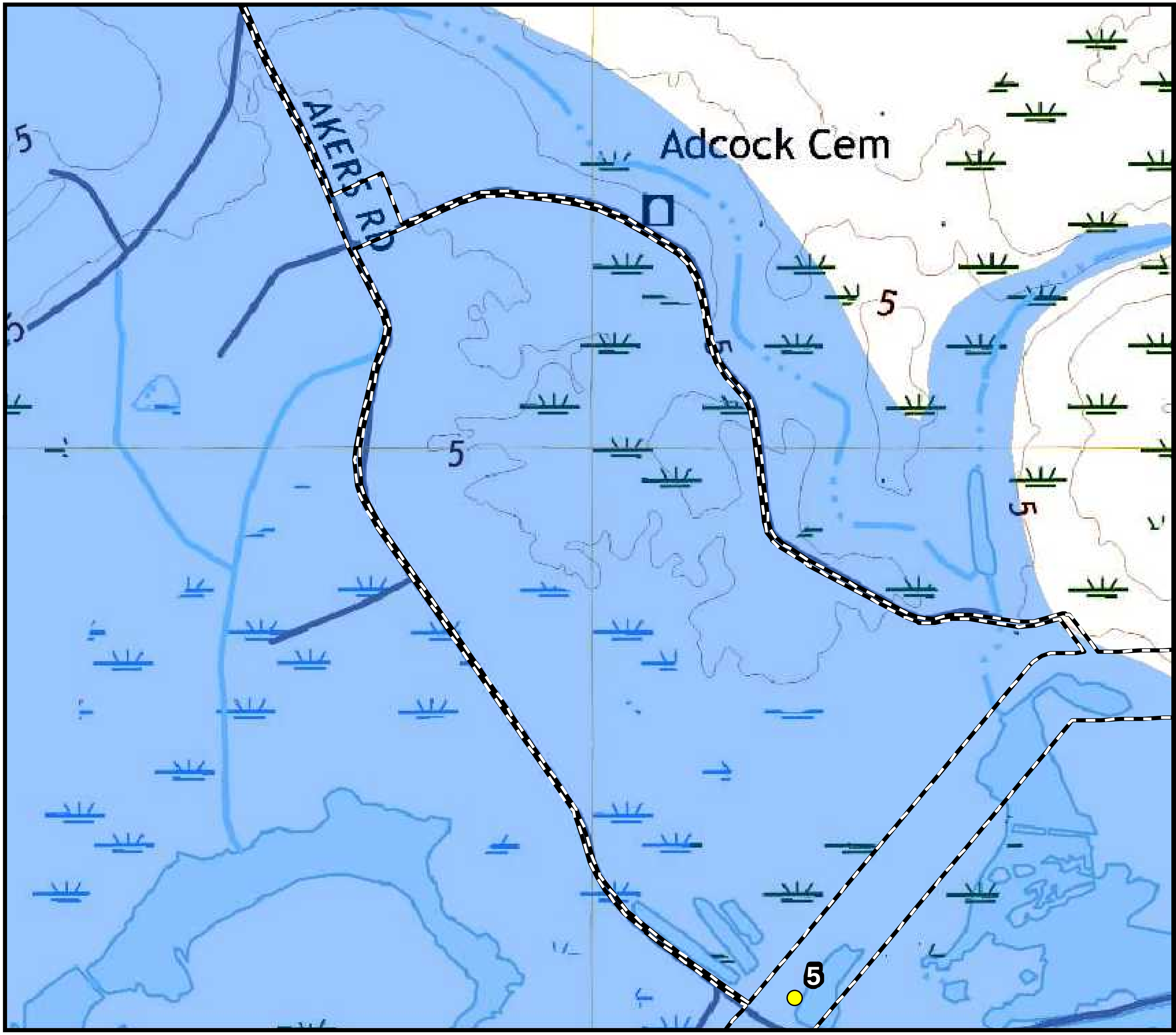
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 13 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd



N

0 200 400 800
Feet

Legend

▭ Survey Area

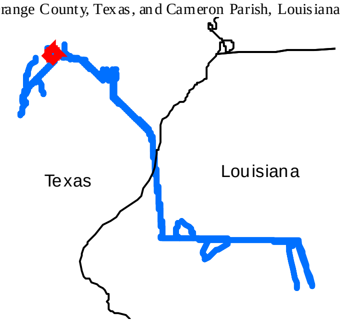
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 14 of 74)

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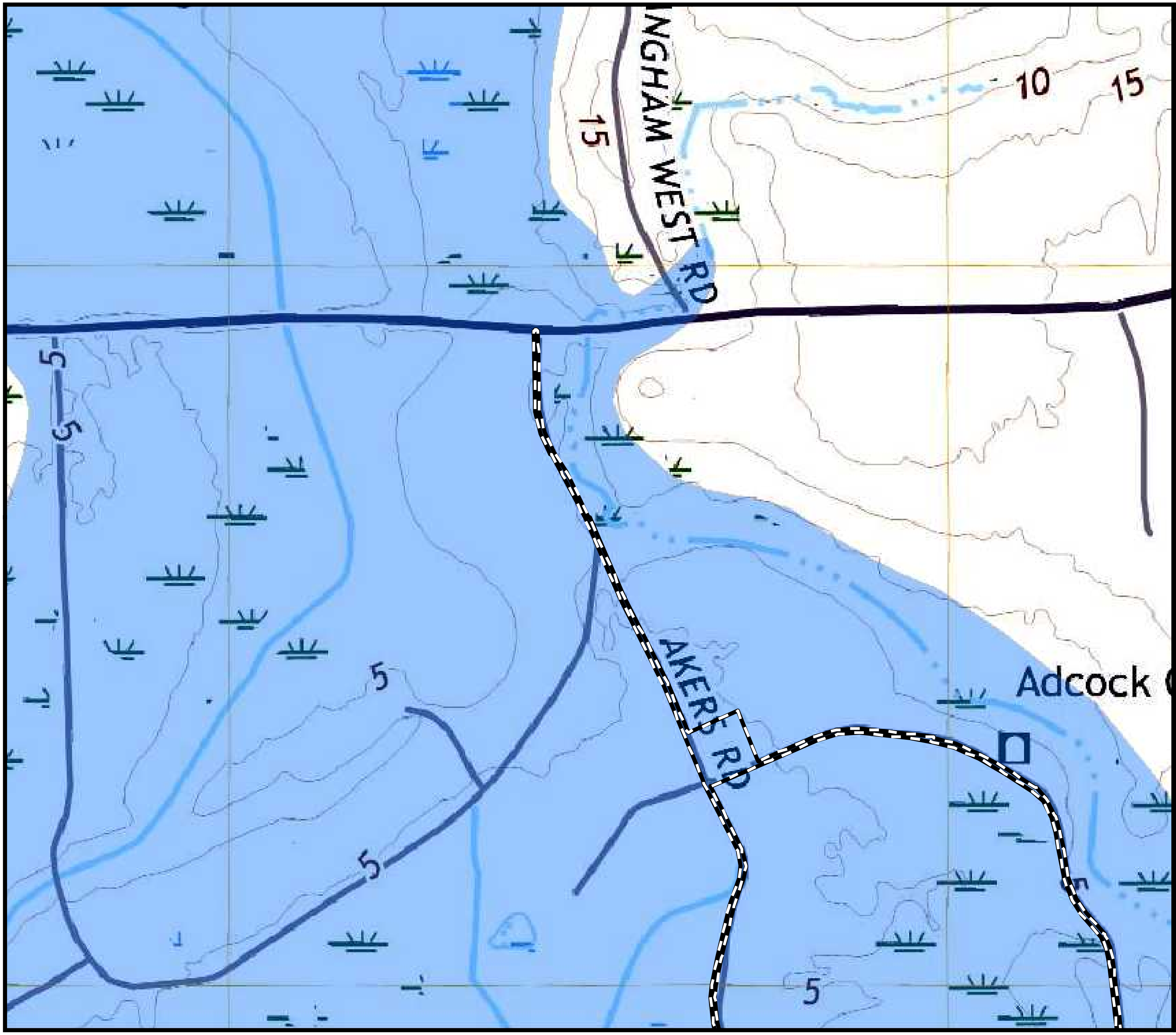


N

0 200 400 800 Feet

Legend

▭ Survey Area

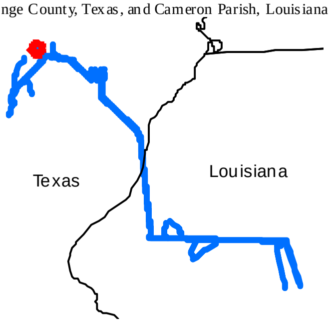
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

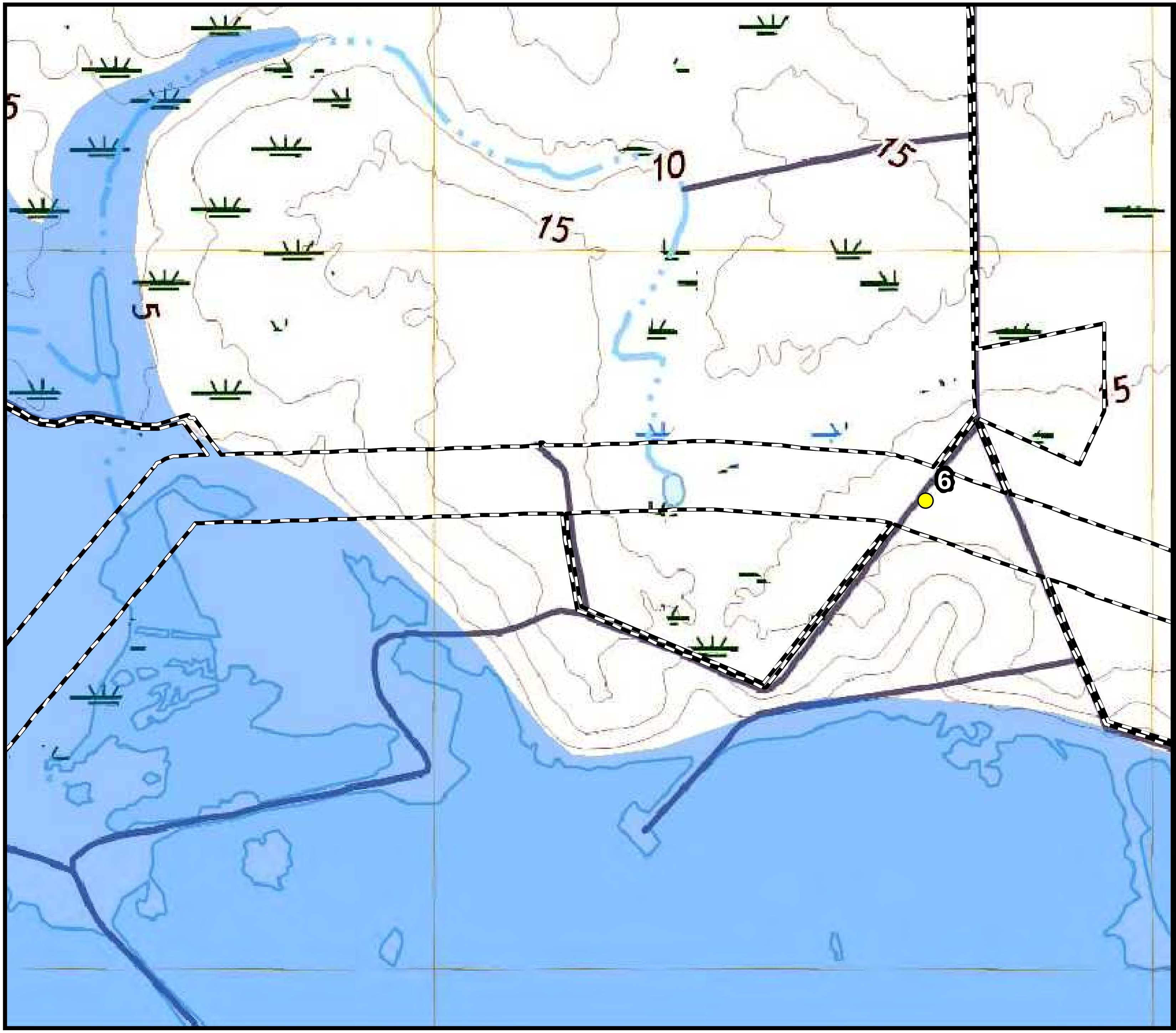
BESI
Benchmark
Ecological Services, Inc.

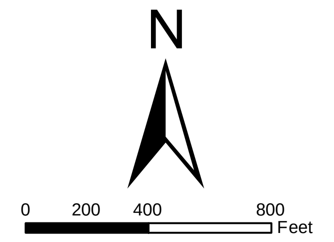
Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 15 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





Legend

▭ Survey Area

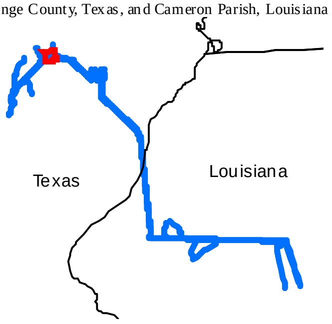
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

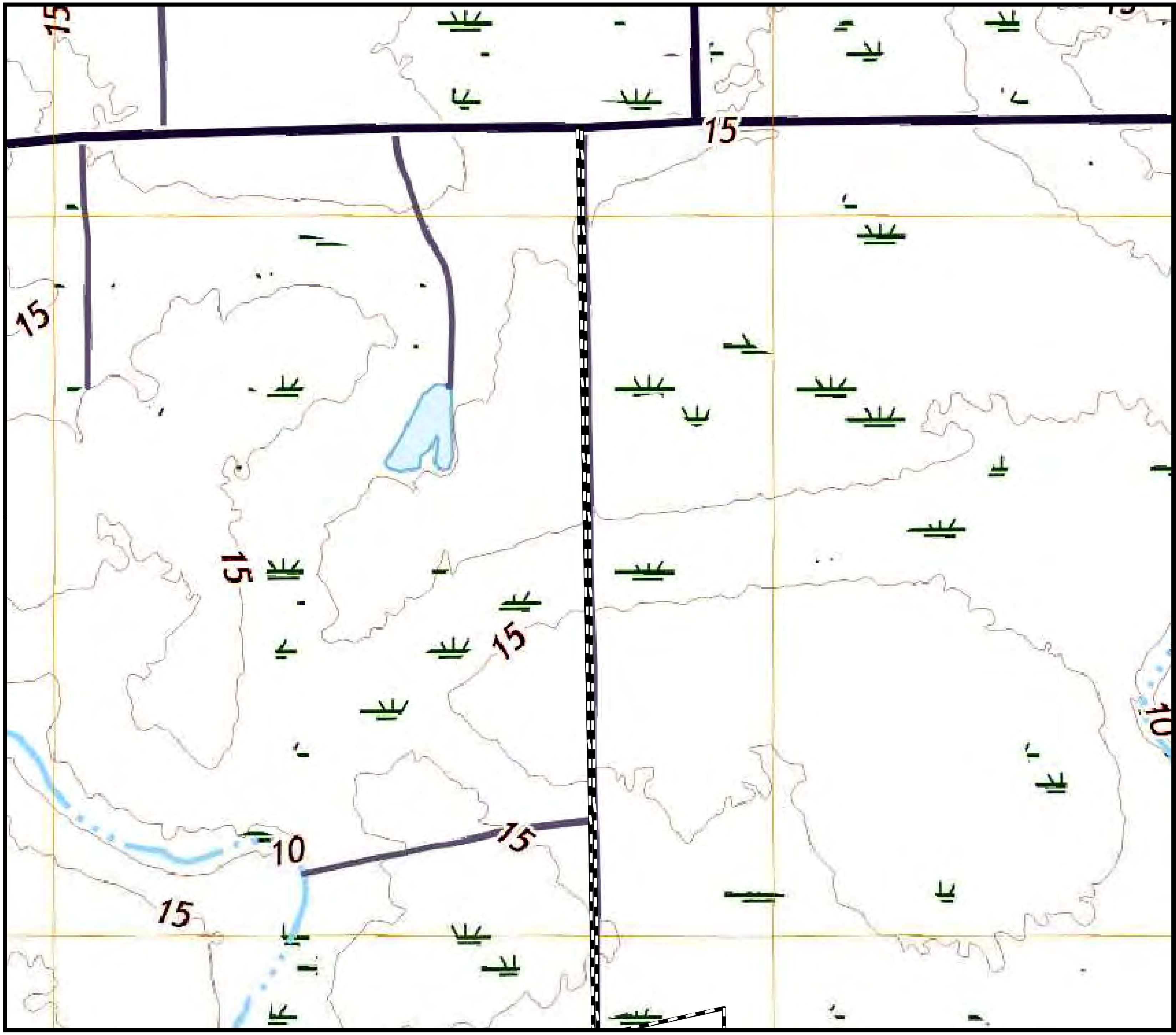
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 16 of 74)



N

0 200 400 800
Feet

Legend

▨ Survey Area

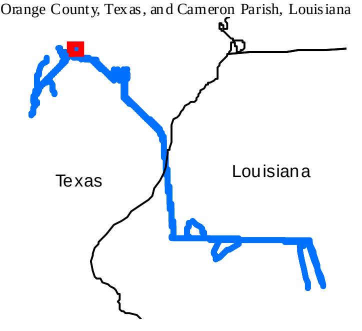
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 17 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800
Feet

Legend

▭ Survey Area

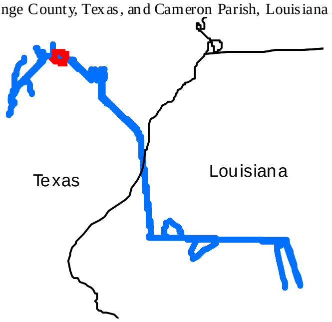
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 18 of 74)

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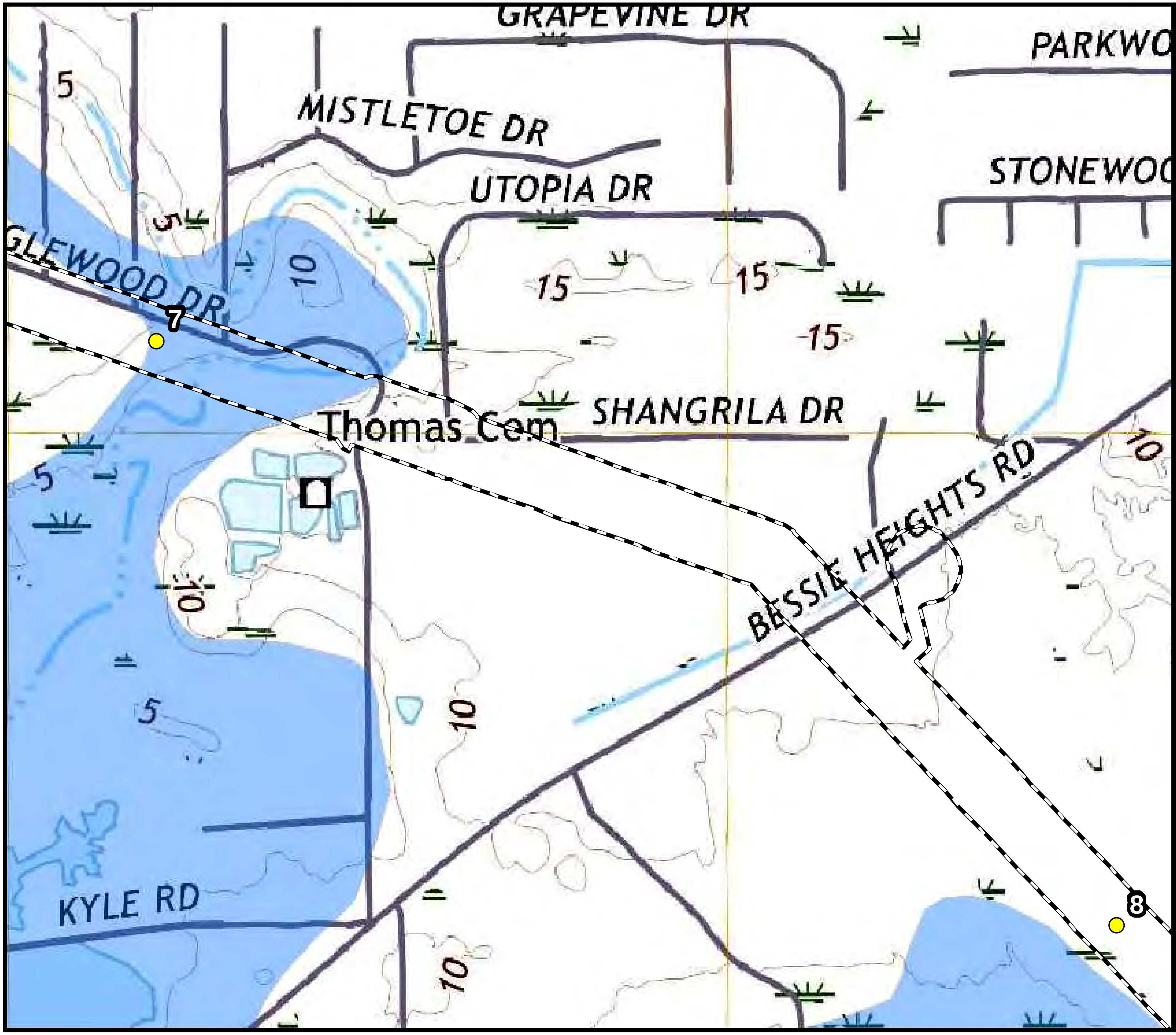


N

0 200 400 800
Feet

Legend

▭ Survey Area

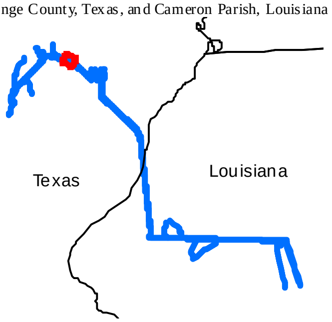
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 19 of 74)

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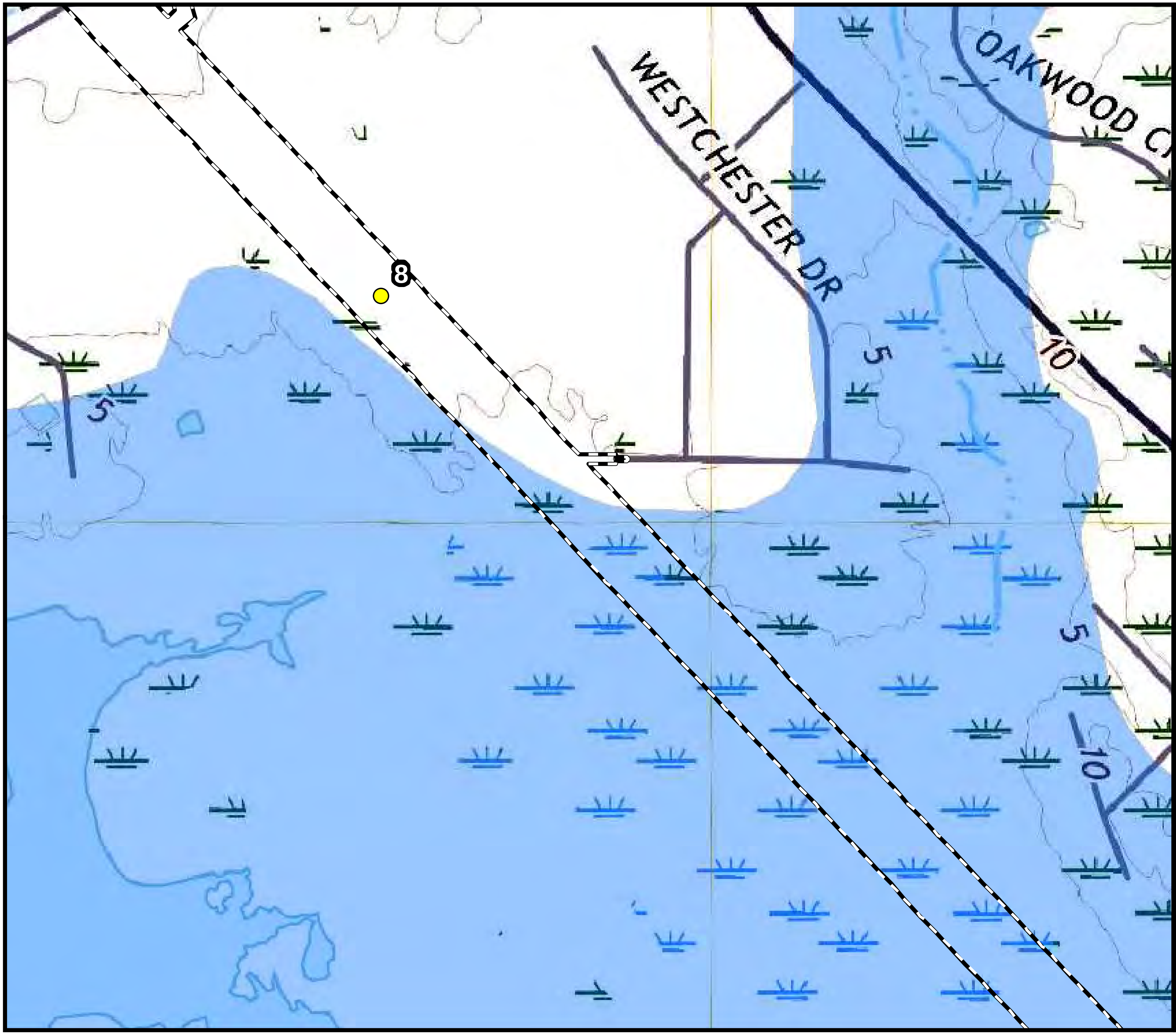


N

0 200 400 800
Feet

Legend

▭ Survey Area

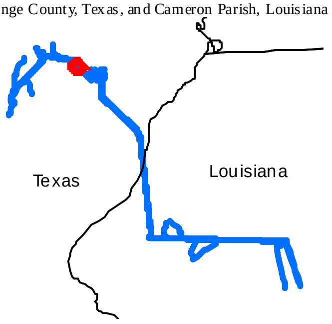
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 20 of 74)

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Legend

▭ Survey Area

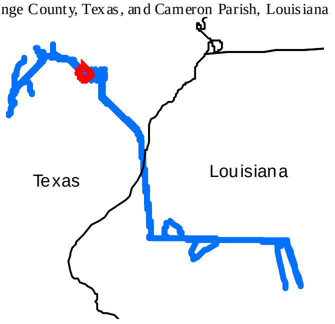
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 21 of 74)

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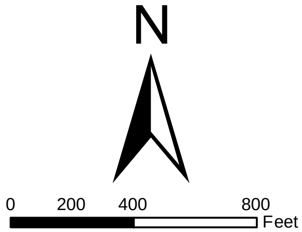


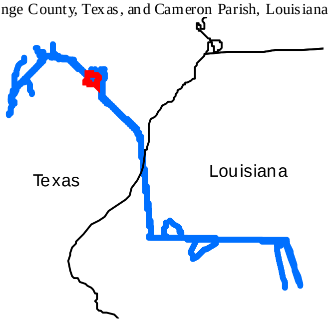
Legend

- ▭ Survey Area
- 🟦 100 Year Floodplain
- ● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 22 of 74)

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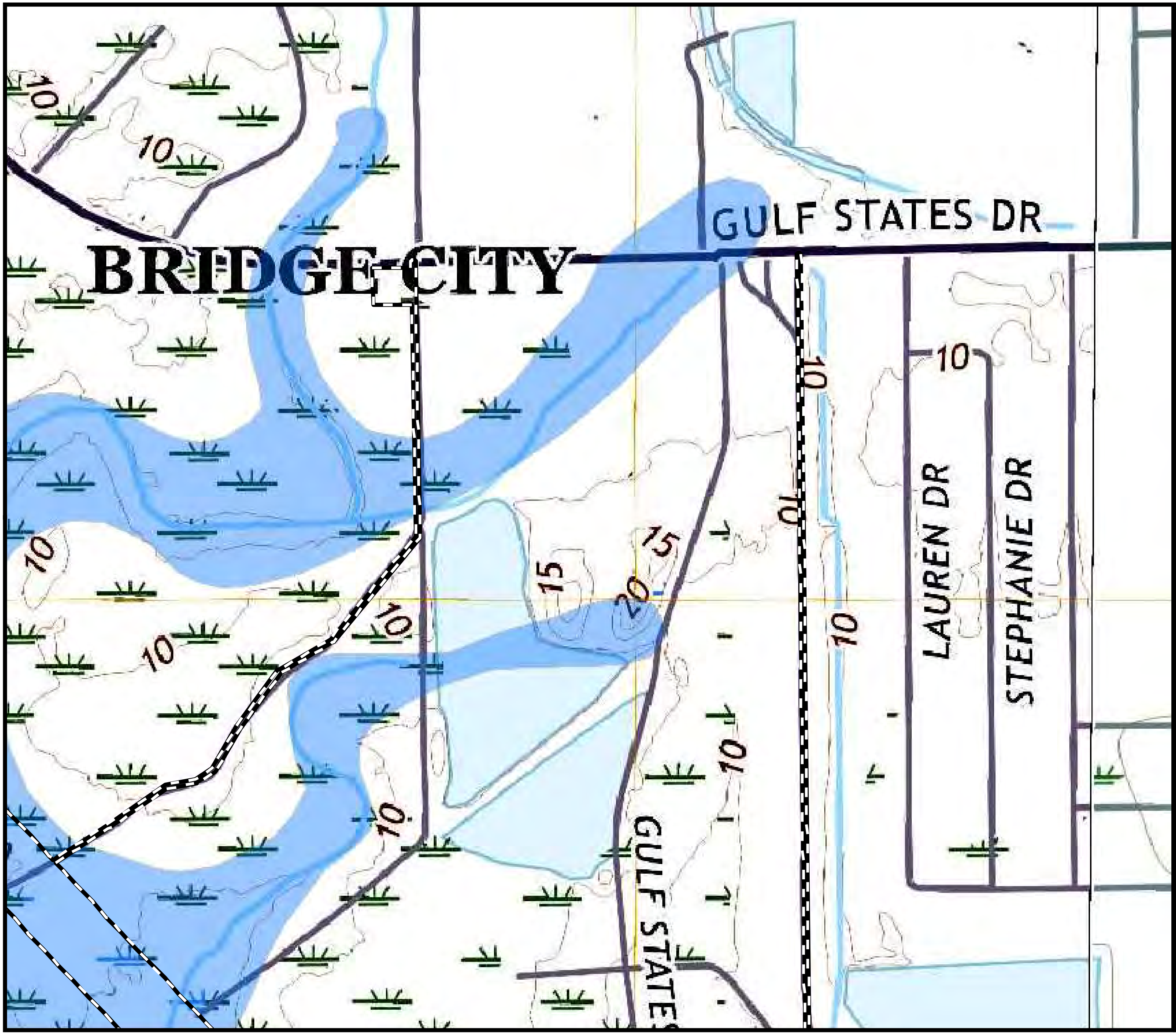


N

0 200 400 800 Feet

Legend

▭ Survey Area

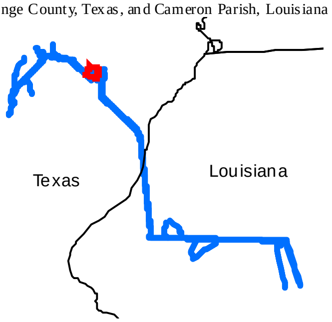
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
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Figure 4
(Map 23 of 74)

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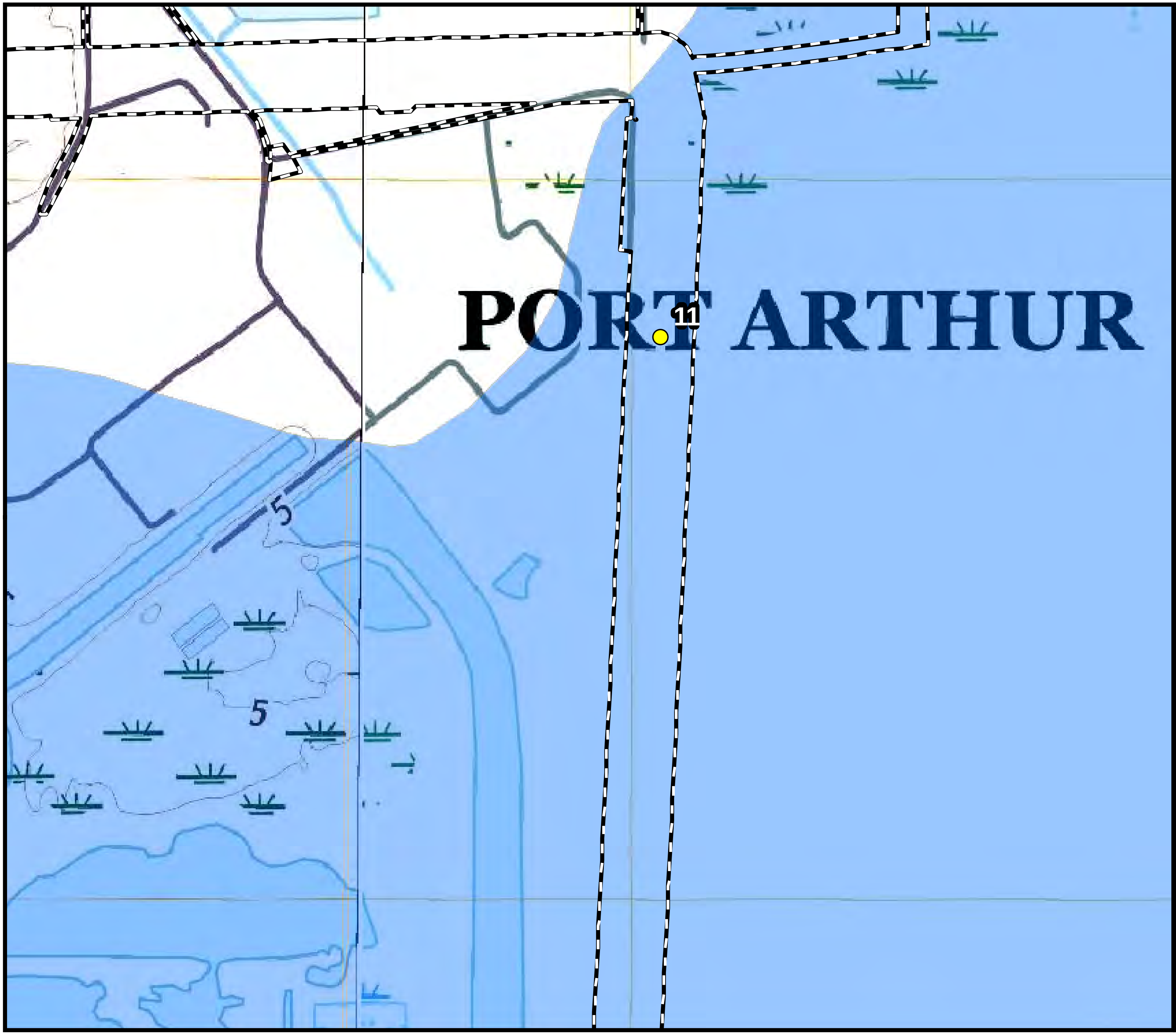


N

0 200 400 800
Feet

Legend

▭ Survey Area

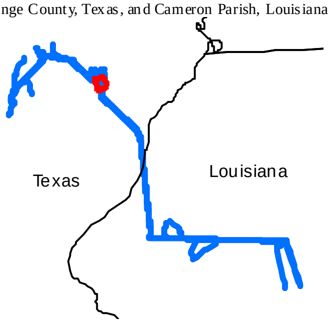
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
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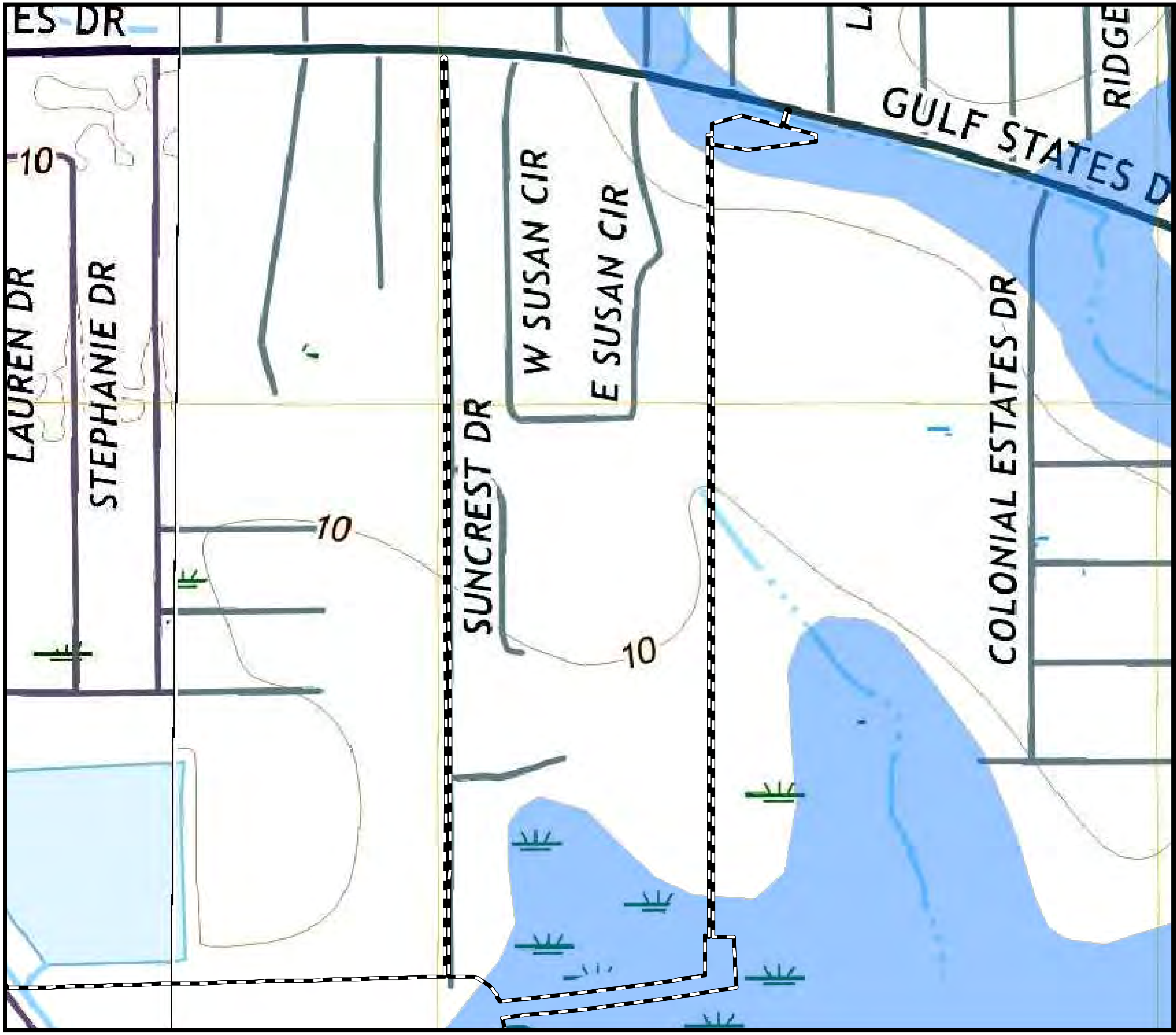
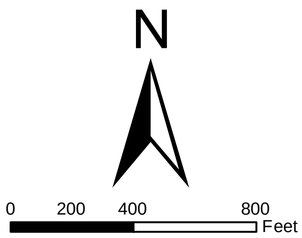




Legend

▭ Survey Area

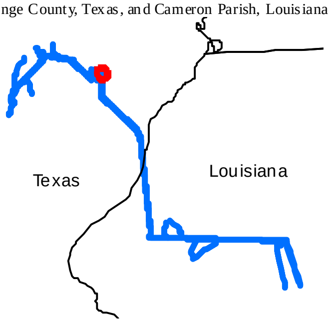
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 25 of 74)

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N

0 200 400 800
Feet

Legend

▭ Survey Area

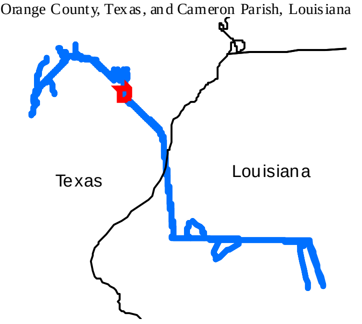
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 26 of 74)

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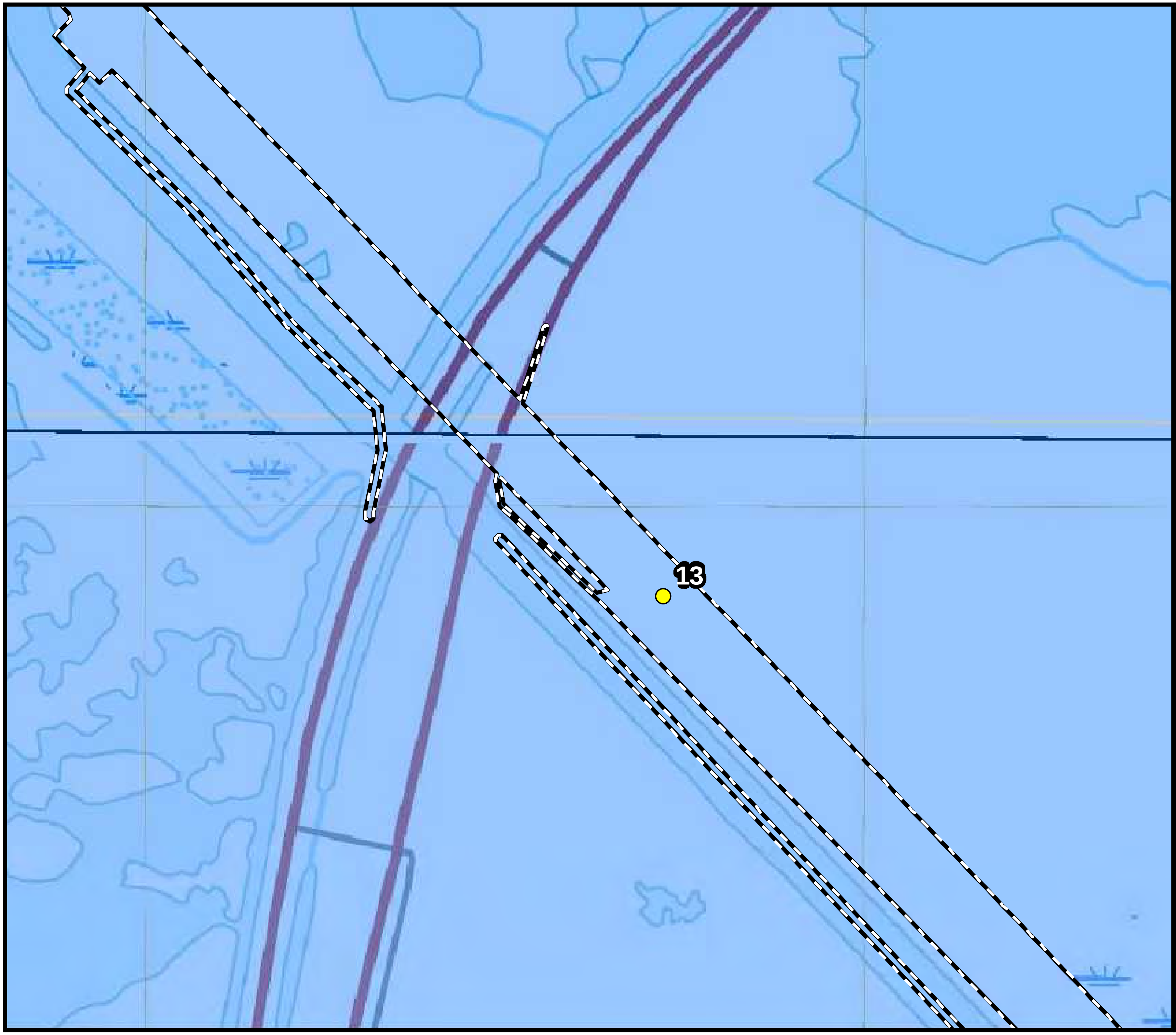
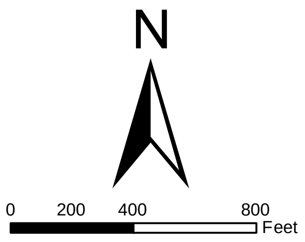




Legend

▭ Survey Area

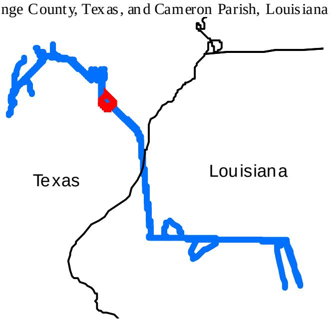
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
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Figure 4
(Map 27 of 74)

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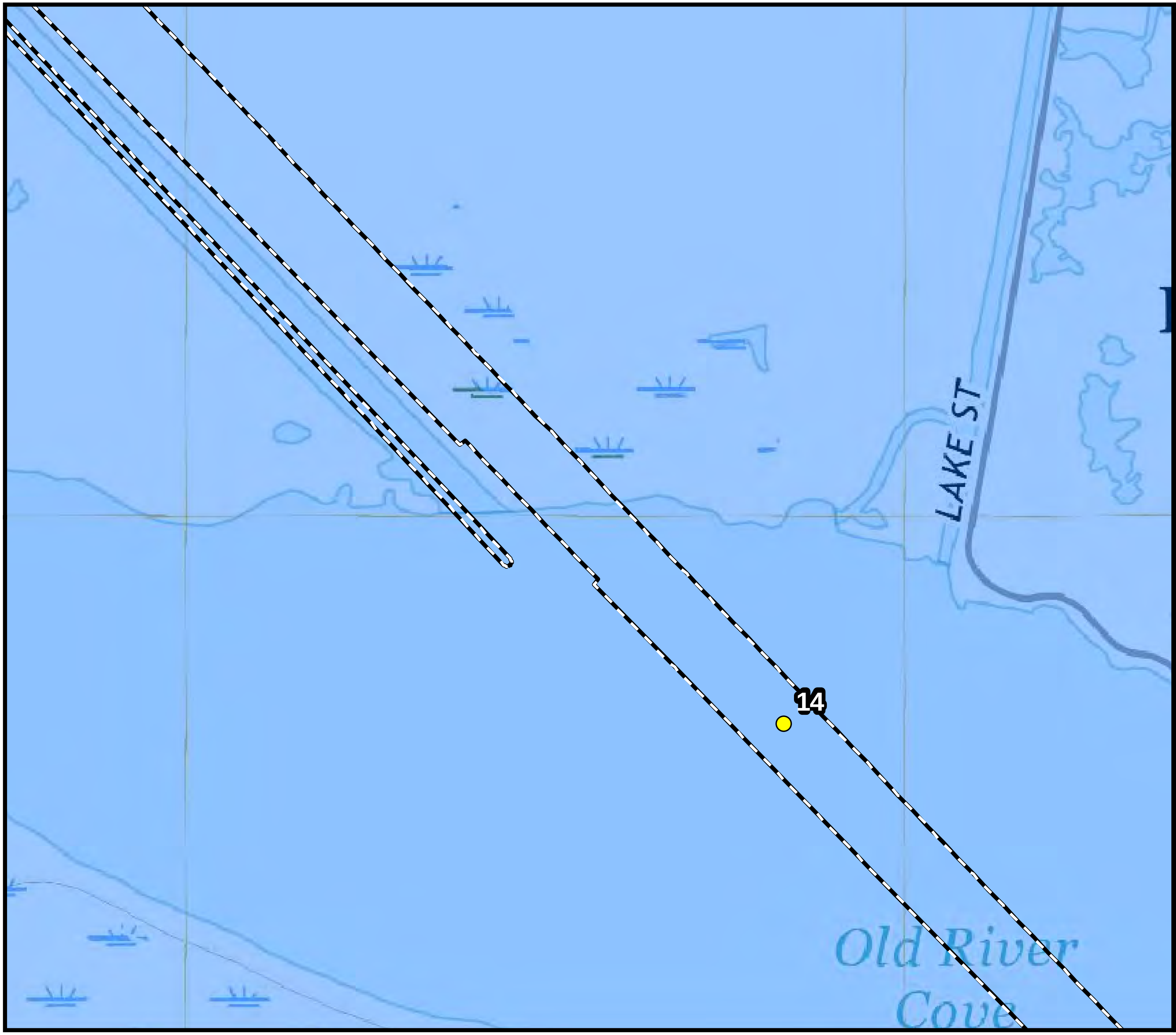


N

0 200 400 800
Feet

Legend

▨ Survey Area

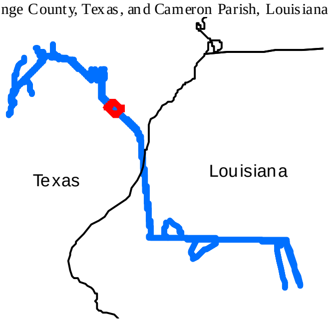
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

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Figure 4
(Map 28 of 74)

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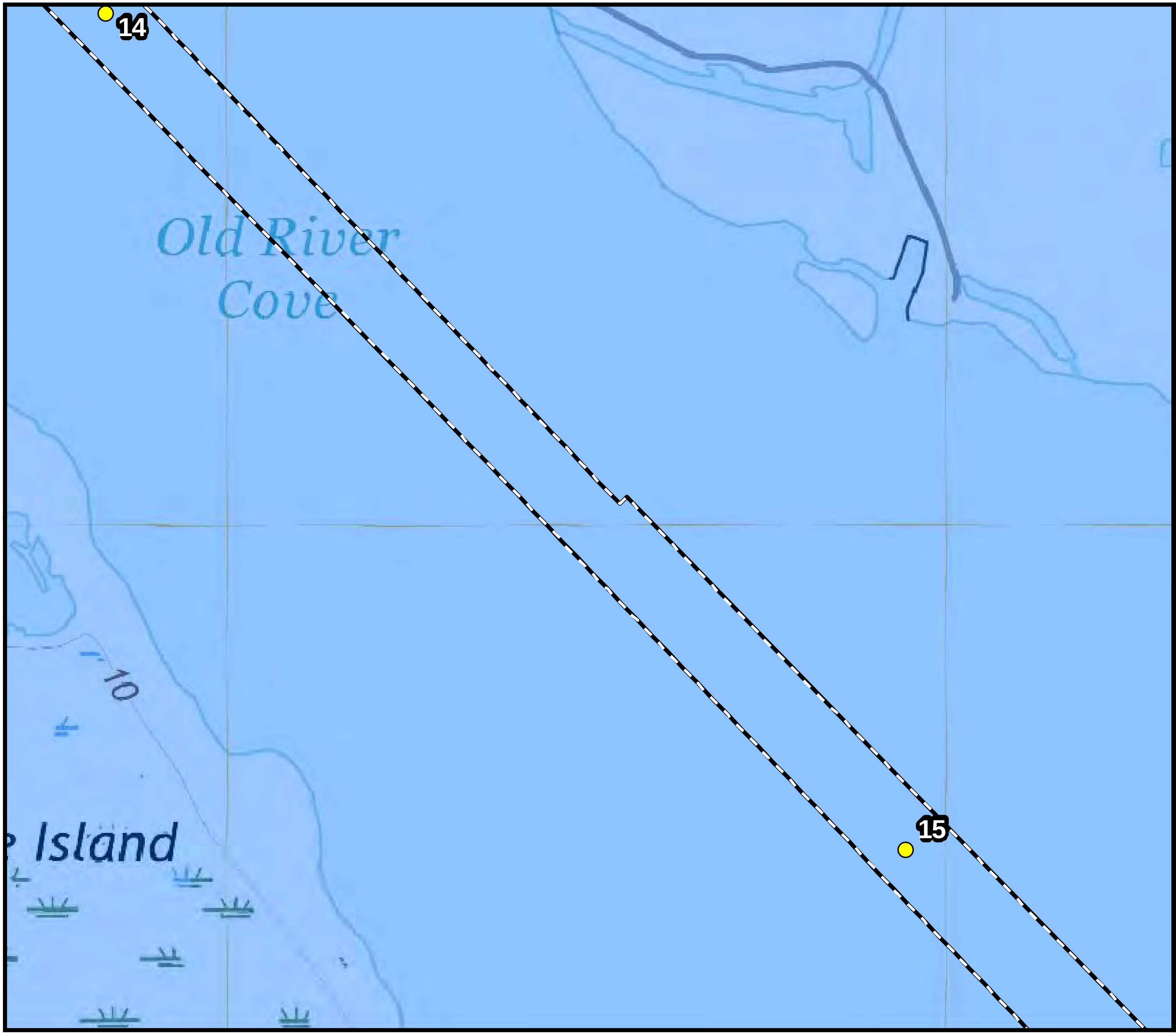
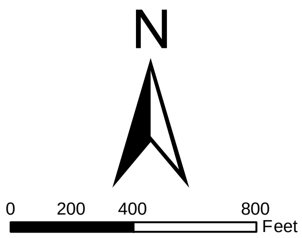




Legend

▭ Survey Area

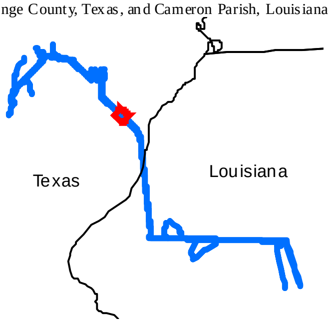
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 29 of 74)

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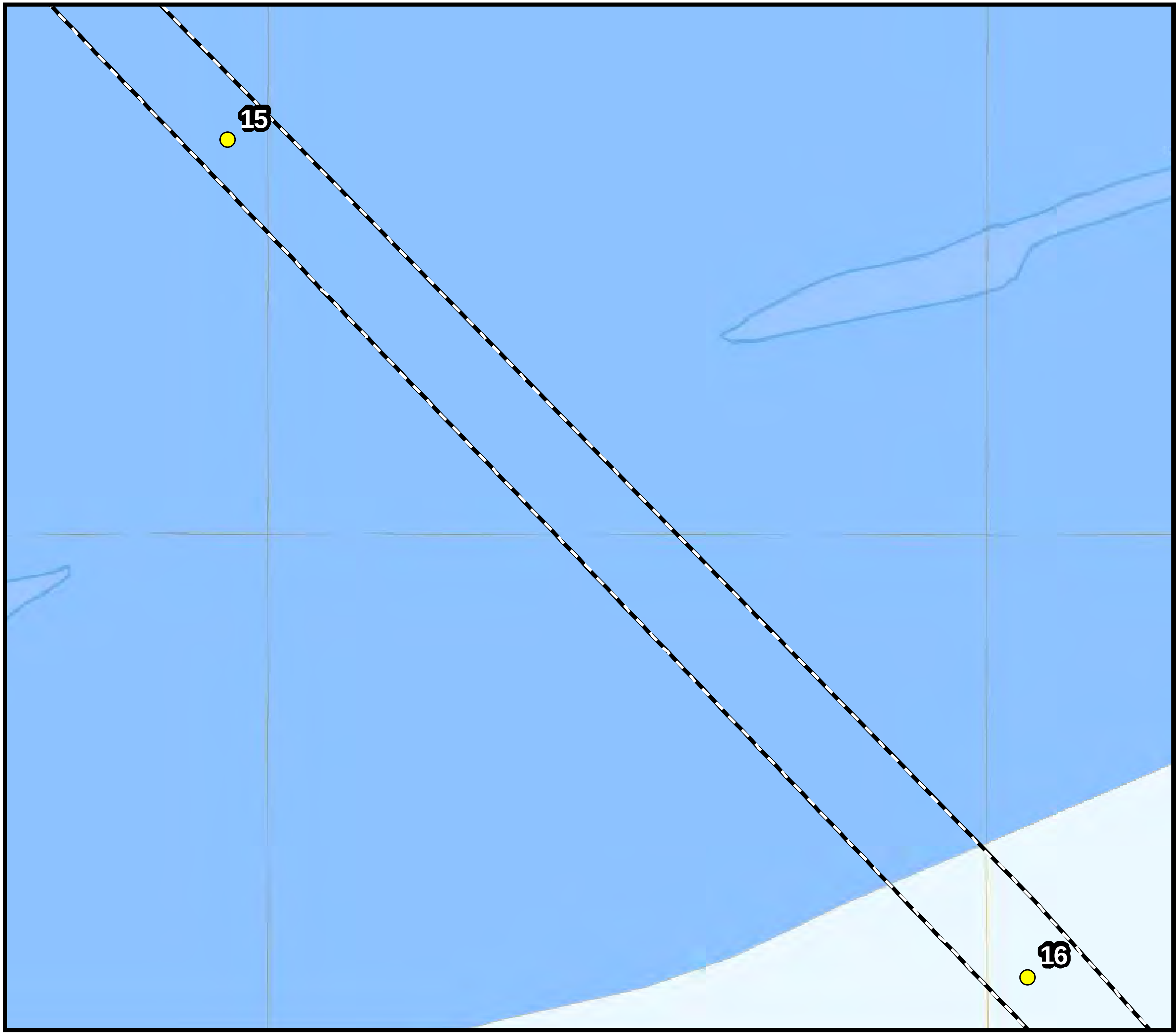


N

0 200 400 800
Feet

Legend

▭ Survey Area

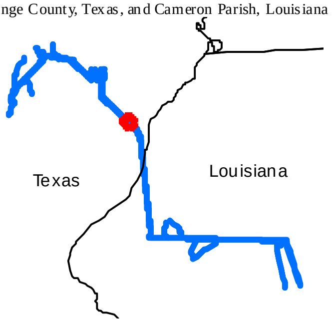
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
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Figure 4
(Map 30 of 74)

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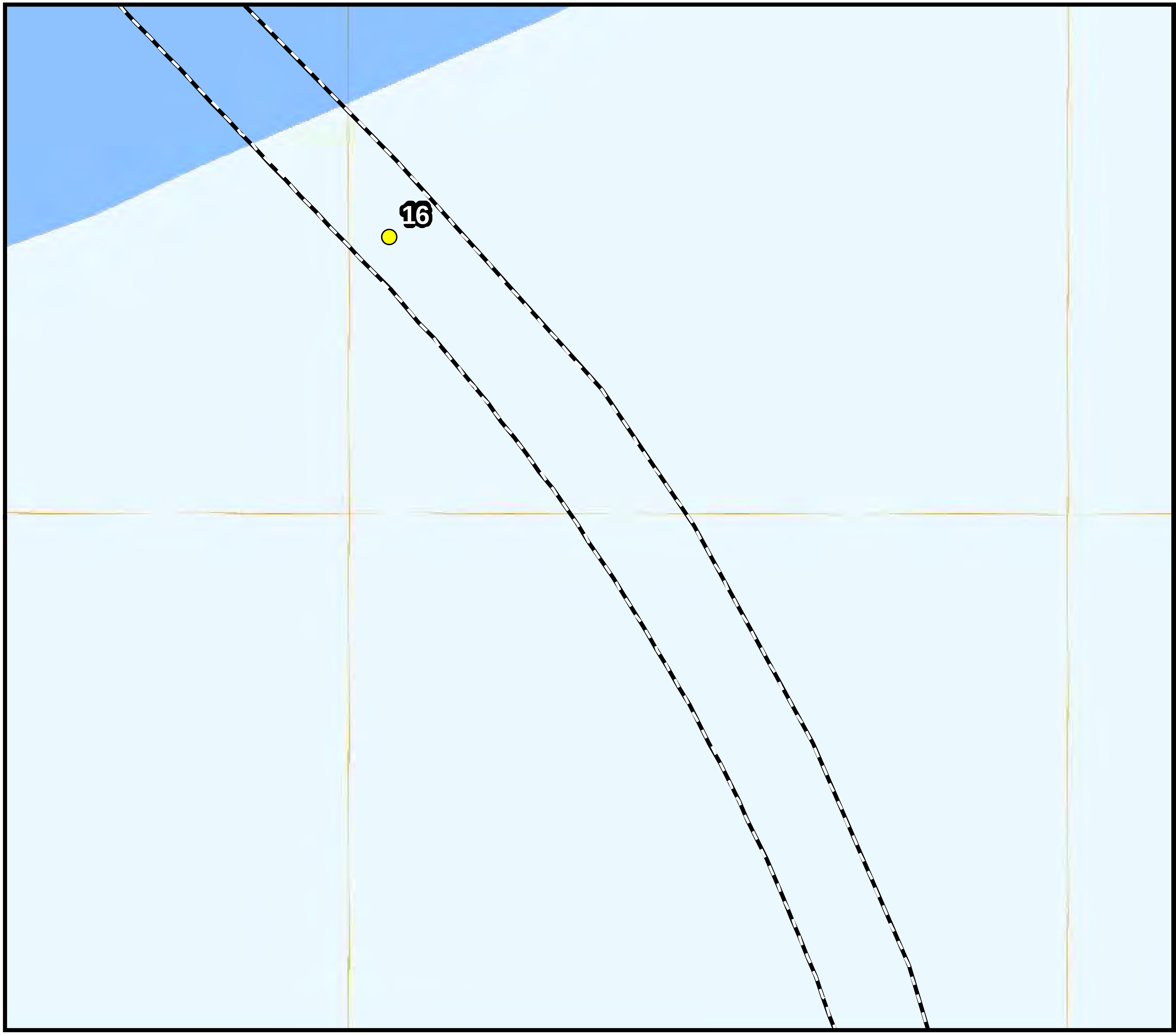
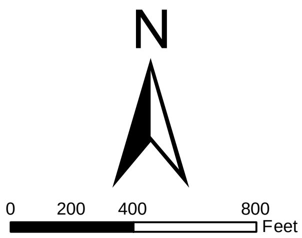




Legend

▭ Survey Area

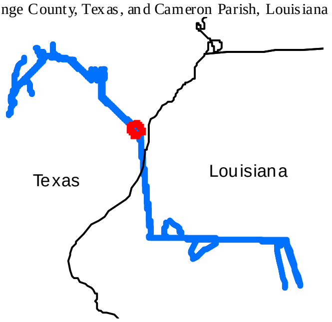
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

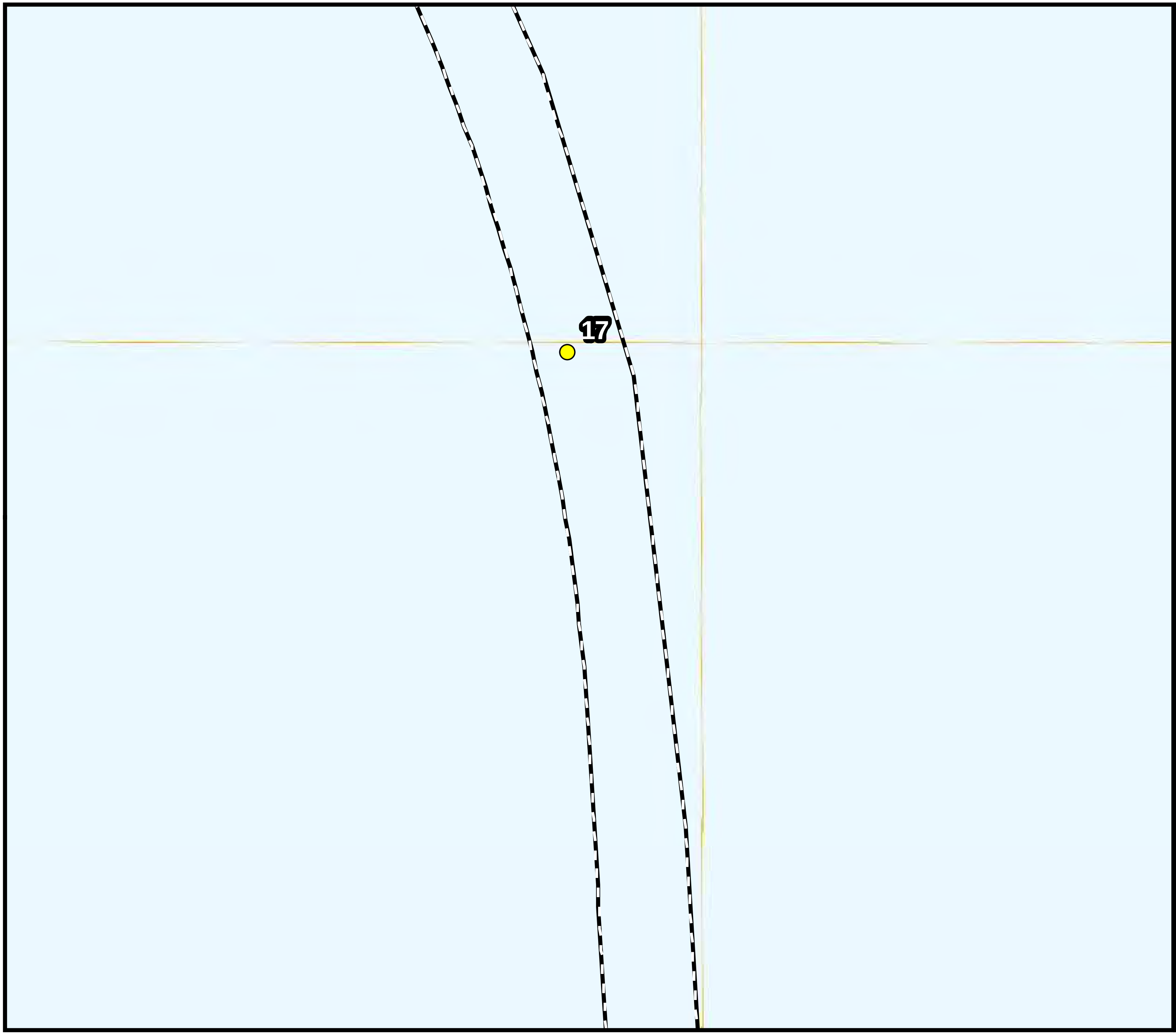
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 31 of 74)



N

0 200 400 800 Feet

Legend

▭ Survey Area

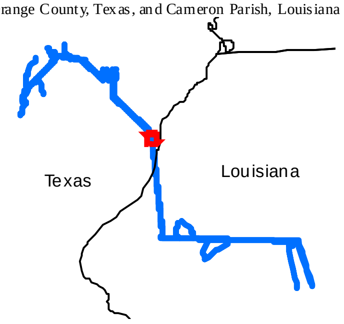
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 32 of 74)

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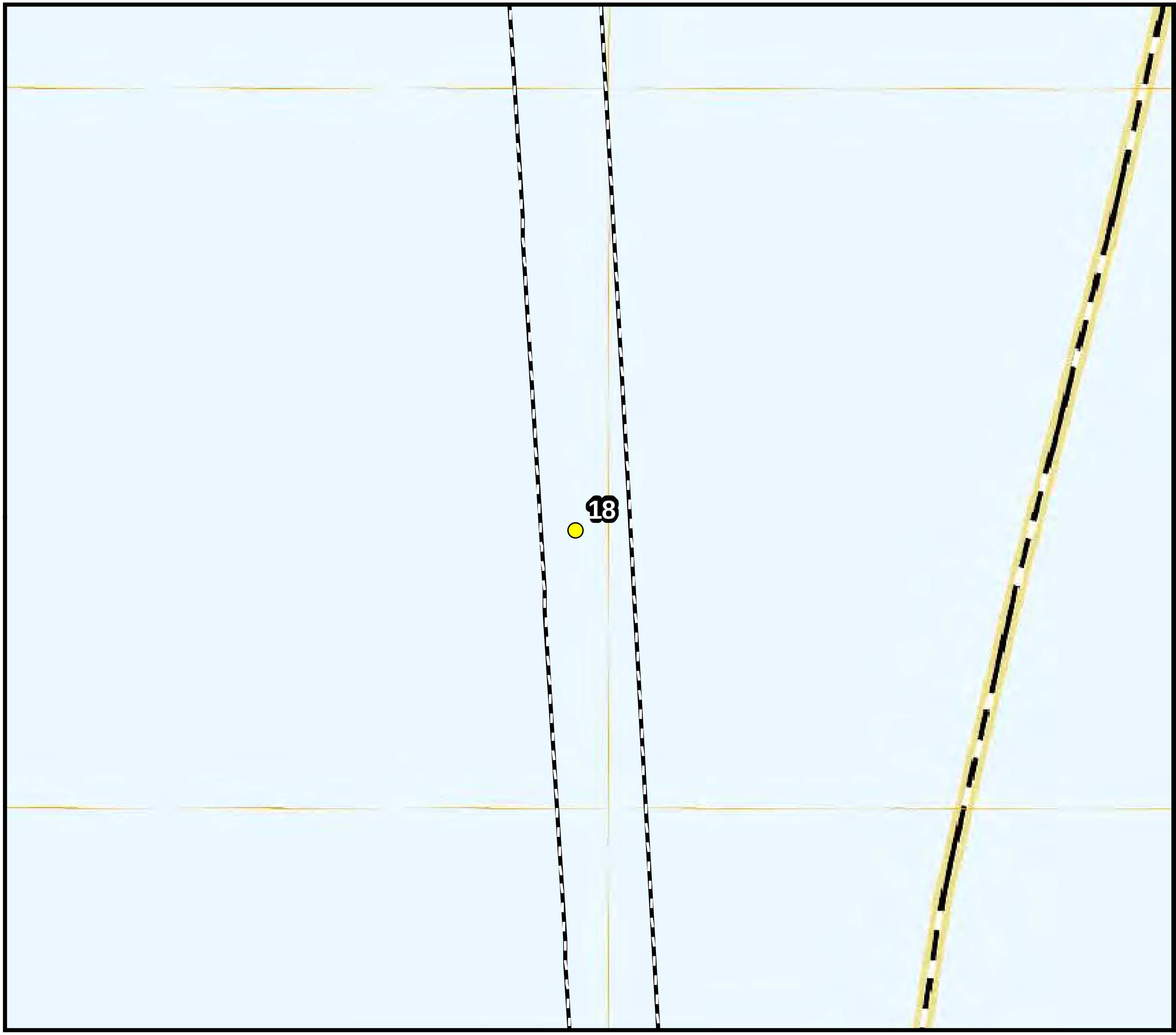


N

0 200 400 800 Feet

Legend

▨ Survey Area

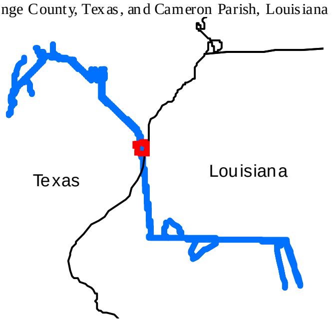
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 33 of 74)

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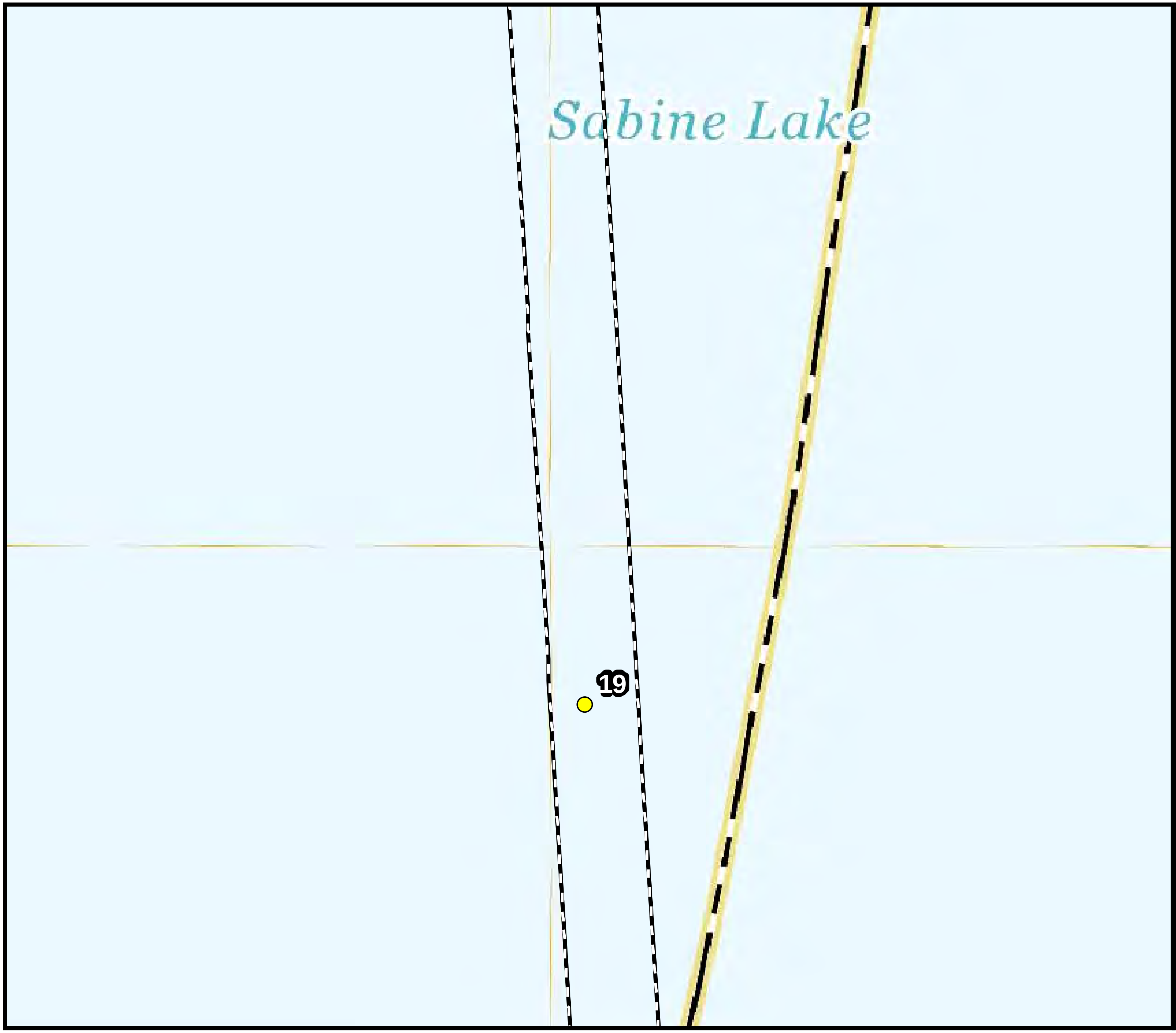


N

0 200 400 800
Feet

Legend

▭ Survey Area

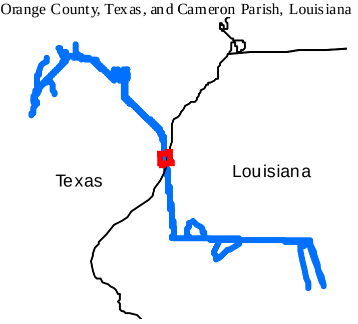
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 34 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800
Feet

Legend

▨ Survey Area

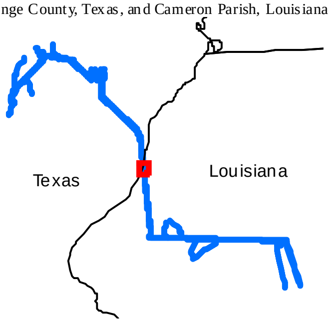
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 35 of 74)

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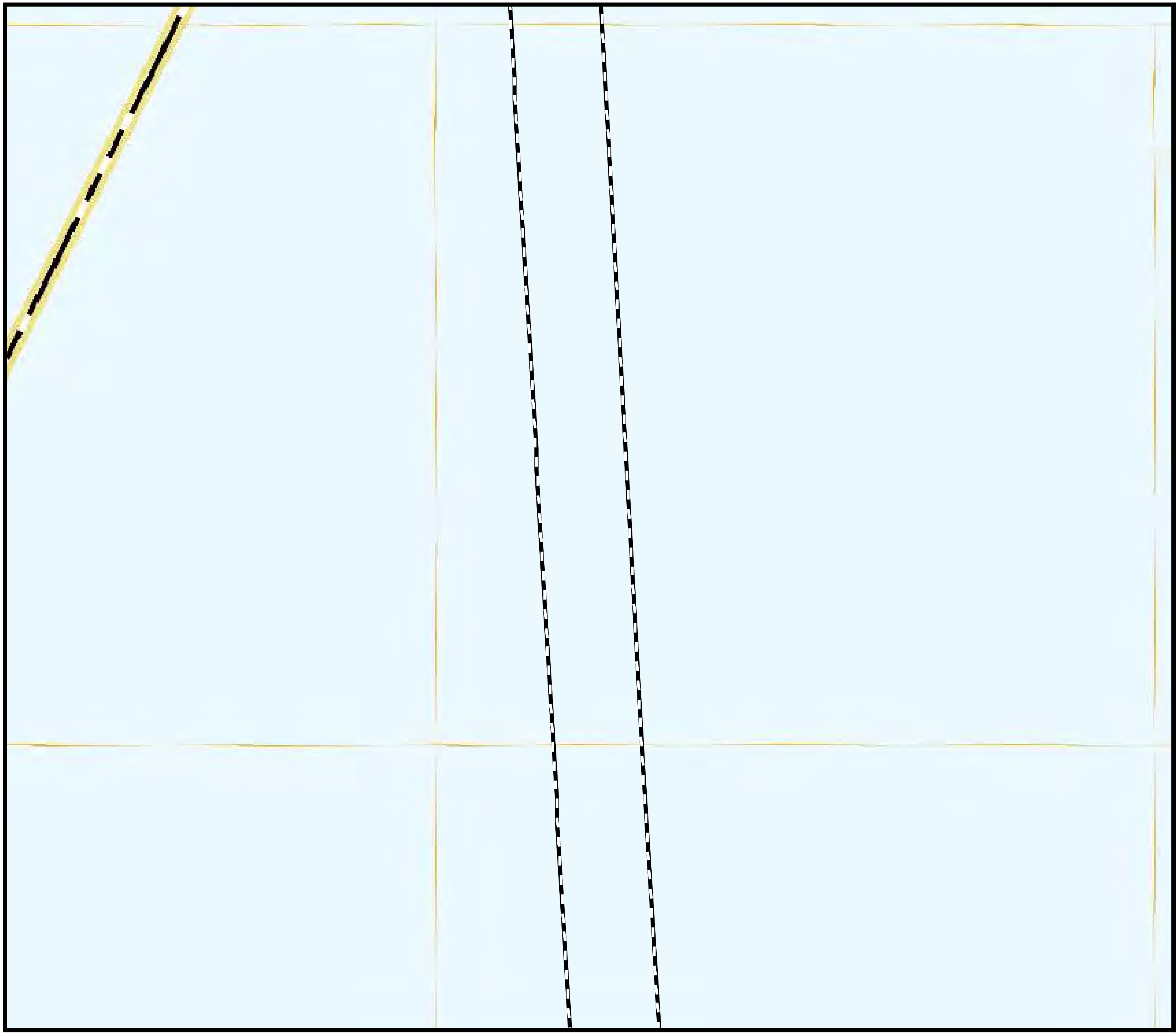

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Legend

☐ Survey Area

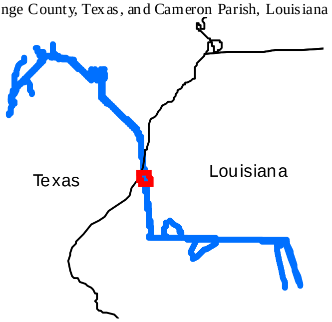
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

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Figure 4
(Map 36 of 74)

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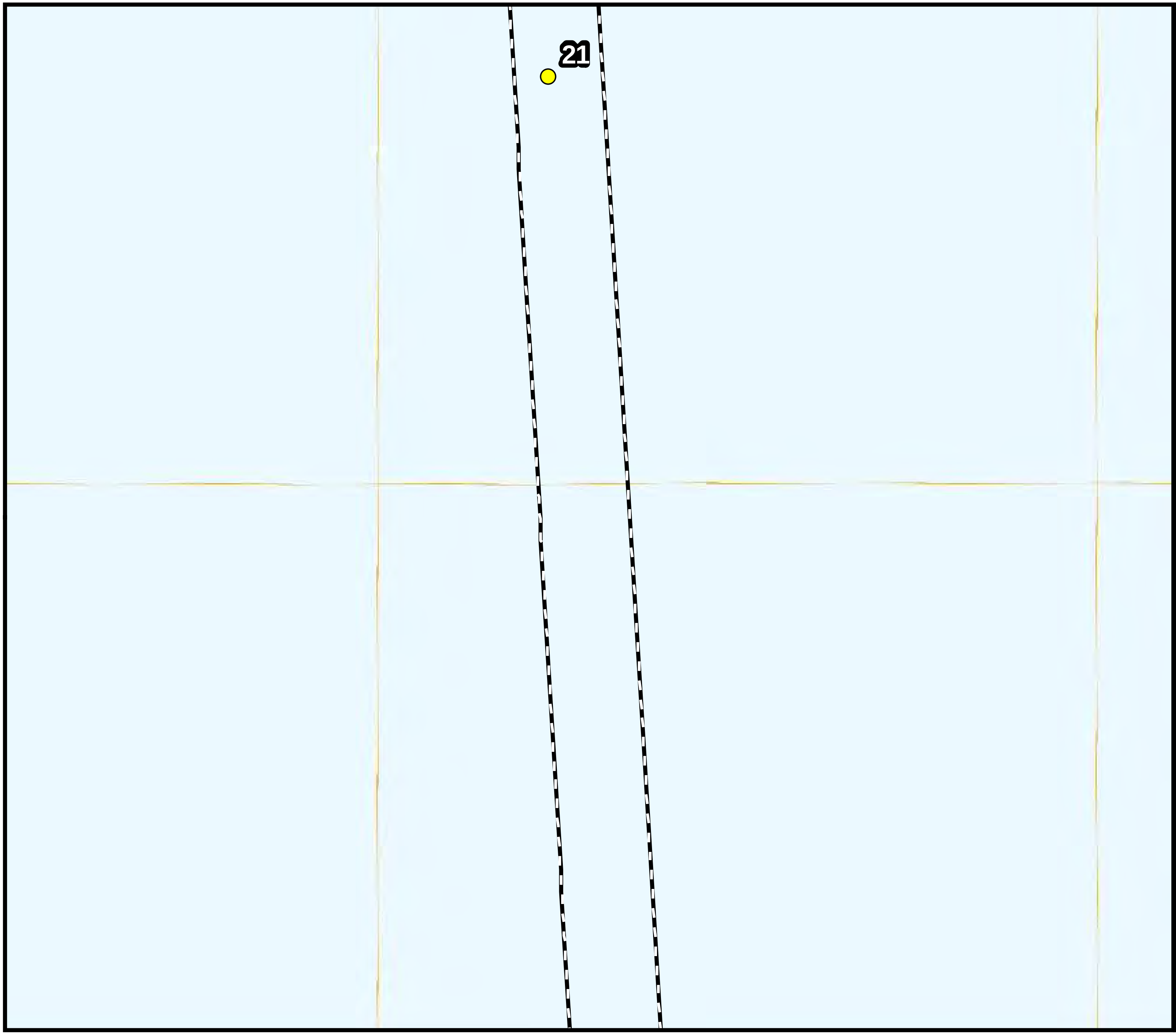


Legend

▭ Survey Area

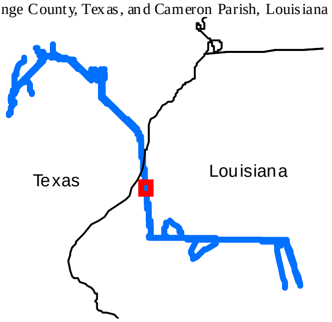
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

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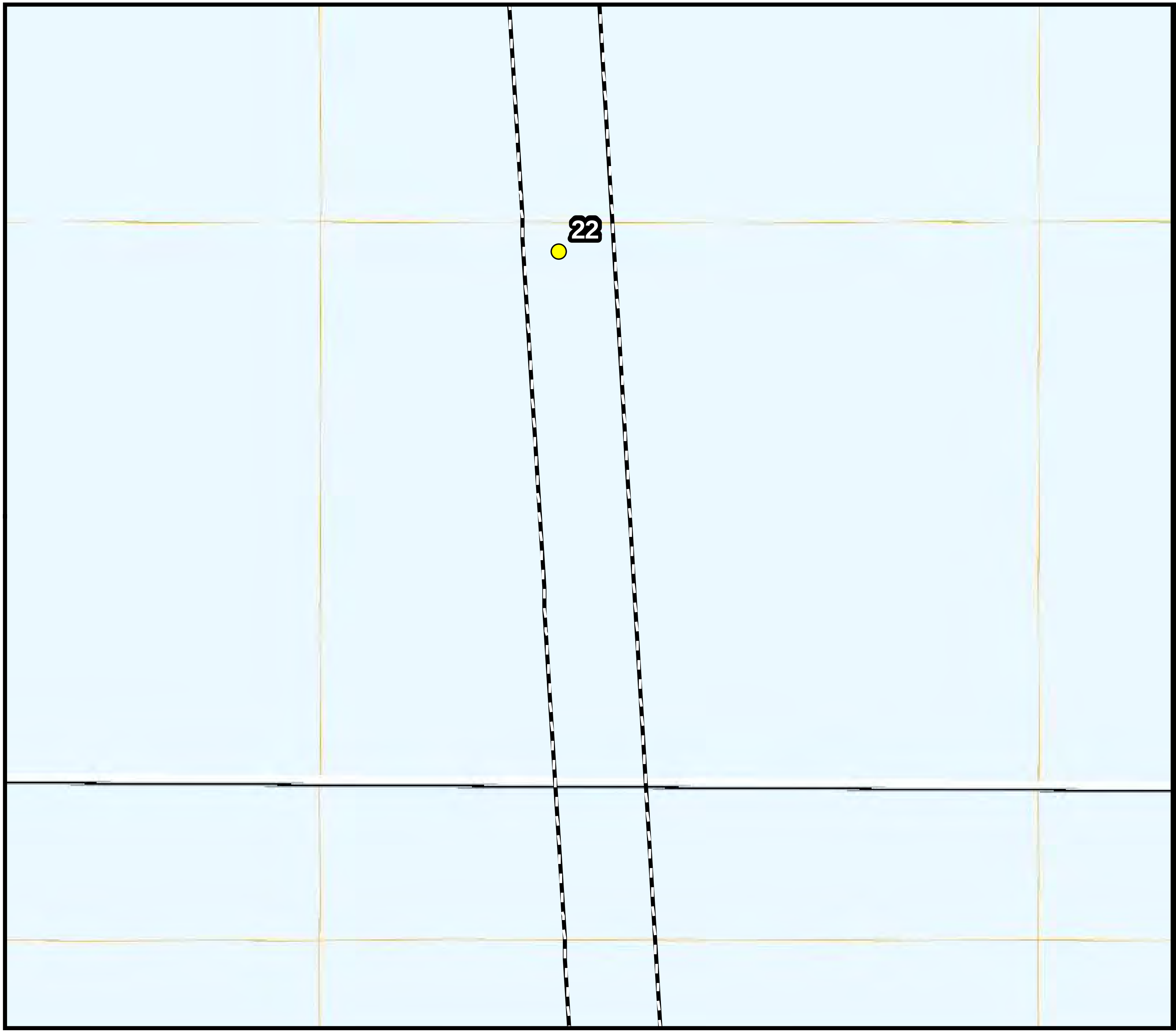
Figure 4
(Map 37 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd



Legend

▭ Survey Area

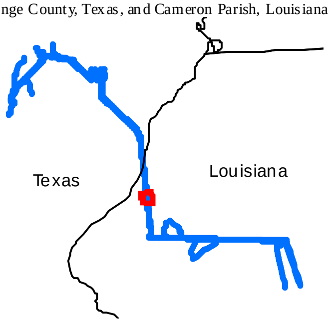
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 38 of 74)

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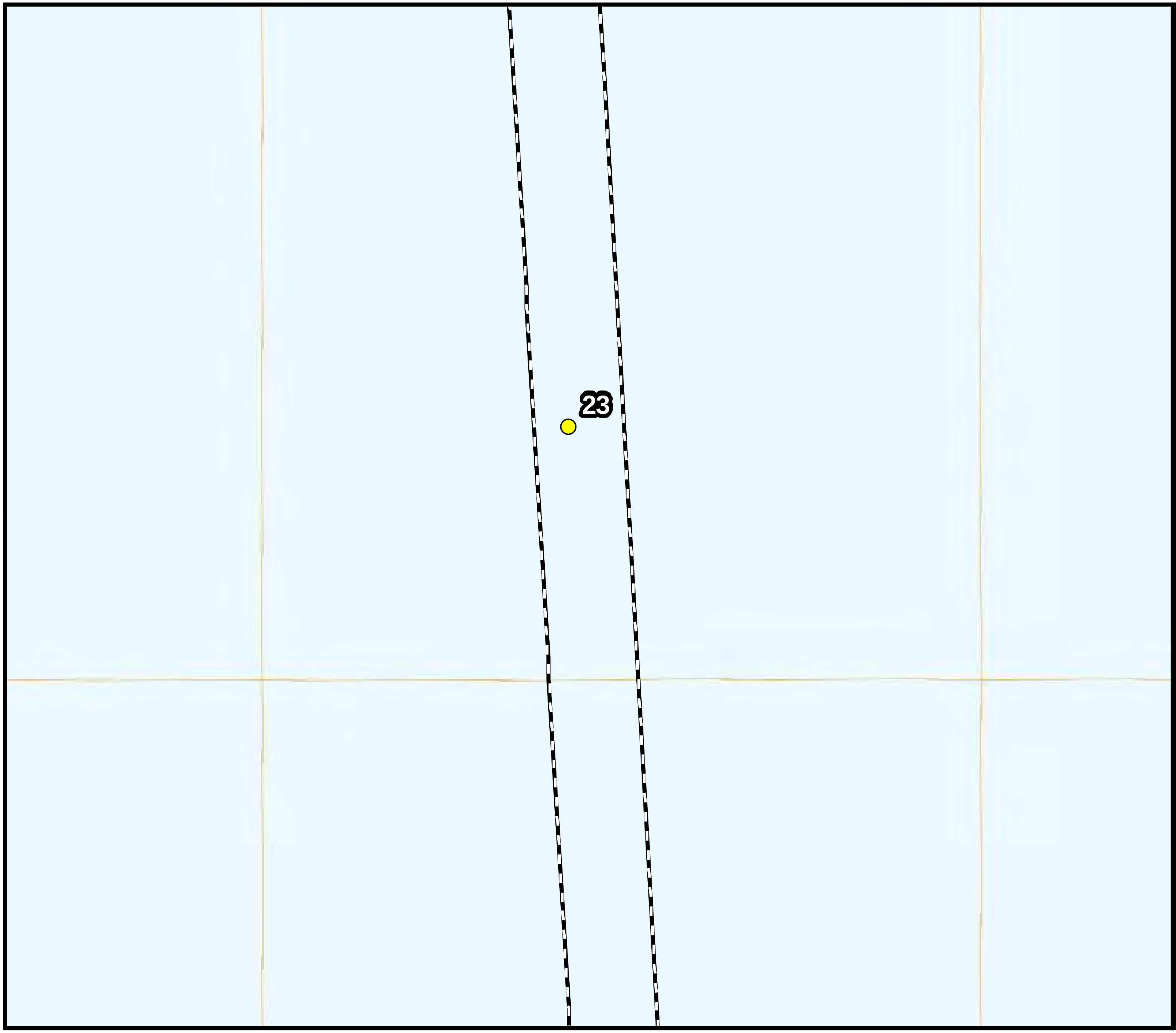


N

0 200 400 800
Feet

Legend

▭ Survey Area

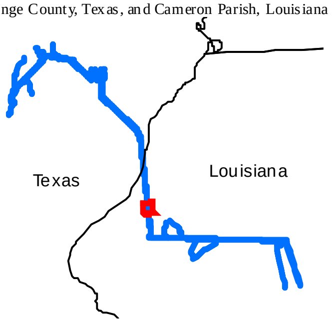
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

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Figure 4
(Map 39 of 74)

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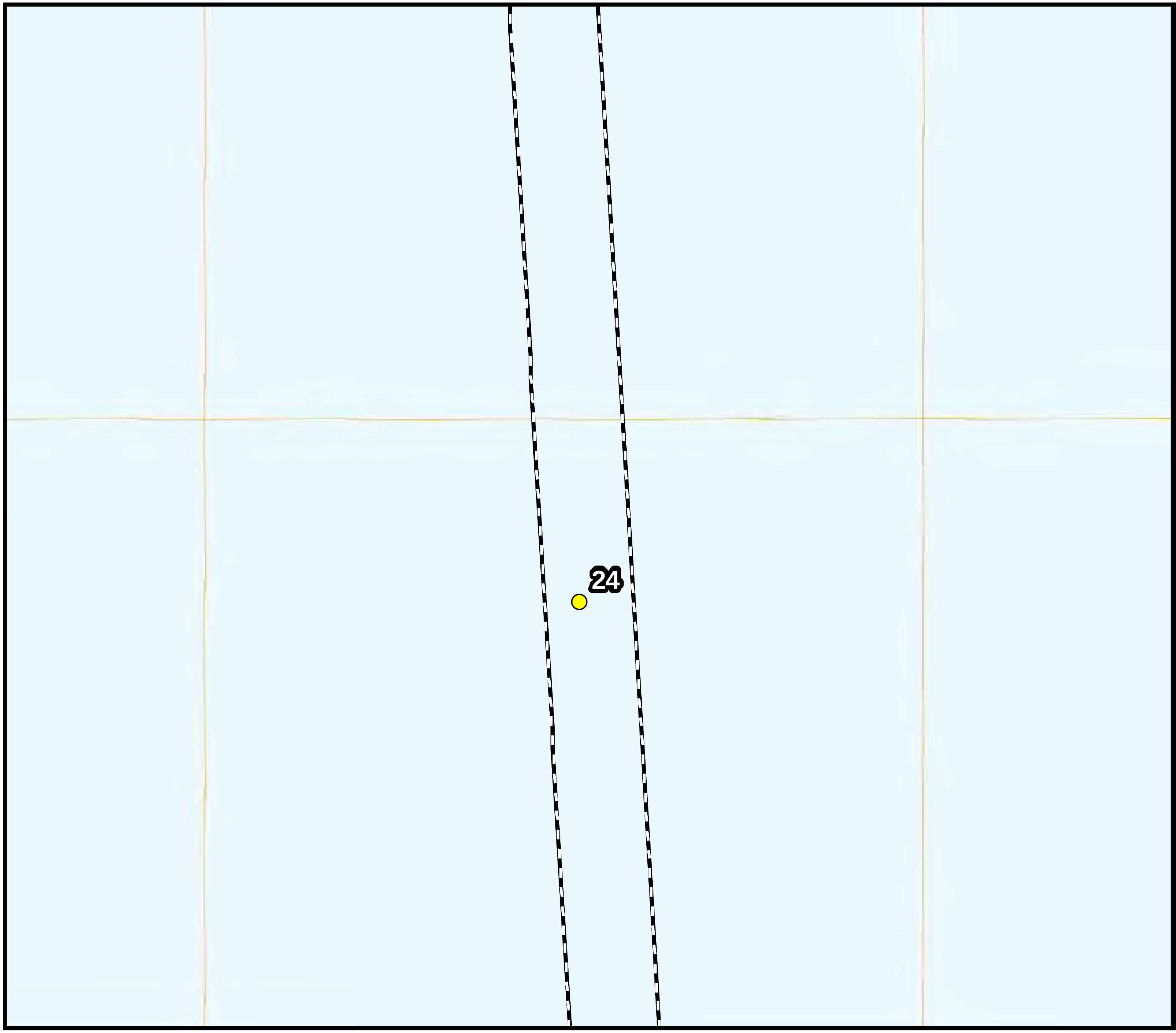


N

0 200 400 800 Feet

Legend

▭ Survey Area

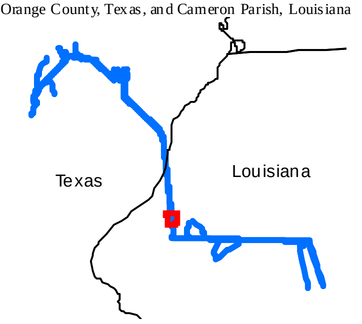
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 40 of 74)

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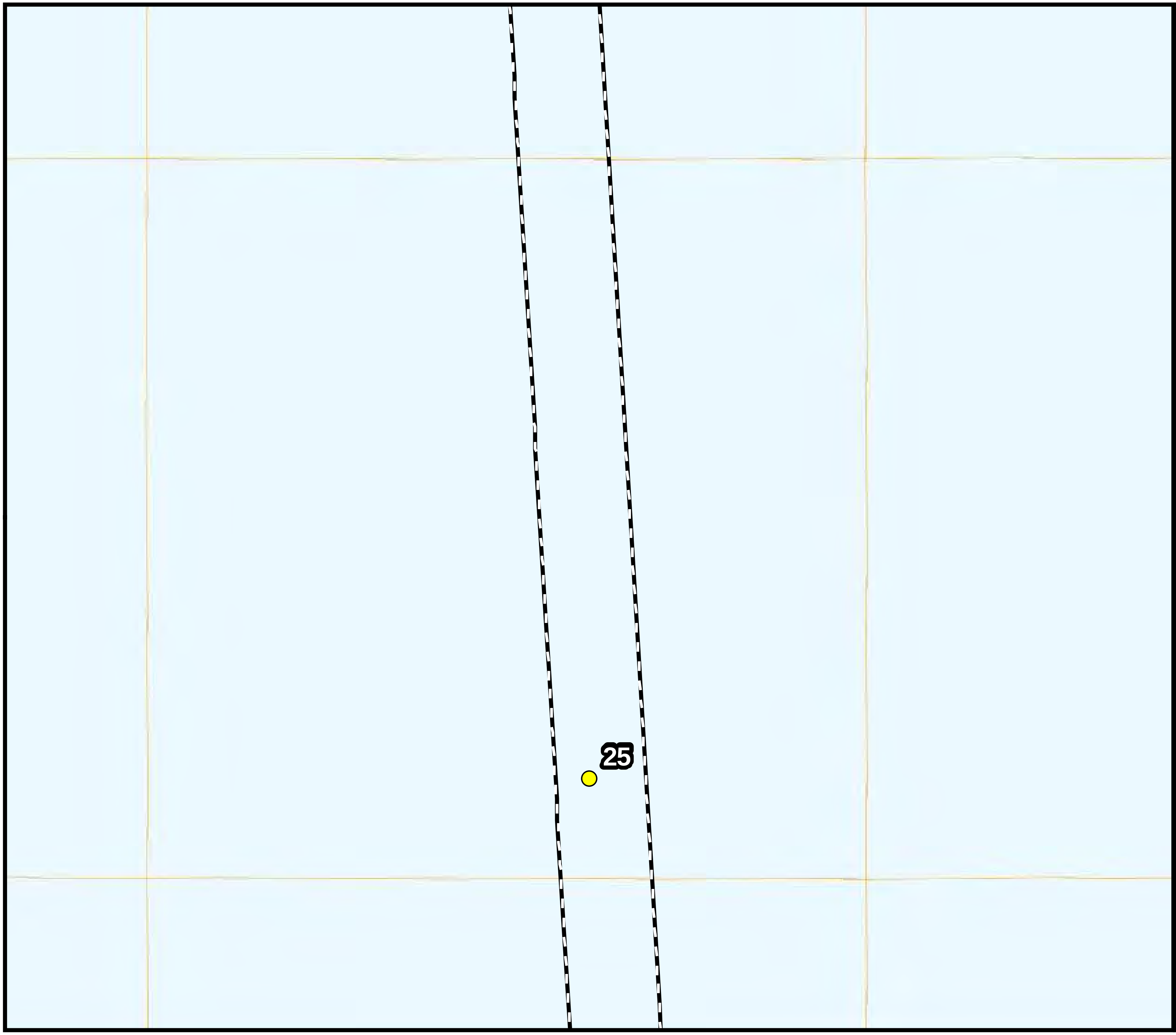


N

0 200 400 800
Feet

Legend

▭ Survey Area

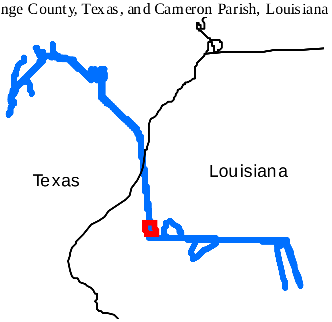
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 41 of 74)

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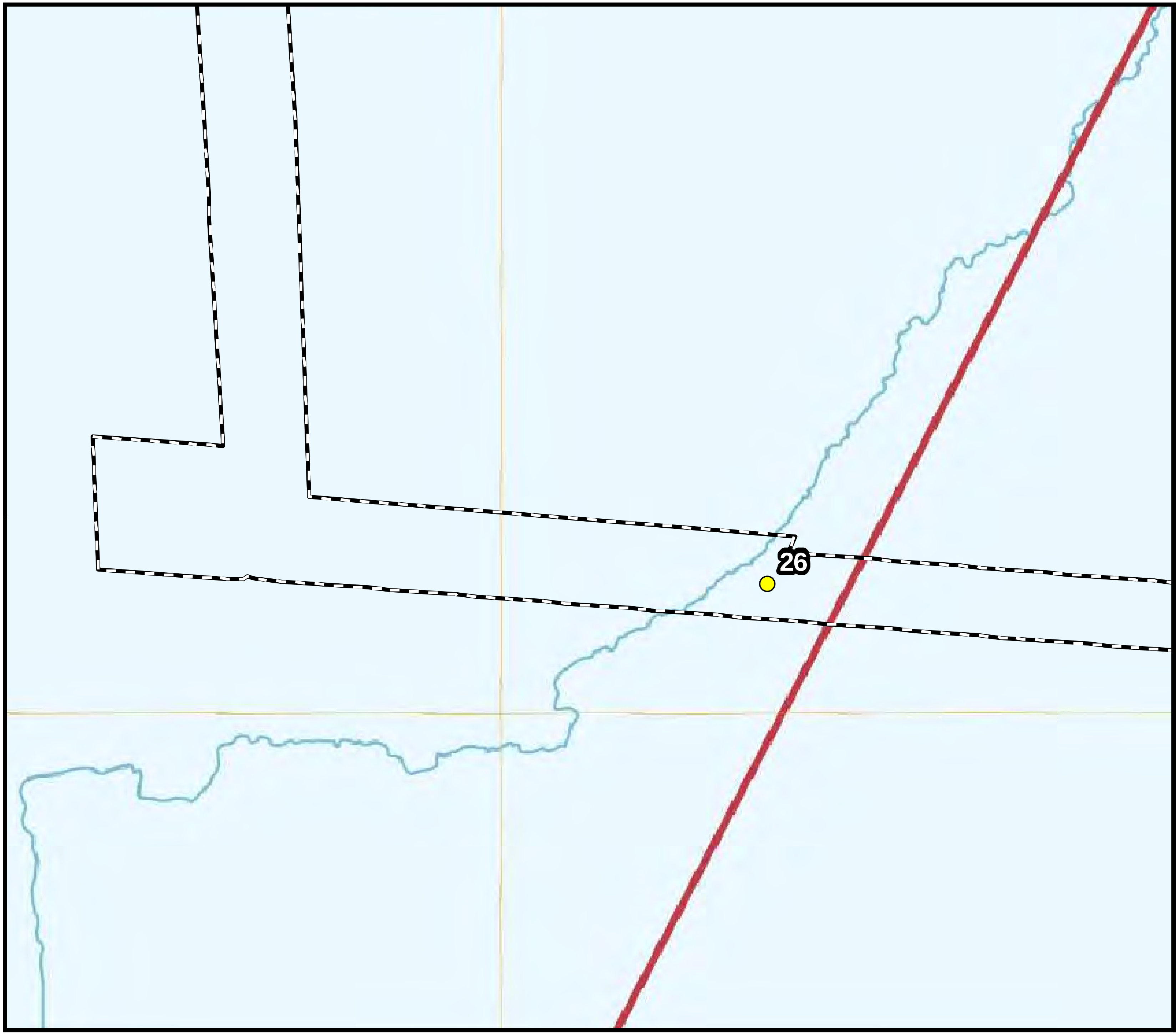


N

0 200 400 800
Feet

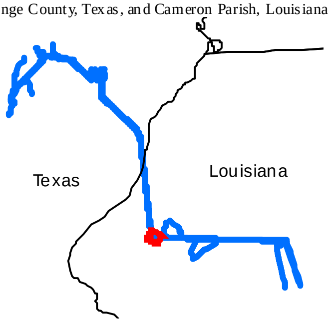
Legend

▭	Survey Area
🟦	100 Year Floodplain
●	Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 42 of 74)

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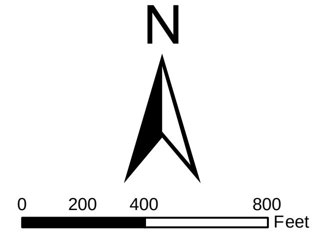


Legend

▨ Survey Area

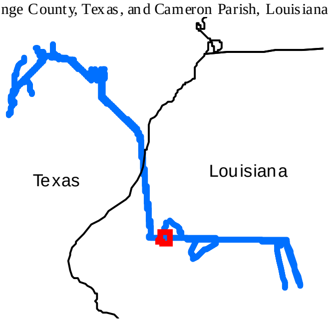
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 43 of 74)

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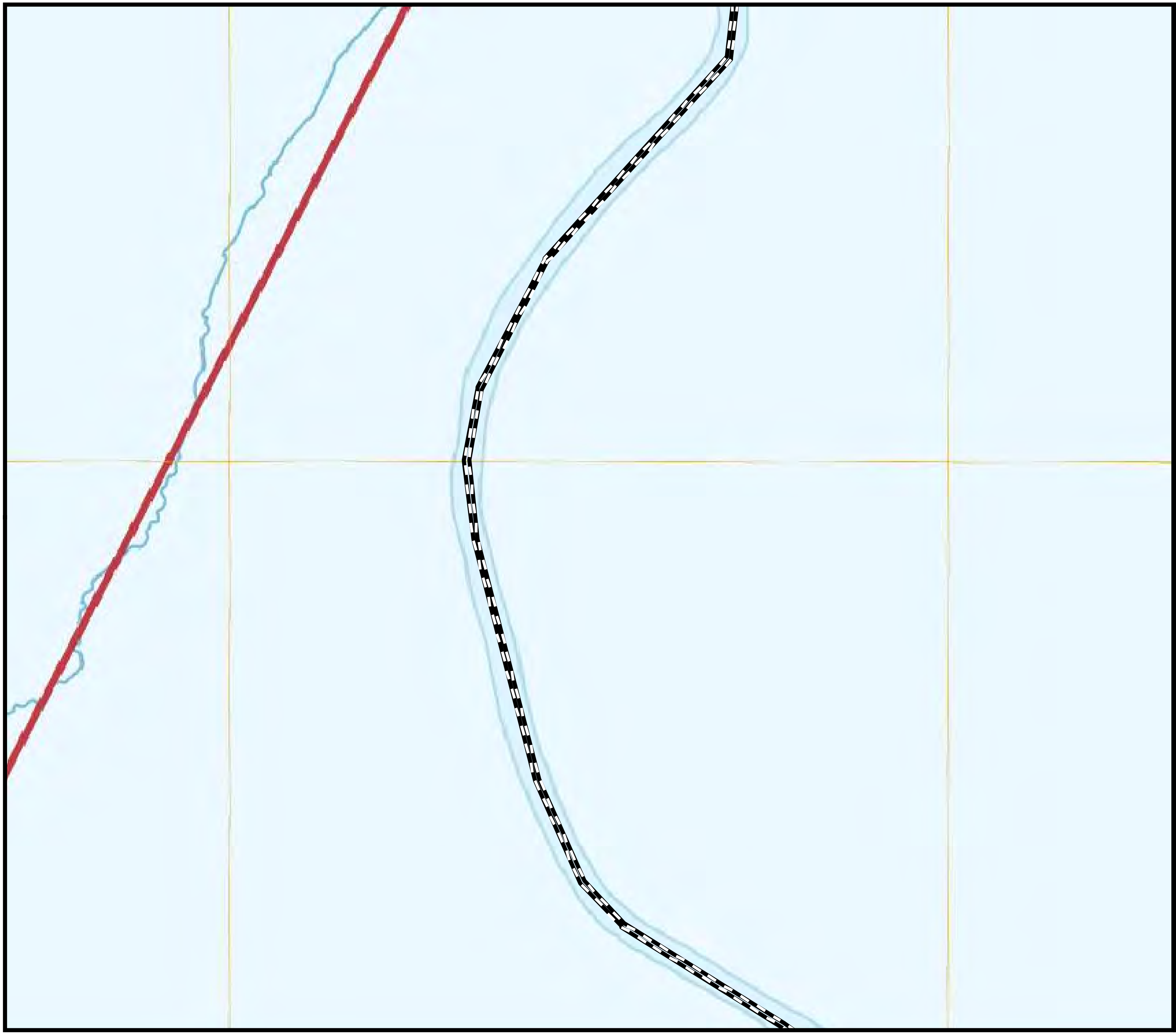


N

0 200 400 800
Feet

Legend

▭ Survey Area

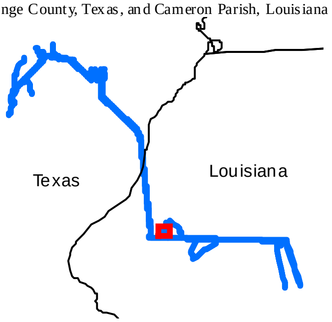
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

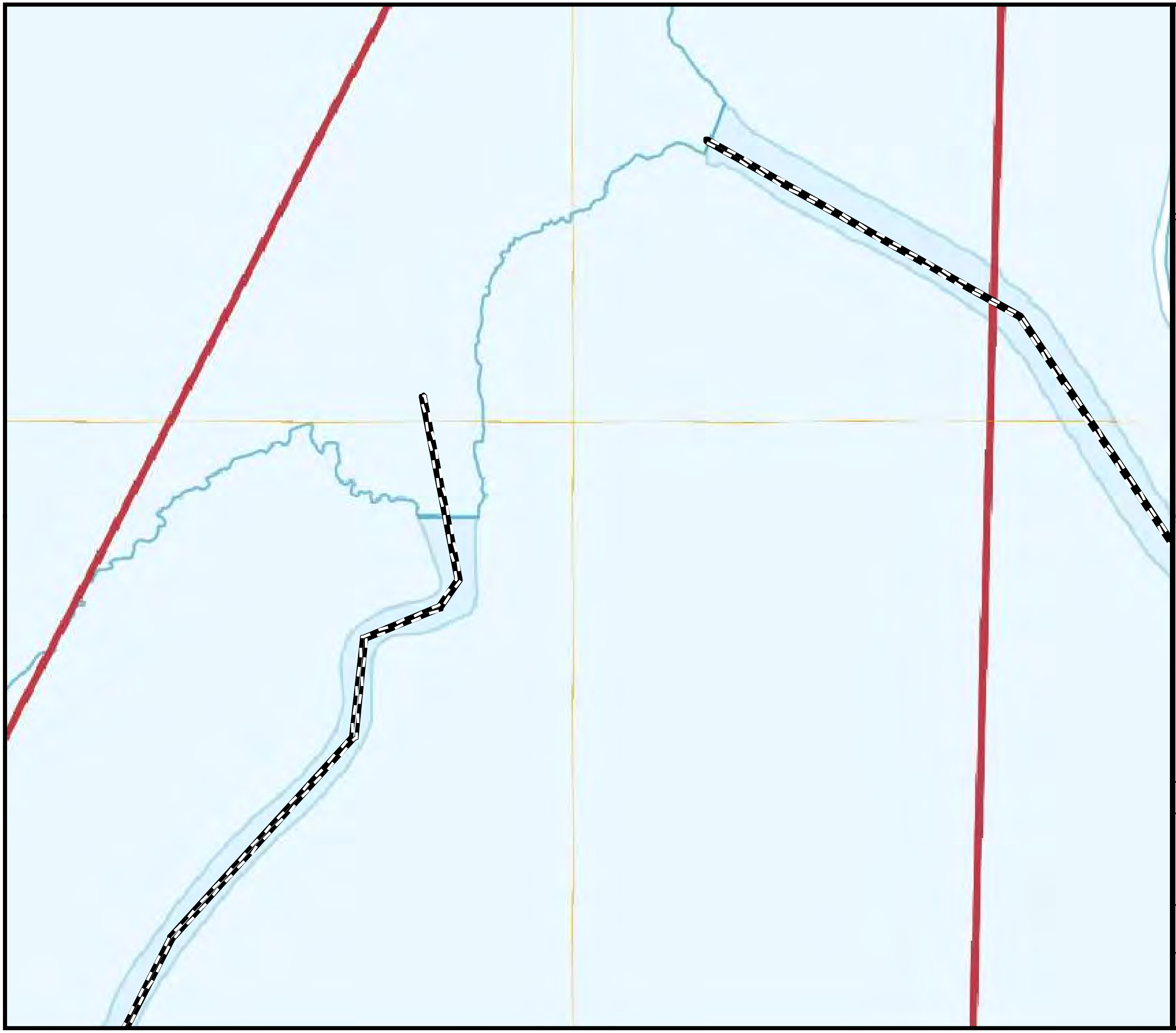
Blue Marlin Offshore Port Project

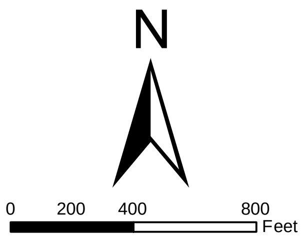
BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 44 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





Legend

▭ Survey Area

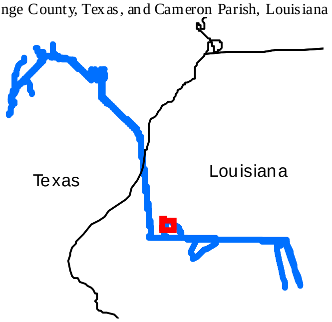
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 45 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

Legend

▭ Survey Area

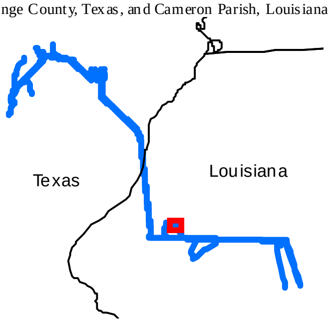
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 46 of 74)

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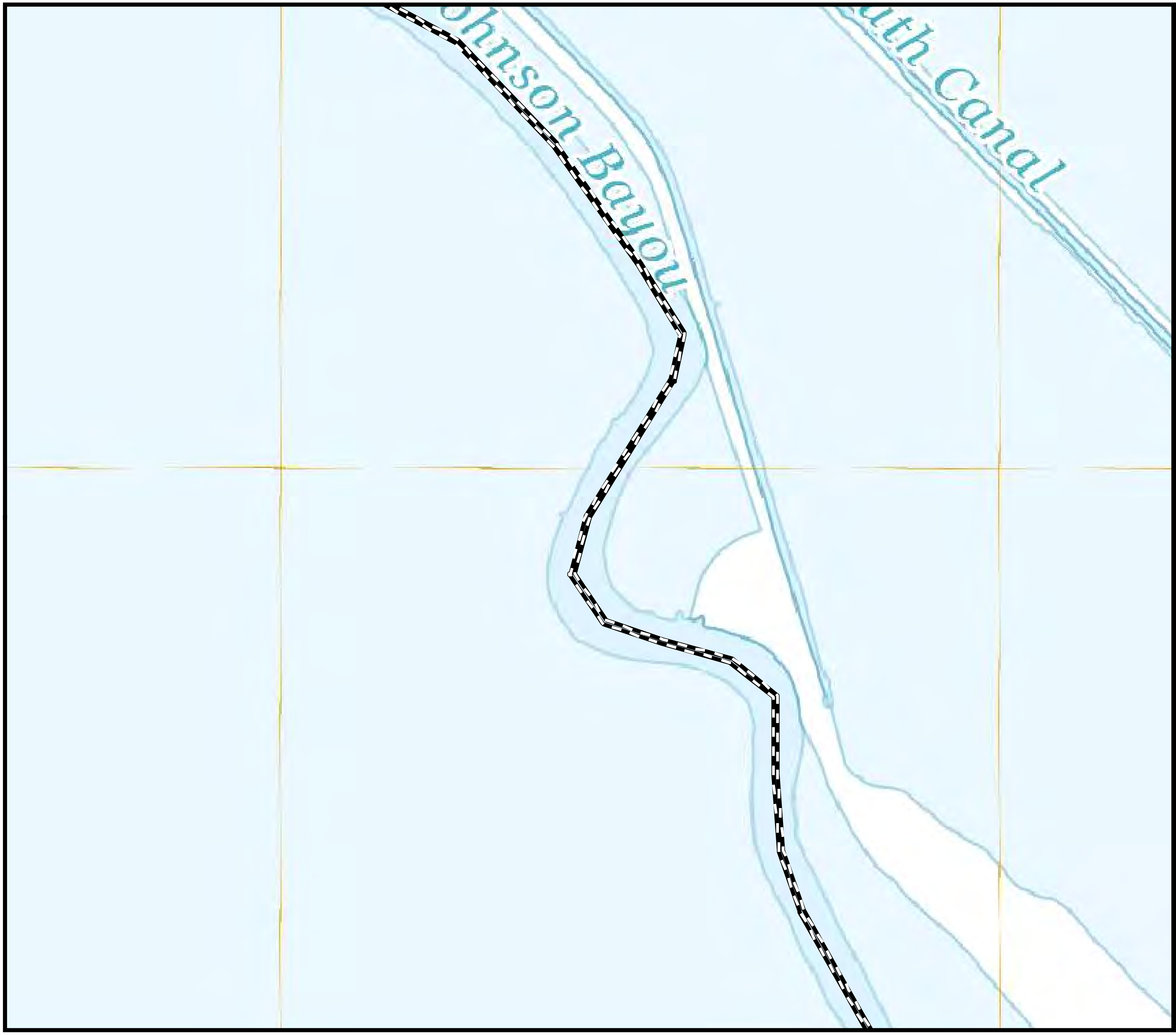


N

0 200 400 800
Feet

Legend

▨ Survey Area

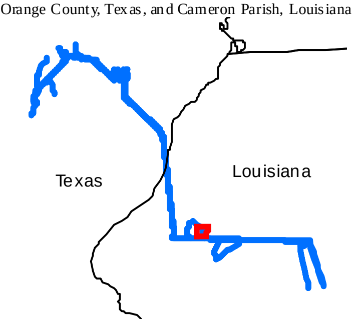
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 47 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800 Feet

Legend

▭ Survey Area

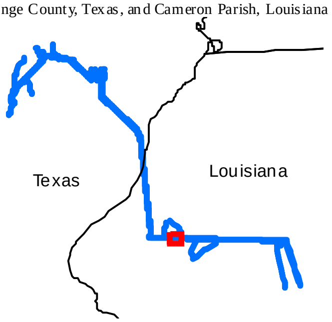
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 48 of 74)

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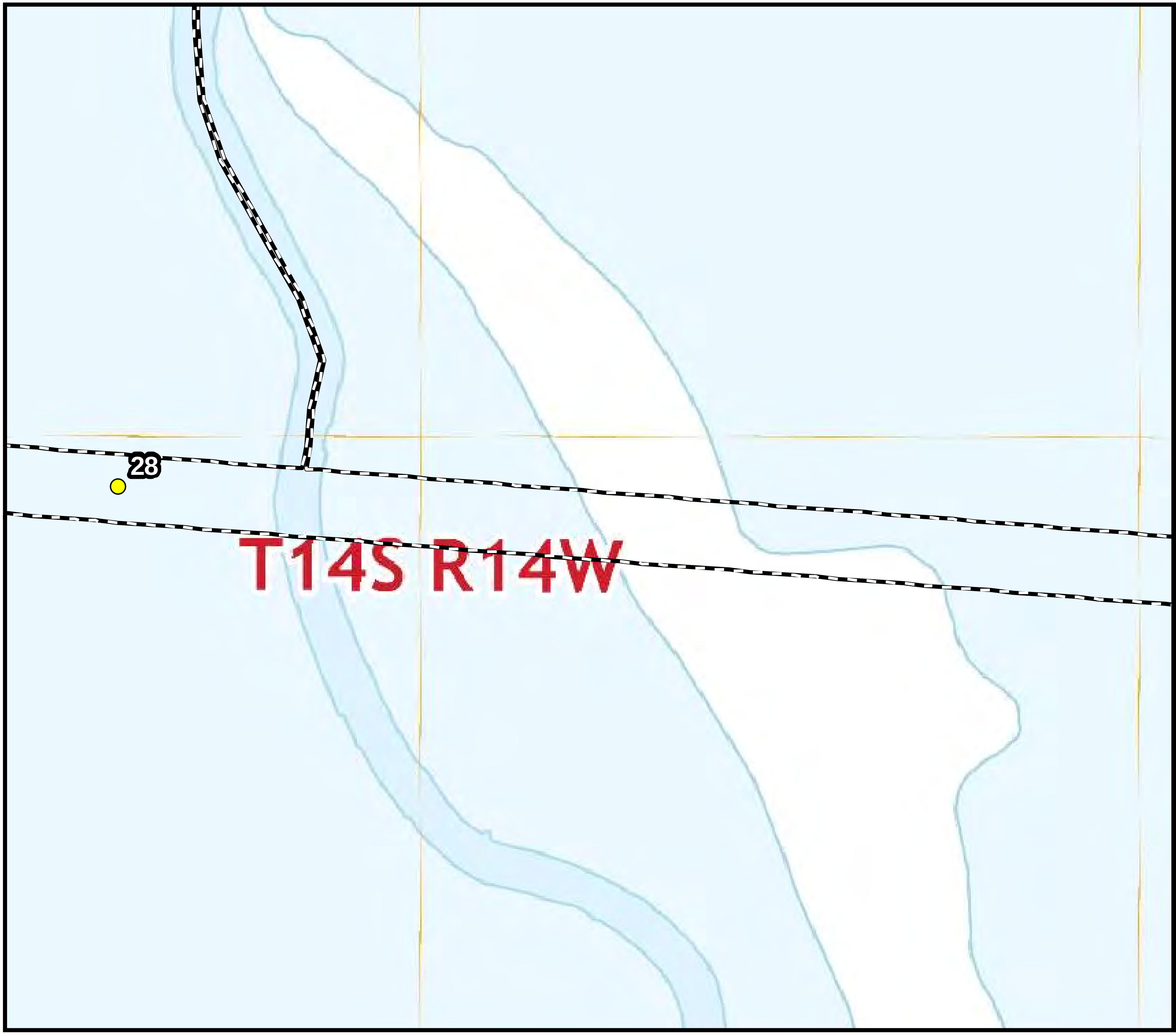


N

0 200 400 800
Feet

Legend

▭ Survey Area

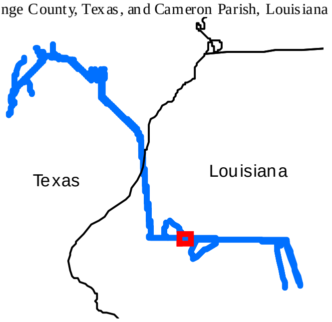
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 49 of 74)

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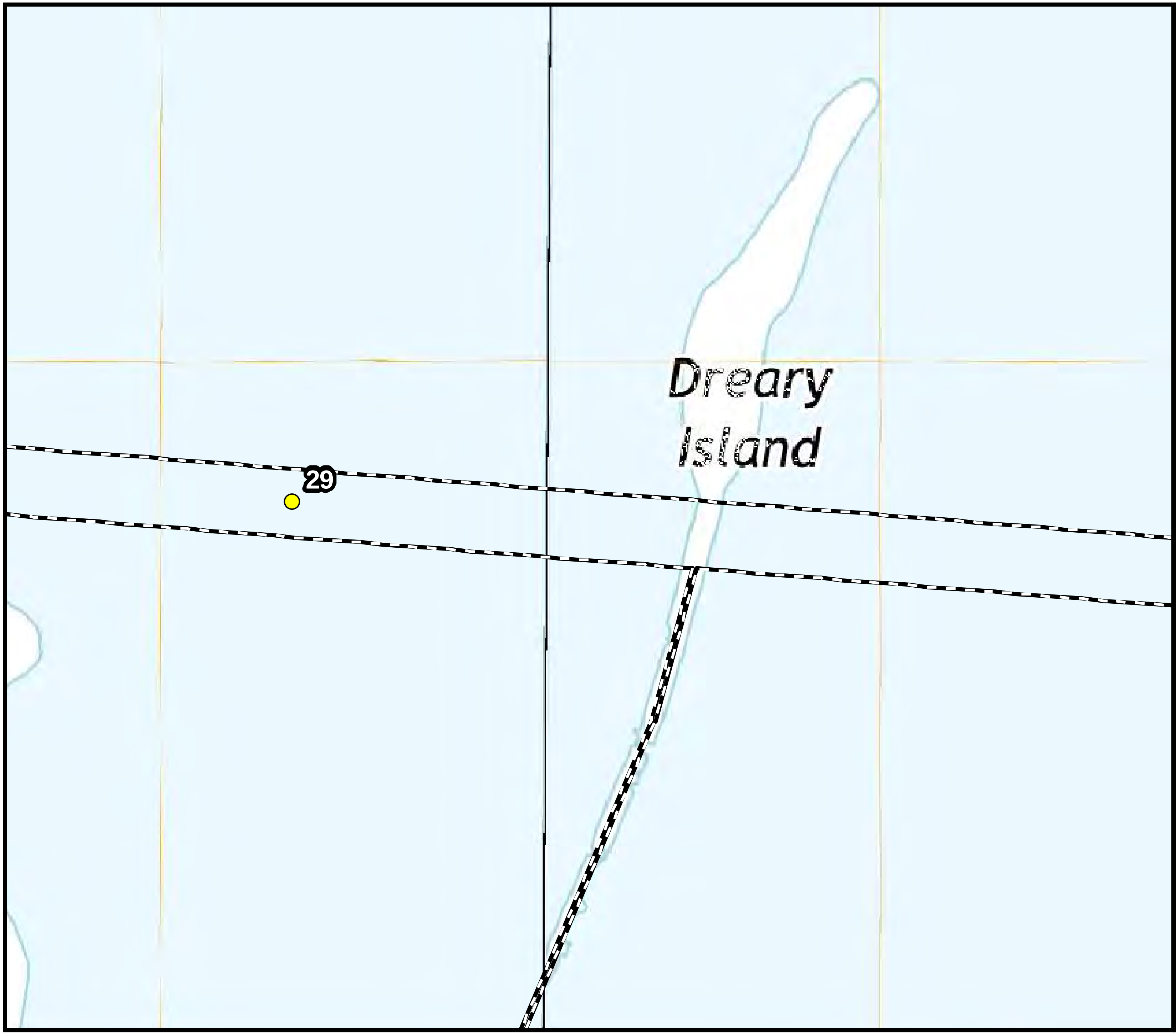
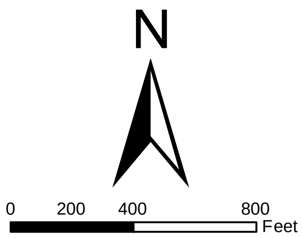




Legend

▭ Survey Area

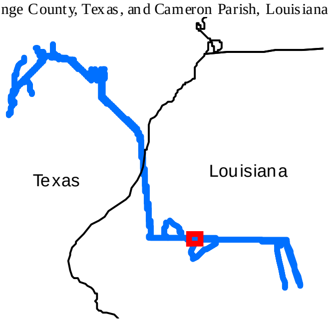
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 50 of 74)

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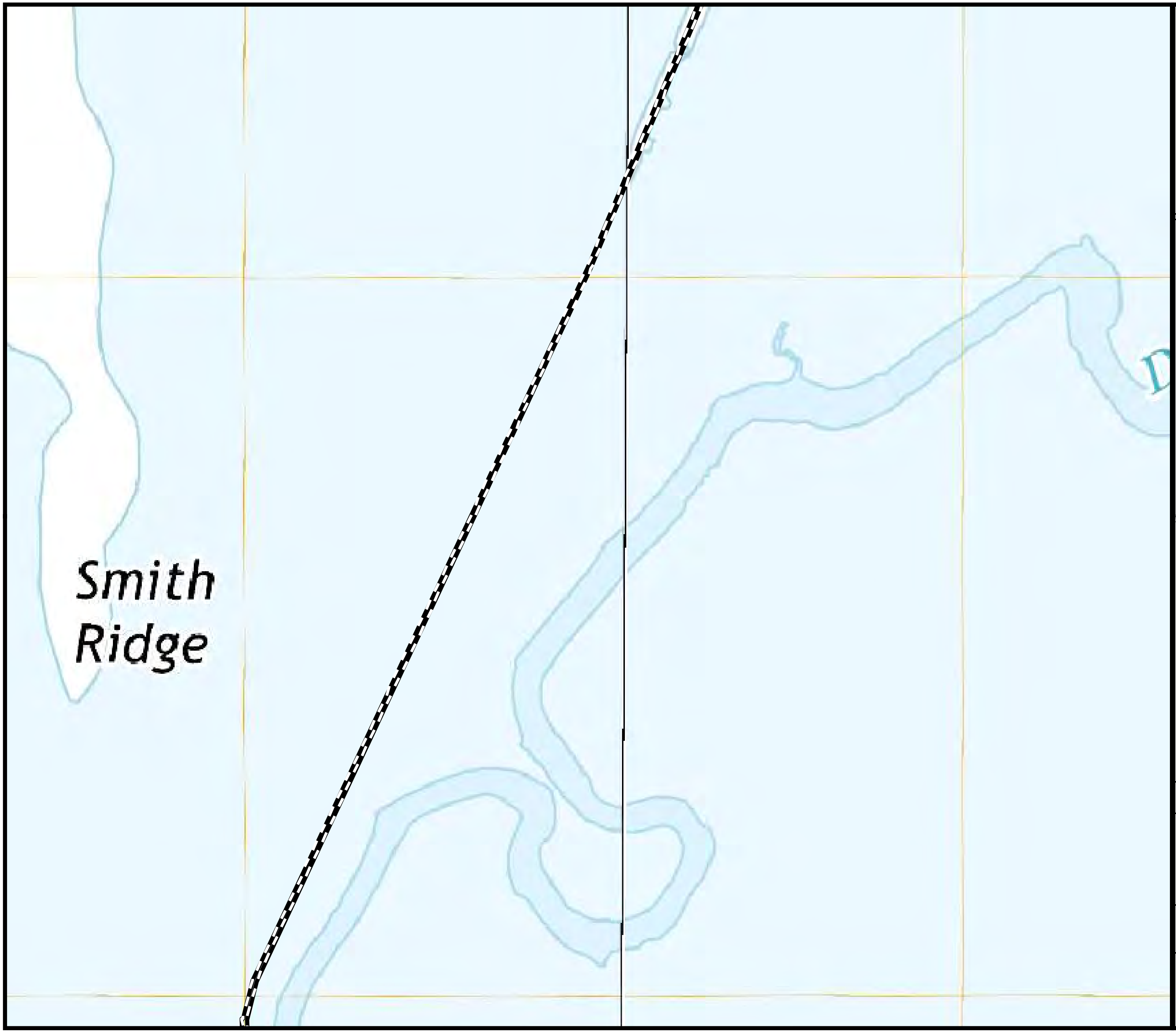


Legend

☐ Survey Area

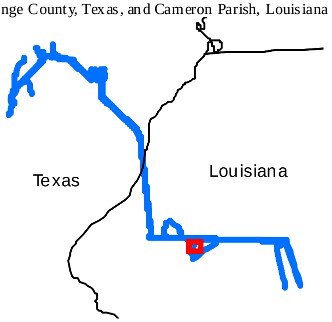
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 51 of 74)

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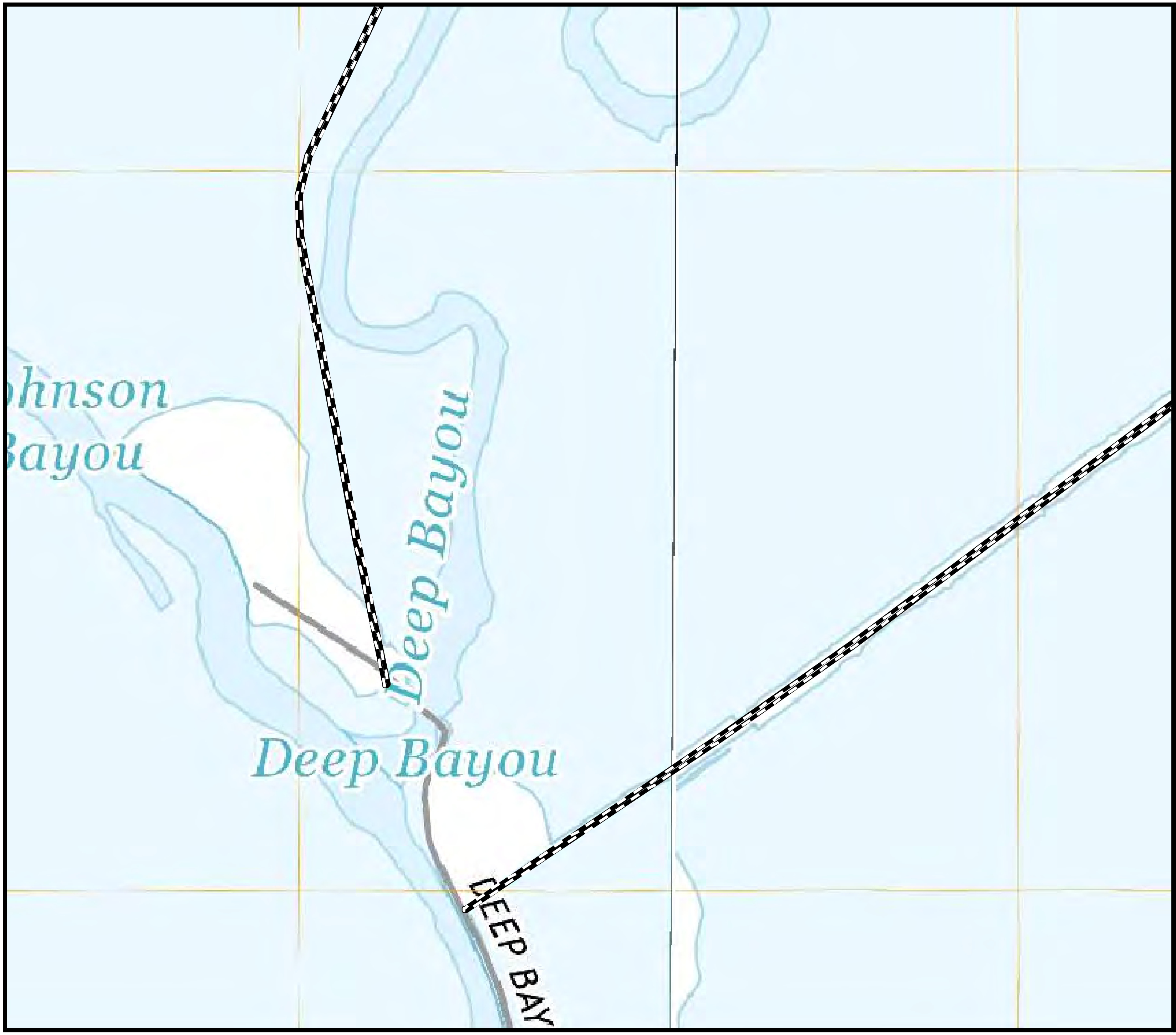


N

0 200 400 800
Feet

Legend

▭ Survey Area

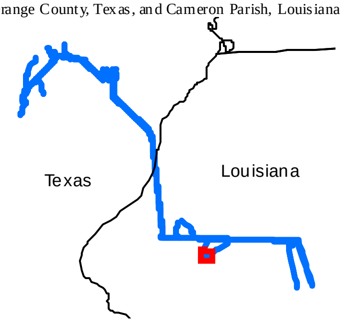
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

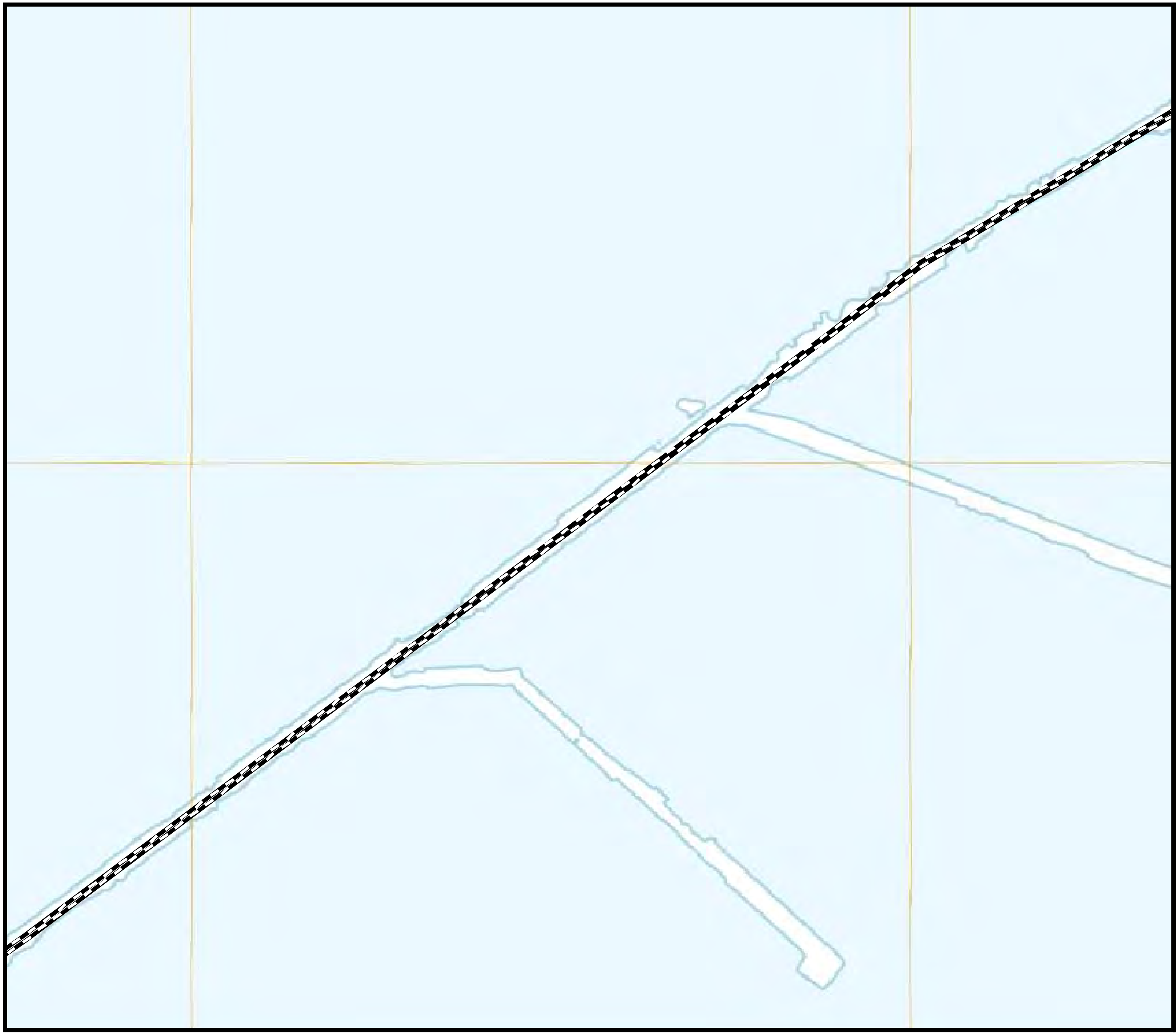
Blue Marlin Offshore Port LLC

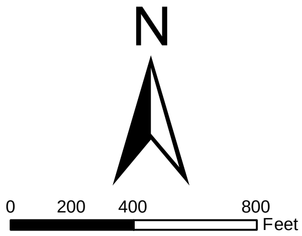
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 52 of 74)





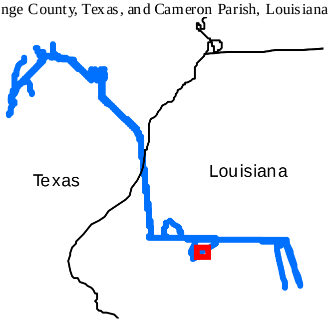
Legend

- ▭ Survey Area
- 🟦 100 Year Floodplain
- ● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

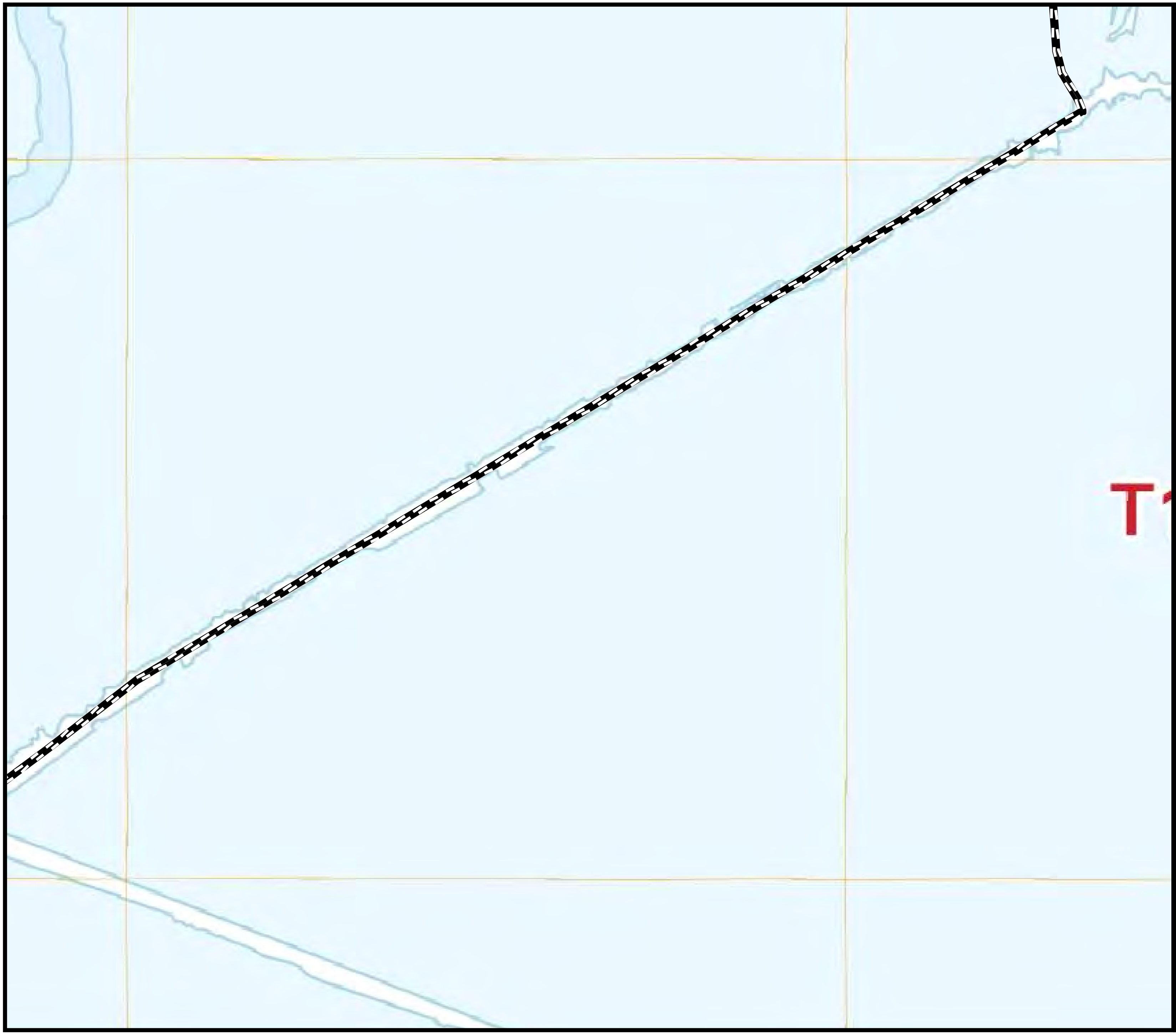
BESI
Benchmark
Ecological Services, Inc.

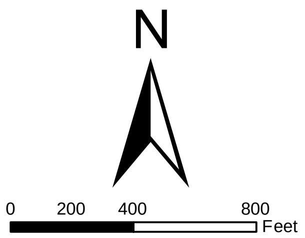
Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 53 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





Legend

▭ Survey Area

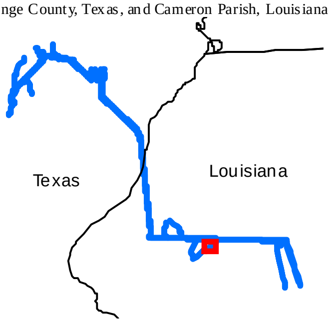
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 54 of 74)

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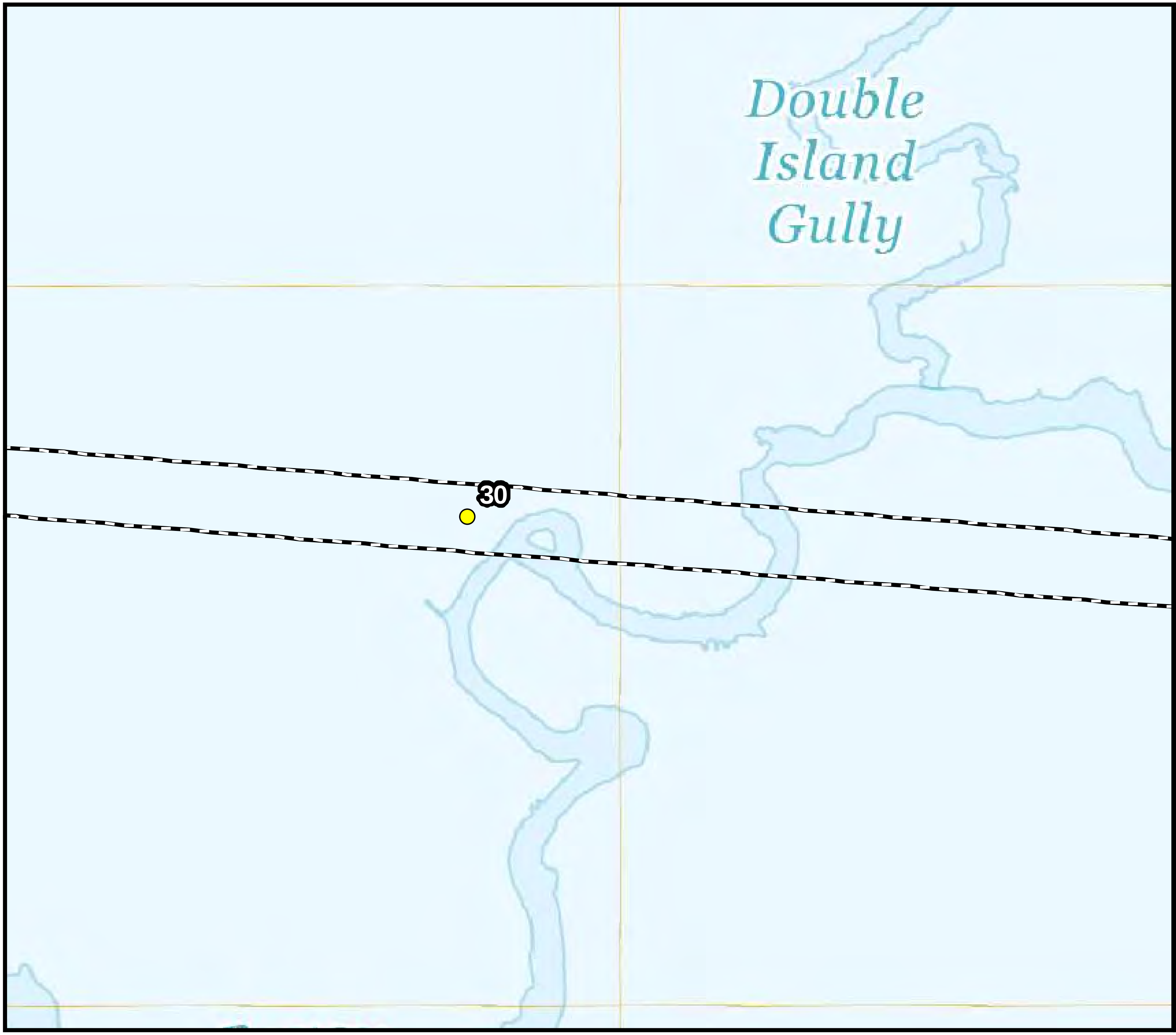
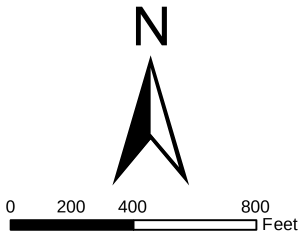




Legend

▭ Survey Area

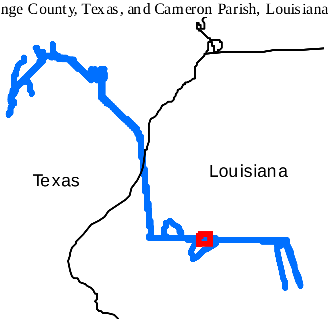
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 55 of 74)

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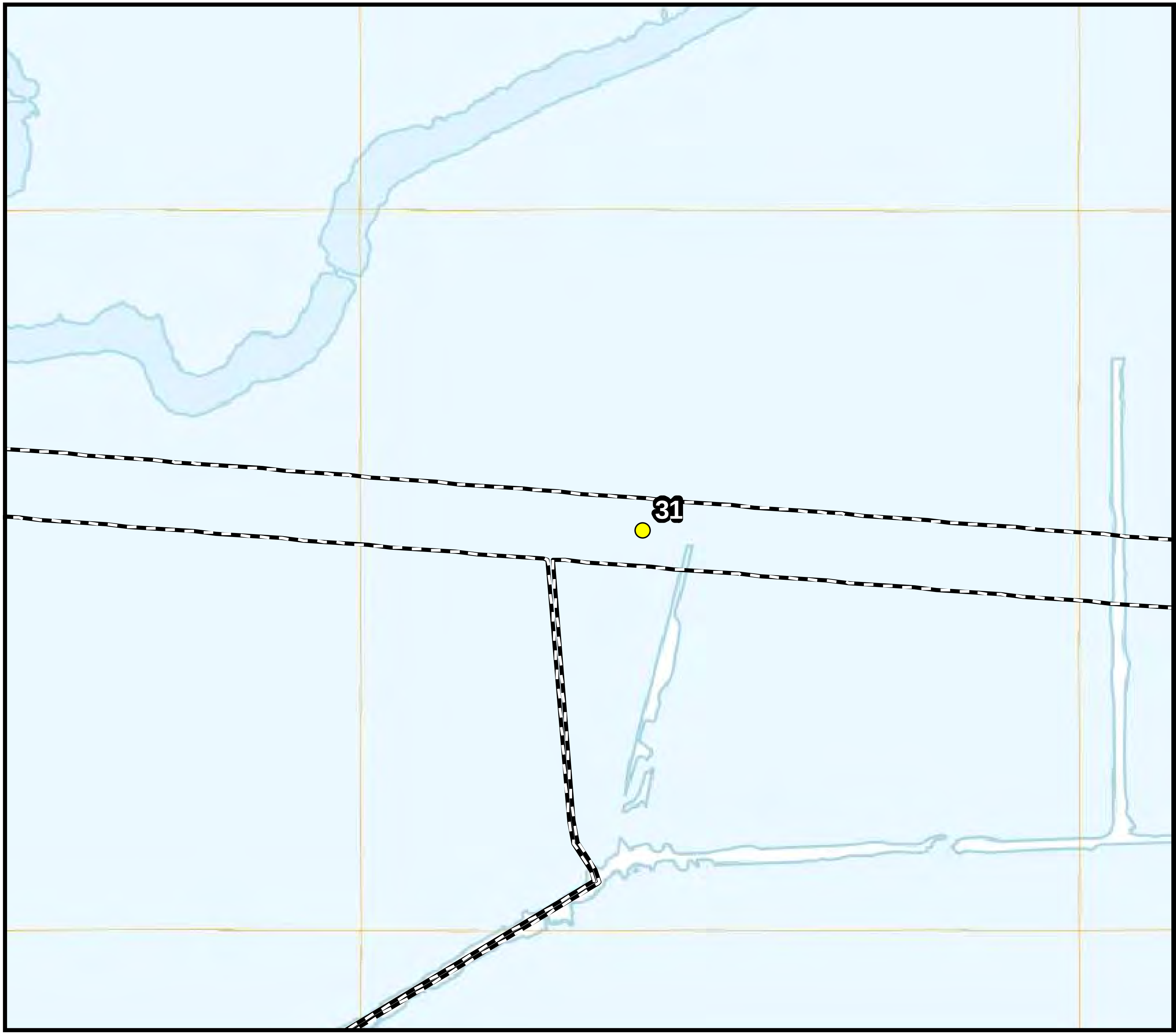


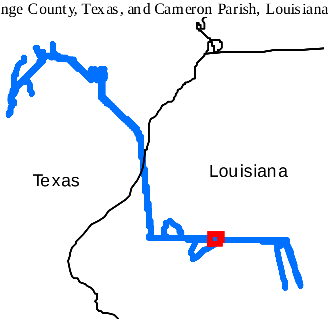
Legend

- ▭ Survey Area
- 🟦 100 Year Floodplain
- ● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 56 of 74)

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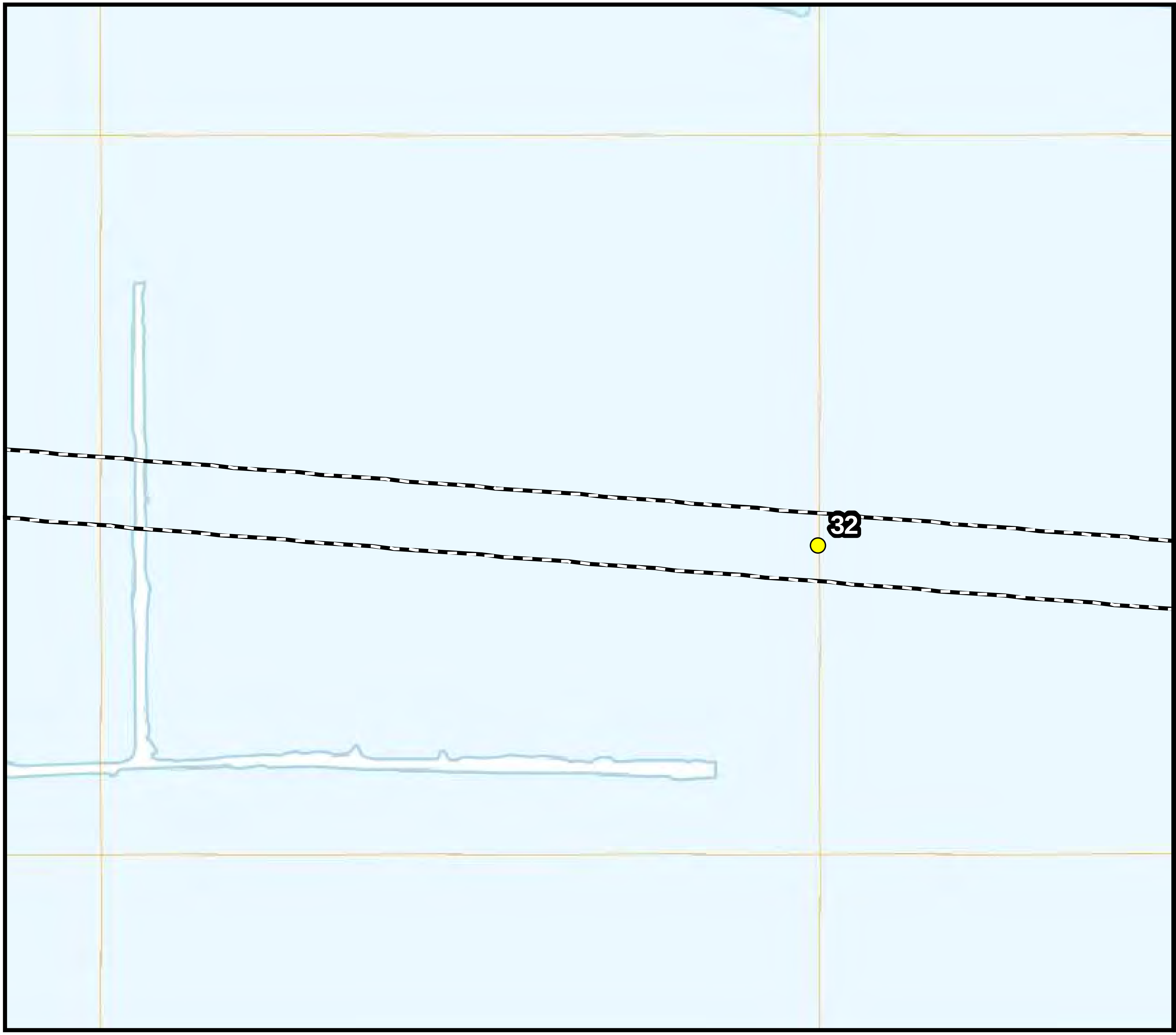


N

0 200 400 800
Feet

Legend

▭ Survey Area

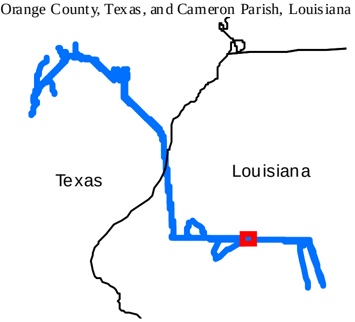
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 57 of 74)

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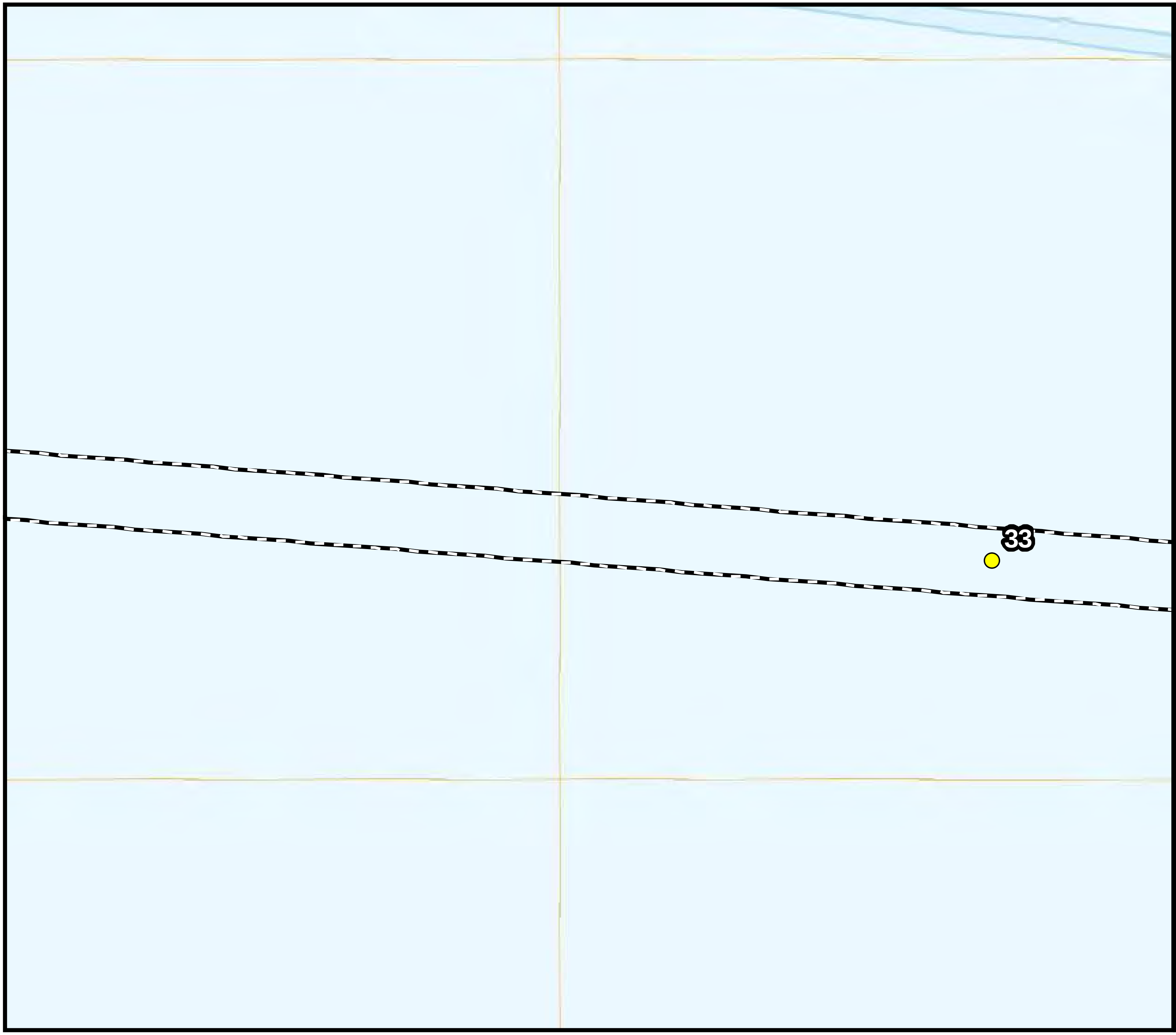


N

0 200 400 800
Feet

Legend

⬚ Survey Area

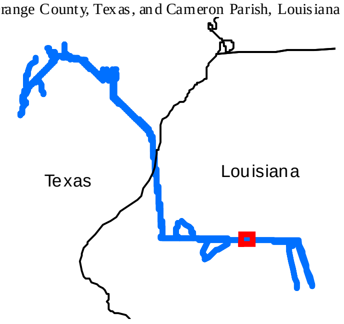
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 58 of 74)

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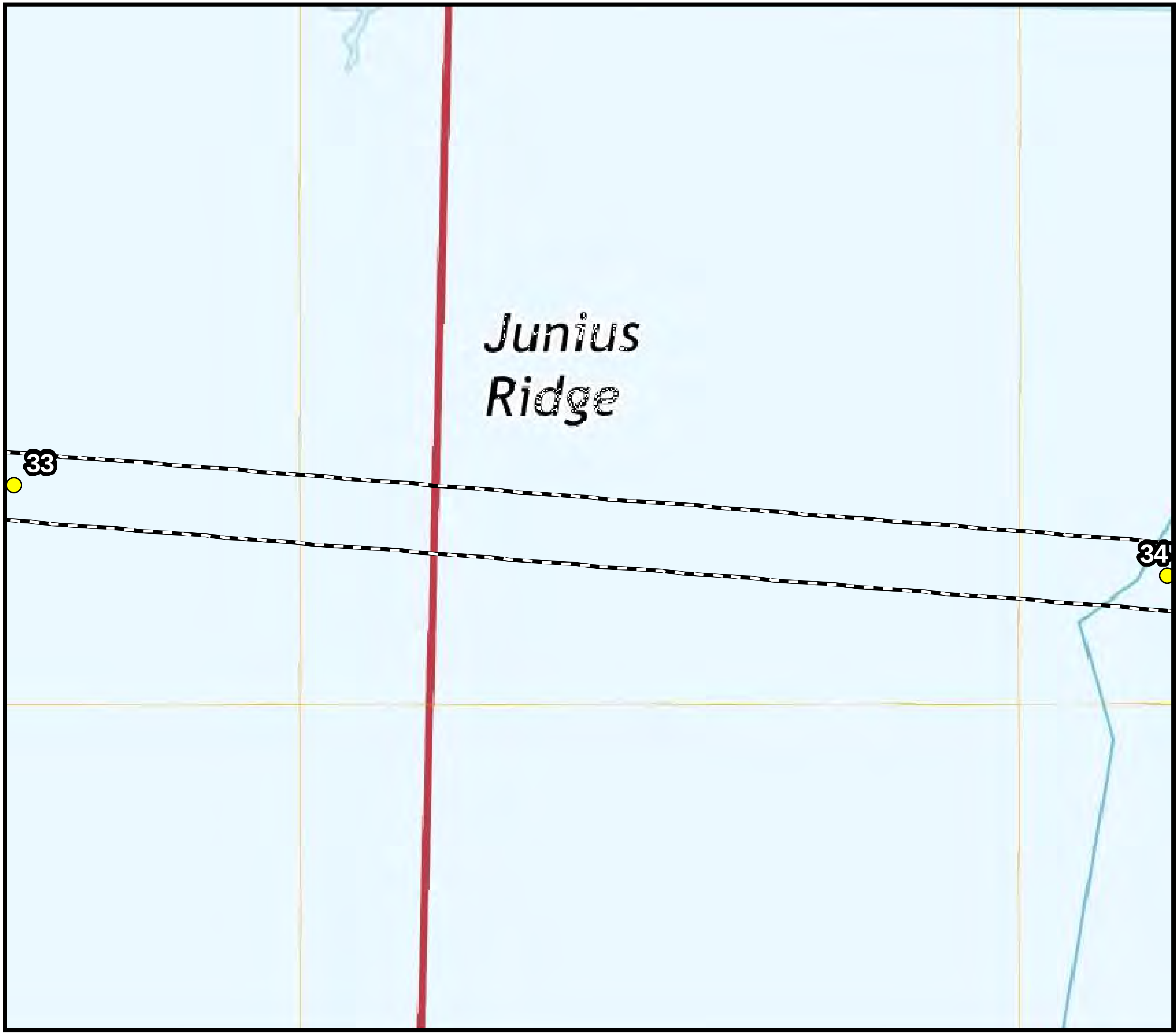


N

0 200 400 800 Feet

Legend

▭ Survey Area

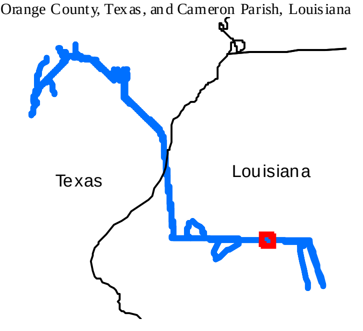
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 59 of 74)

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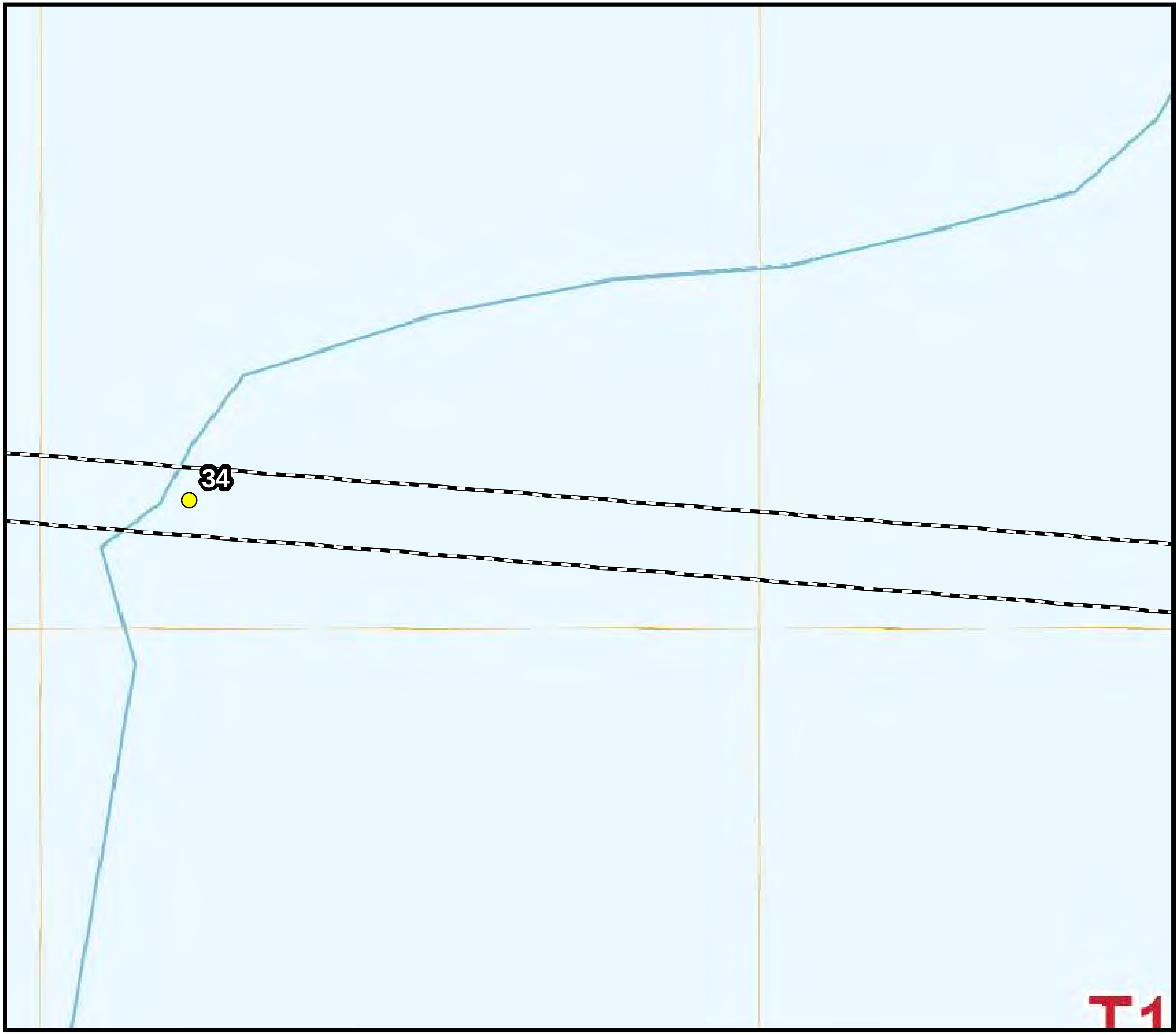
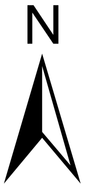




Legend

▭ Survey Area

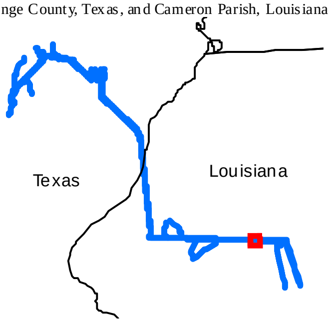
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 60 of 74)

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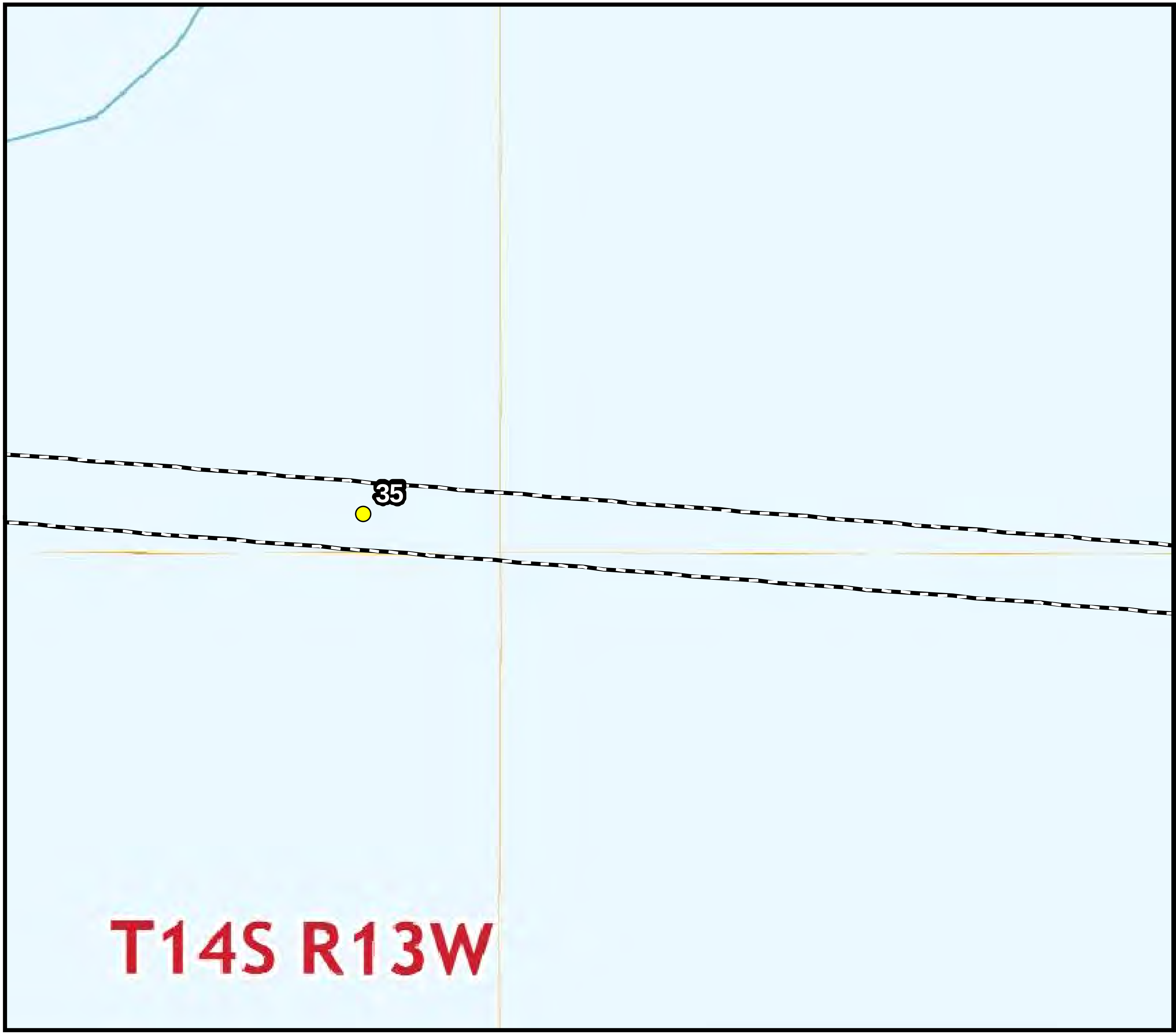
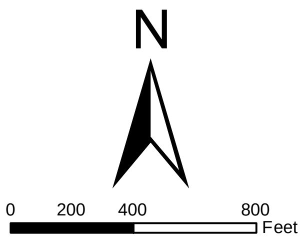




Legend

▭ Survey Area

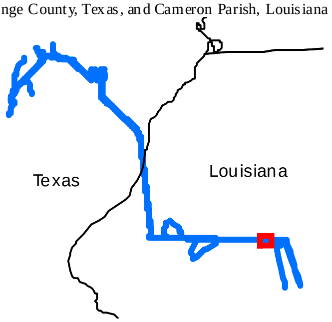
▨ 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

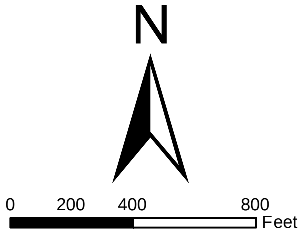
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 61 of 74)



Legend

▭ Survey Area

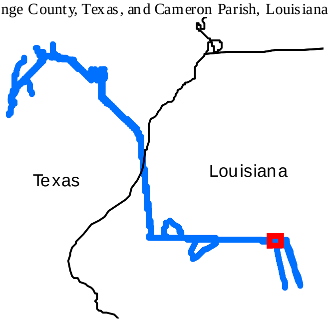
🟦 100 Year Floodplain

🟡 Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 62 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800
Feet

Legend

▭ Survey Area

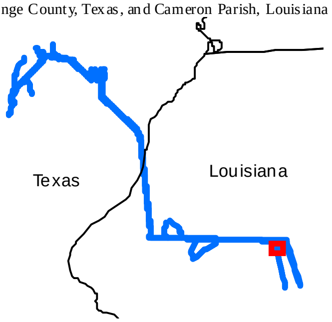
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 63 of 74)

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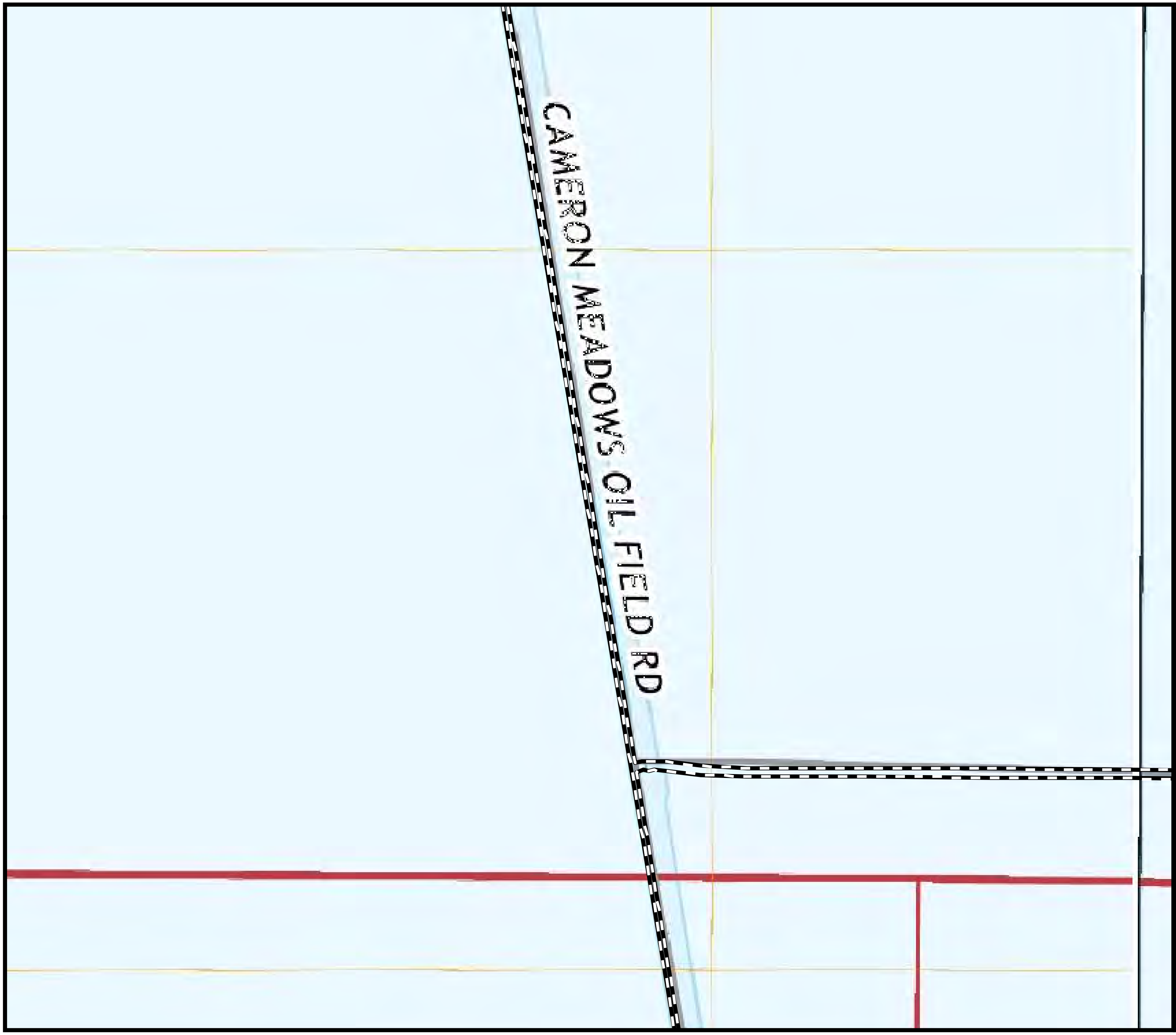
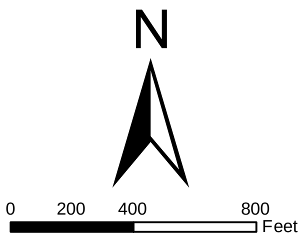




Legend

▭ Survey Area

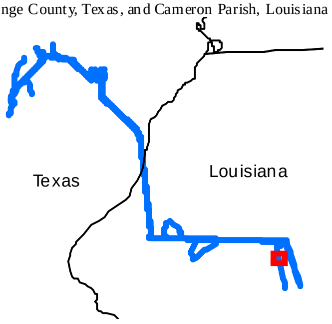
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 64 of 74)

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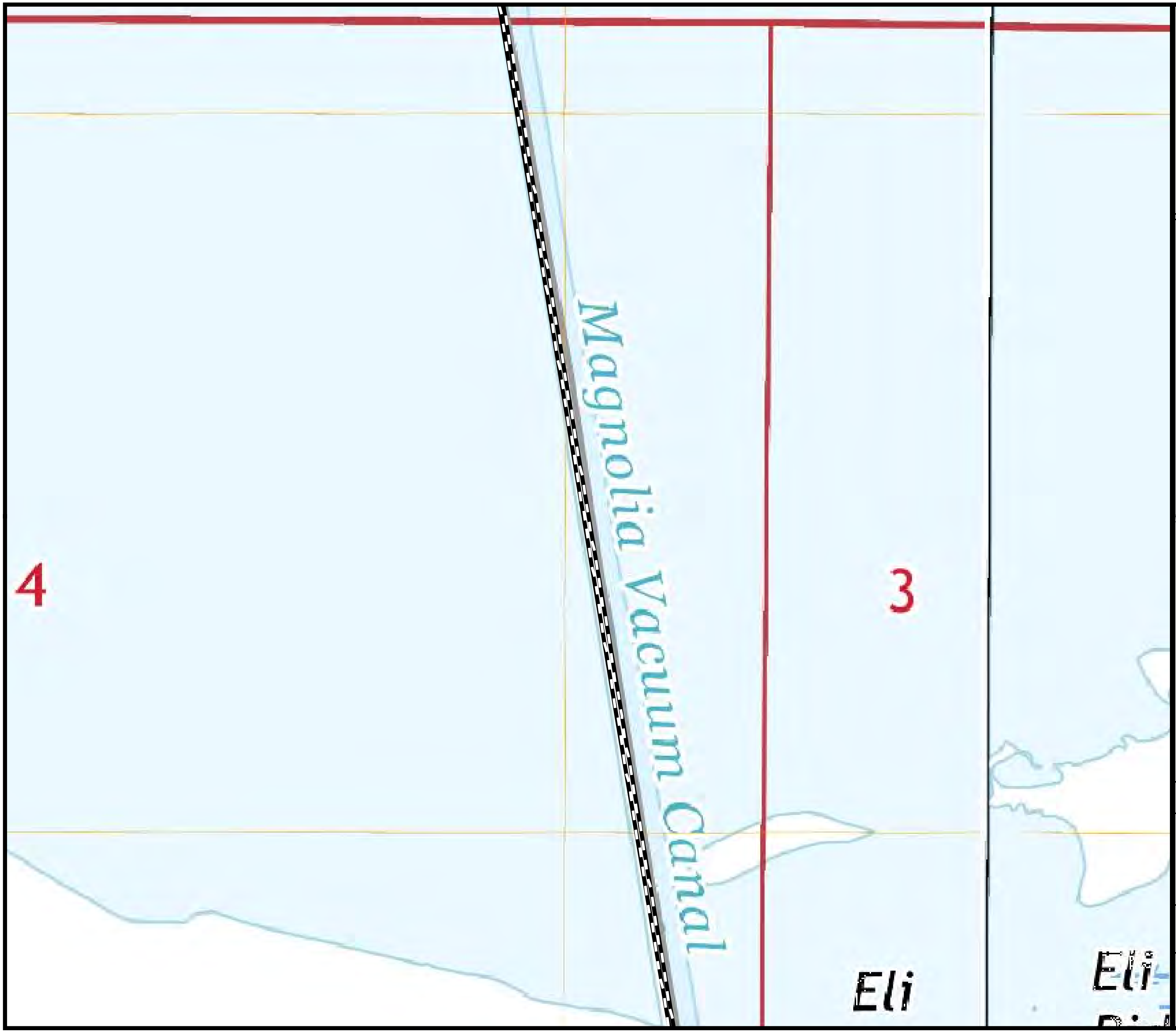


N

0 200 400 800
Feet

Legend

▭ Survey Area

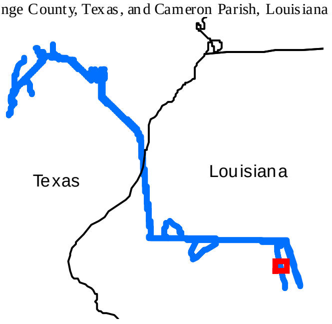
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

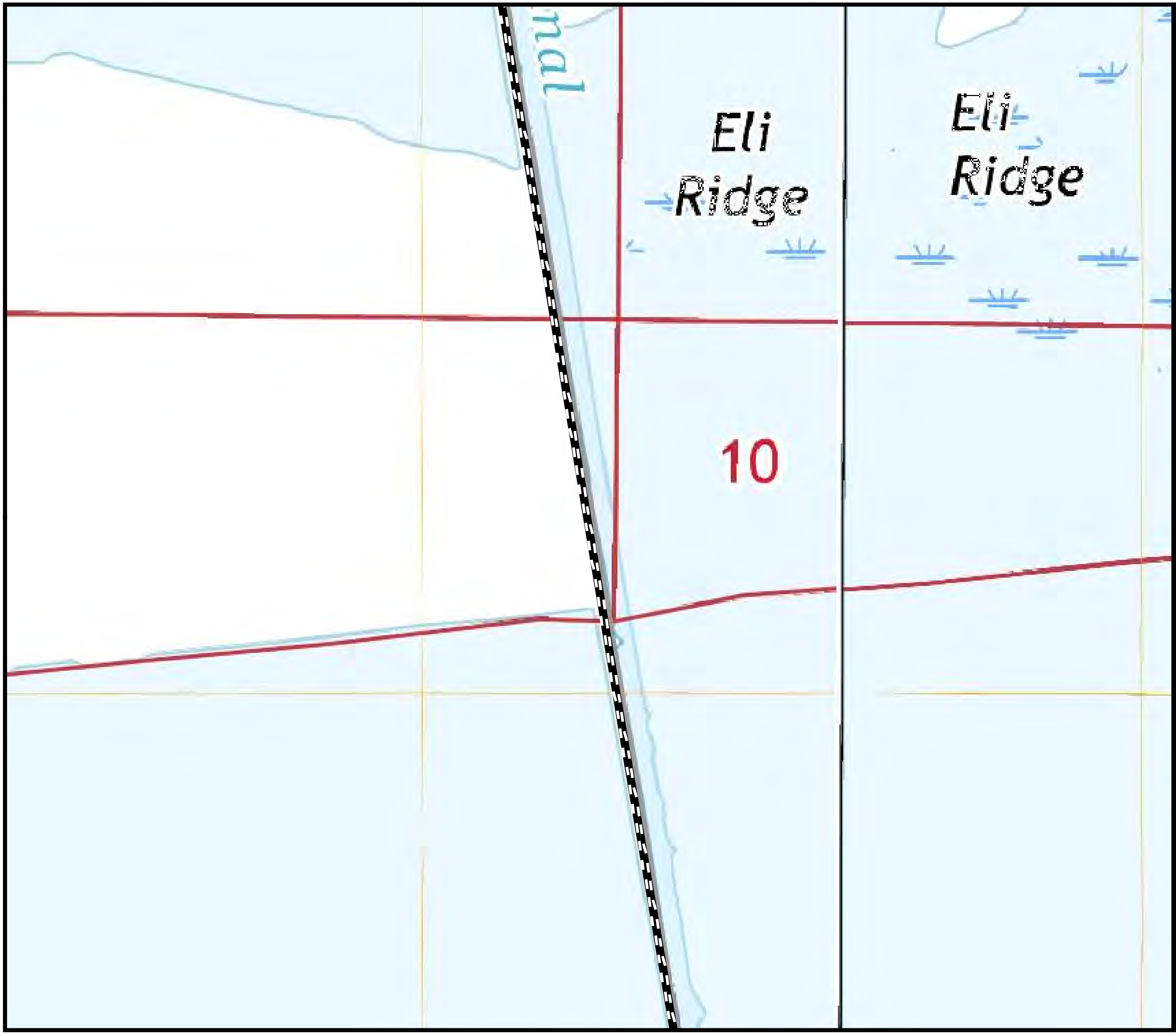
Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 65 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd



N

0 200 400 800 Feet

Legend

▭ Survey Area

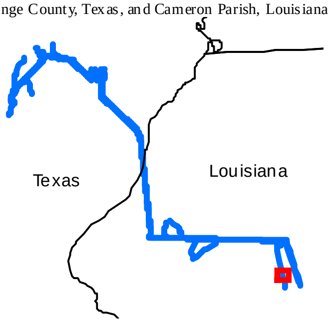
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 66 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

N

0 200 400 800
Feet

Legend

▨ Survey Area

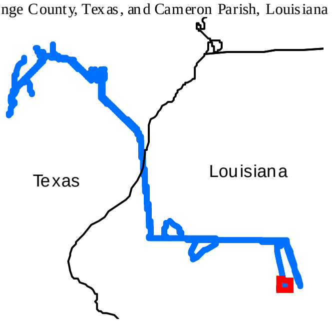
🟦 100 Year Floodplain

○ Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 67 of 74)

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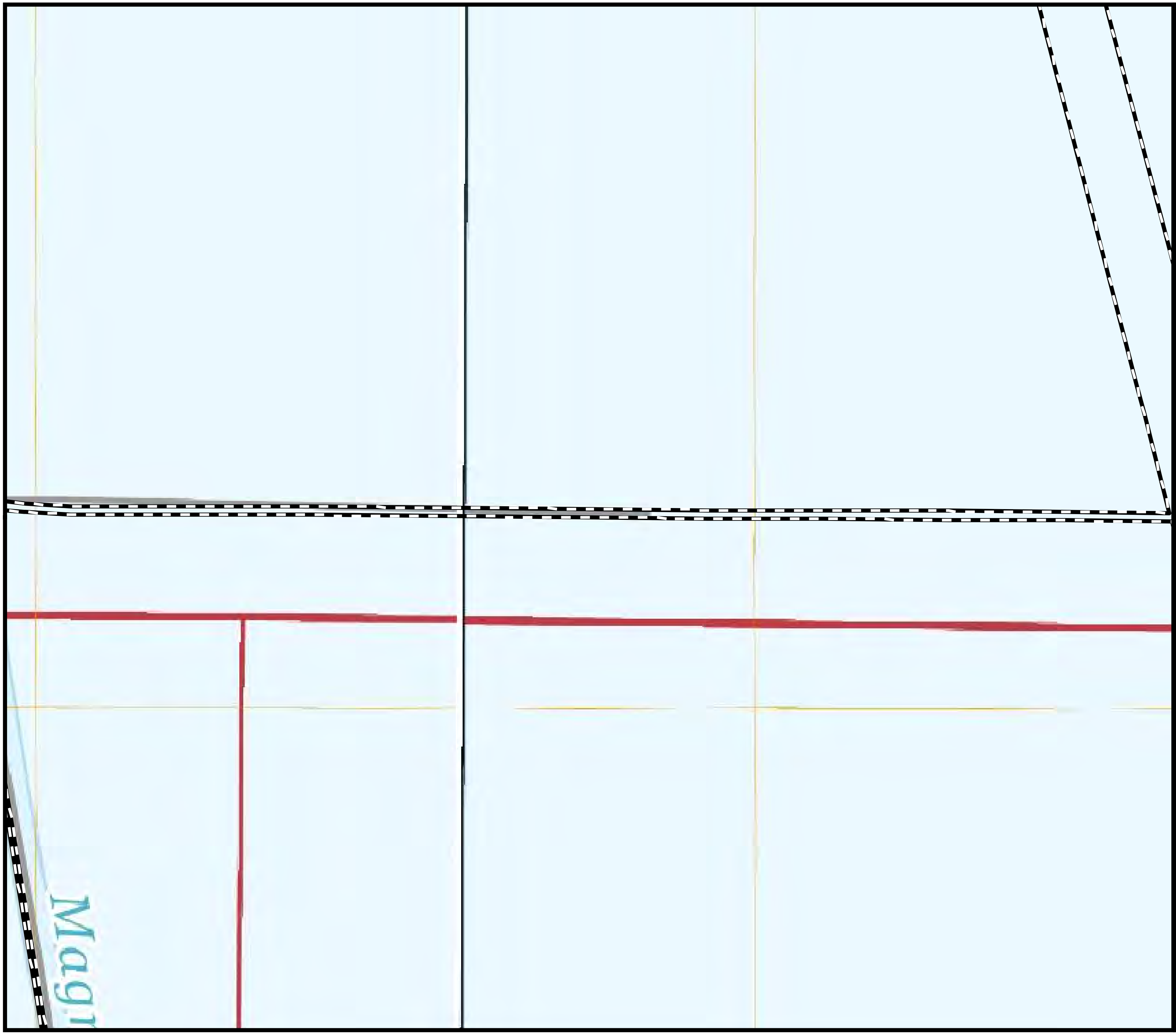


N

0 200 400 800 Feet

Legend

▭ Survey Area

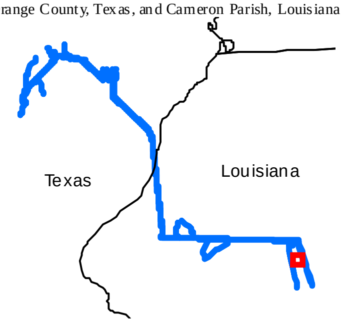
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 68 of 74)

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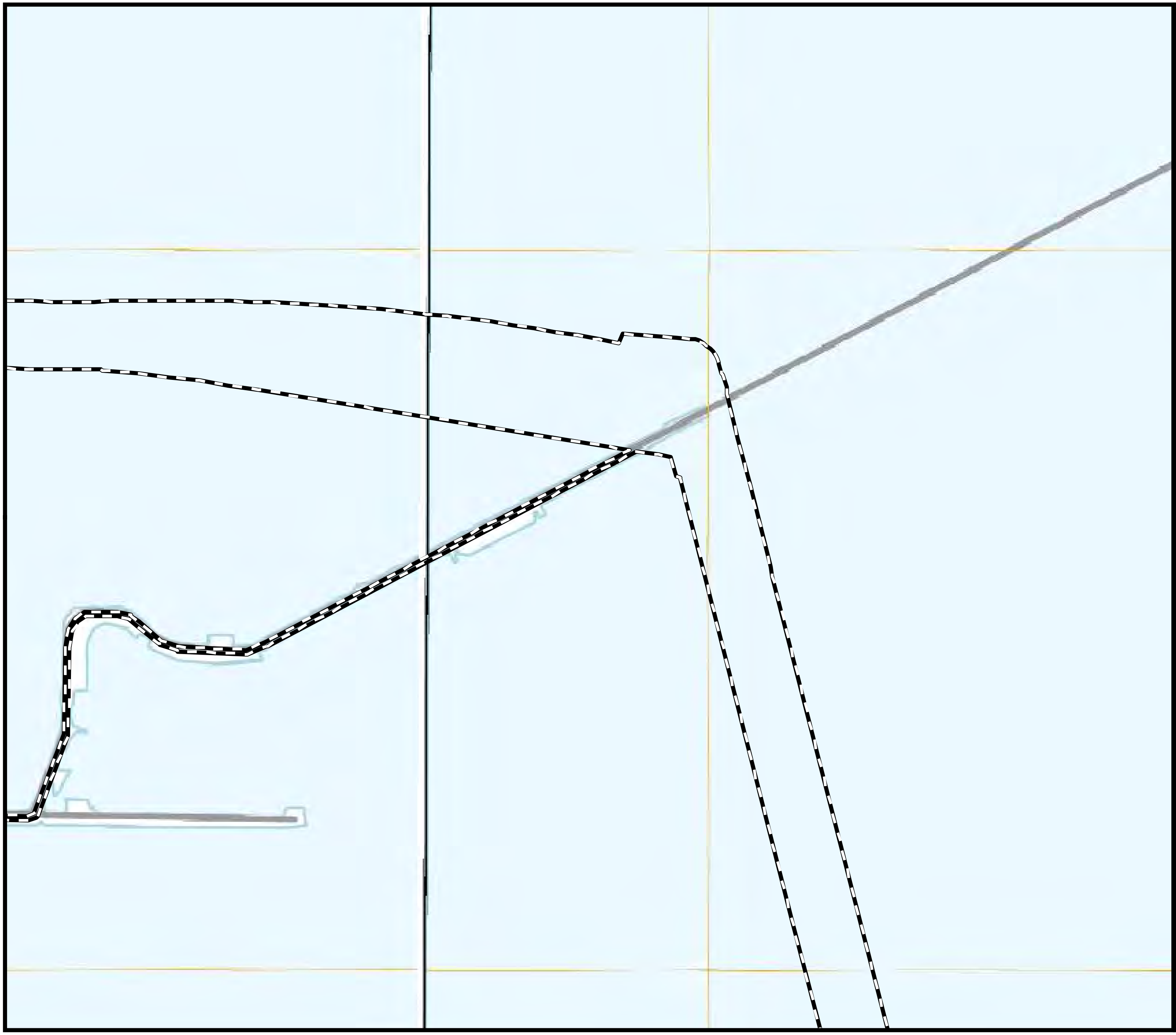


N

Legend

▨ Survey Area

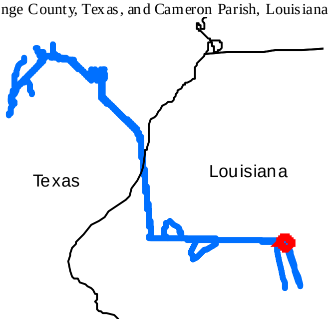
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 69 of 74)

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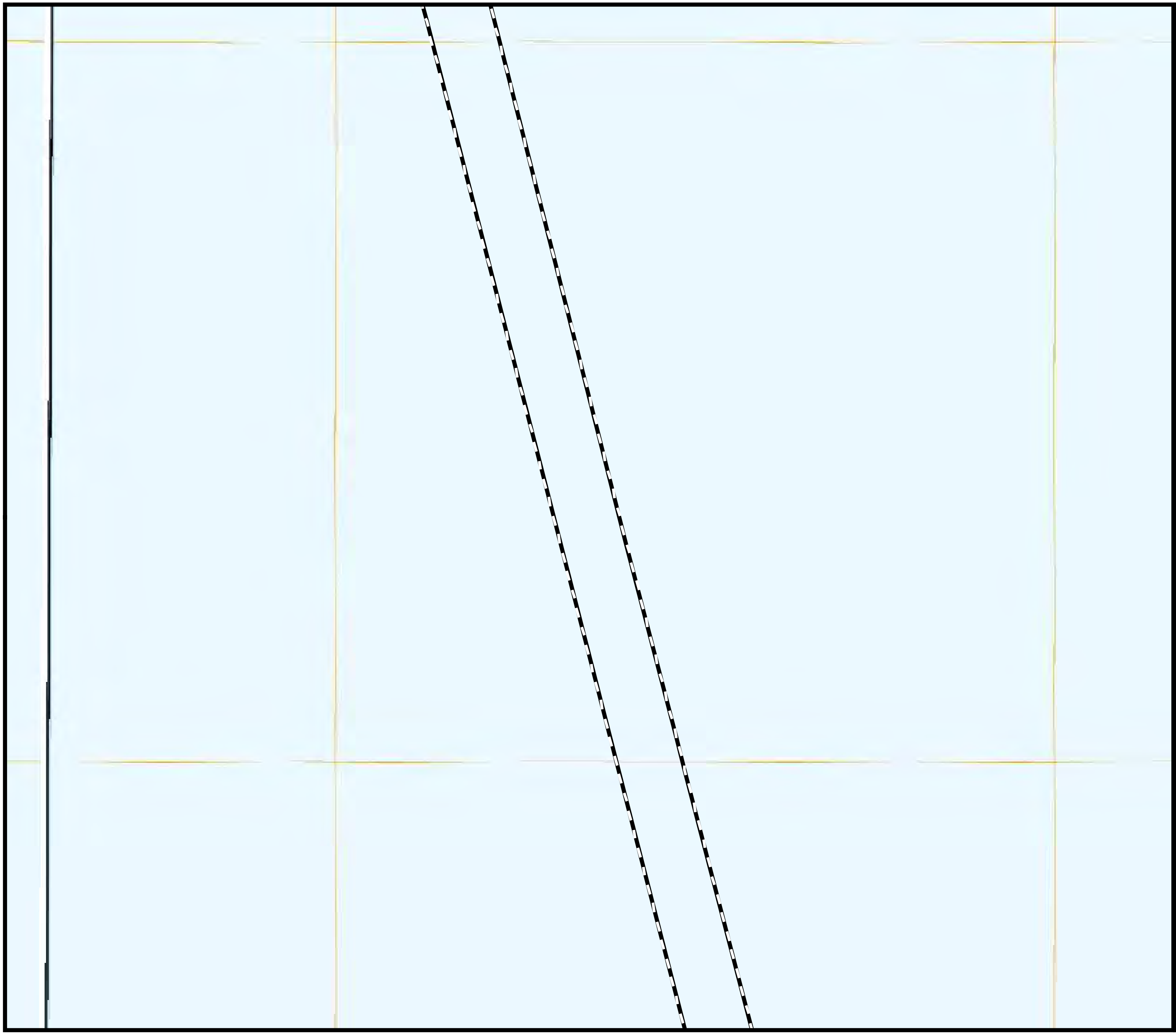
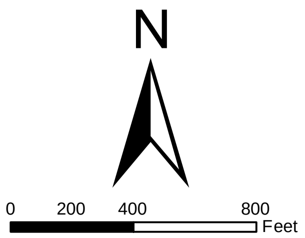




Legend

▭ Survey Area

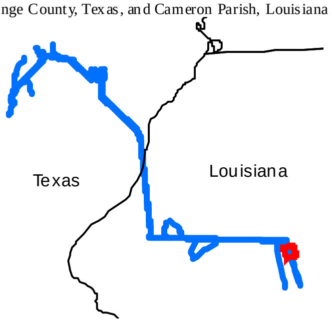
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 70 of 74)

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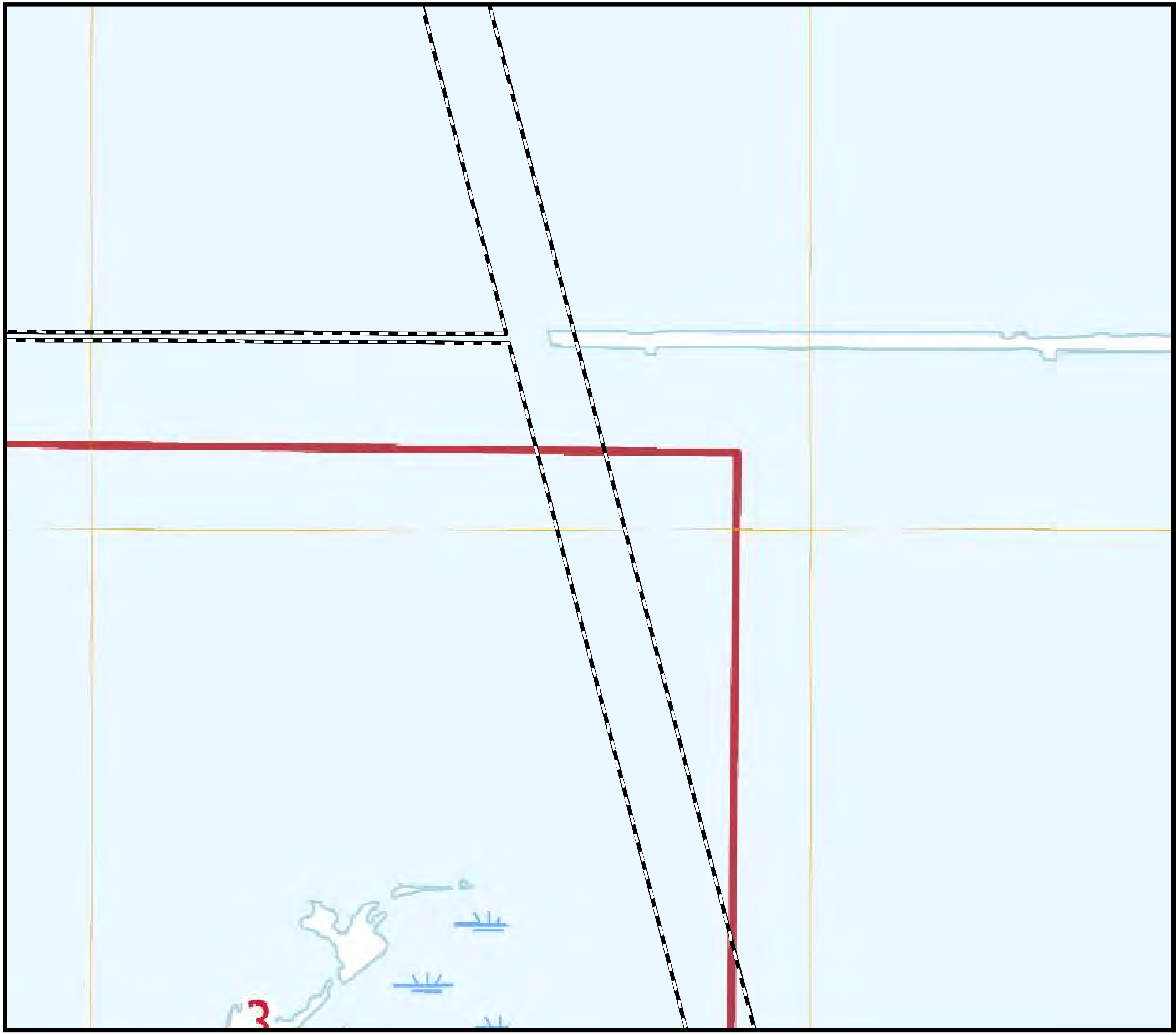


N

0 200 400 800
Feet

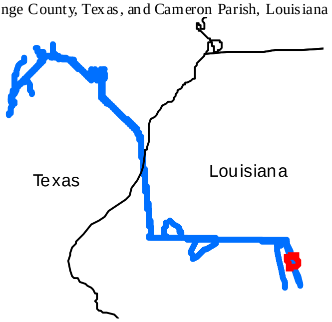
Legend

▨	Survey Area
🟦	100 Year Floodplain
●	Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

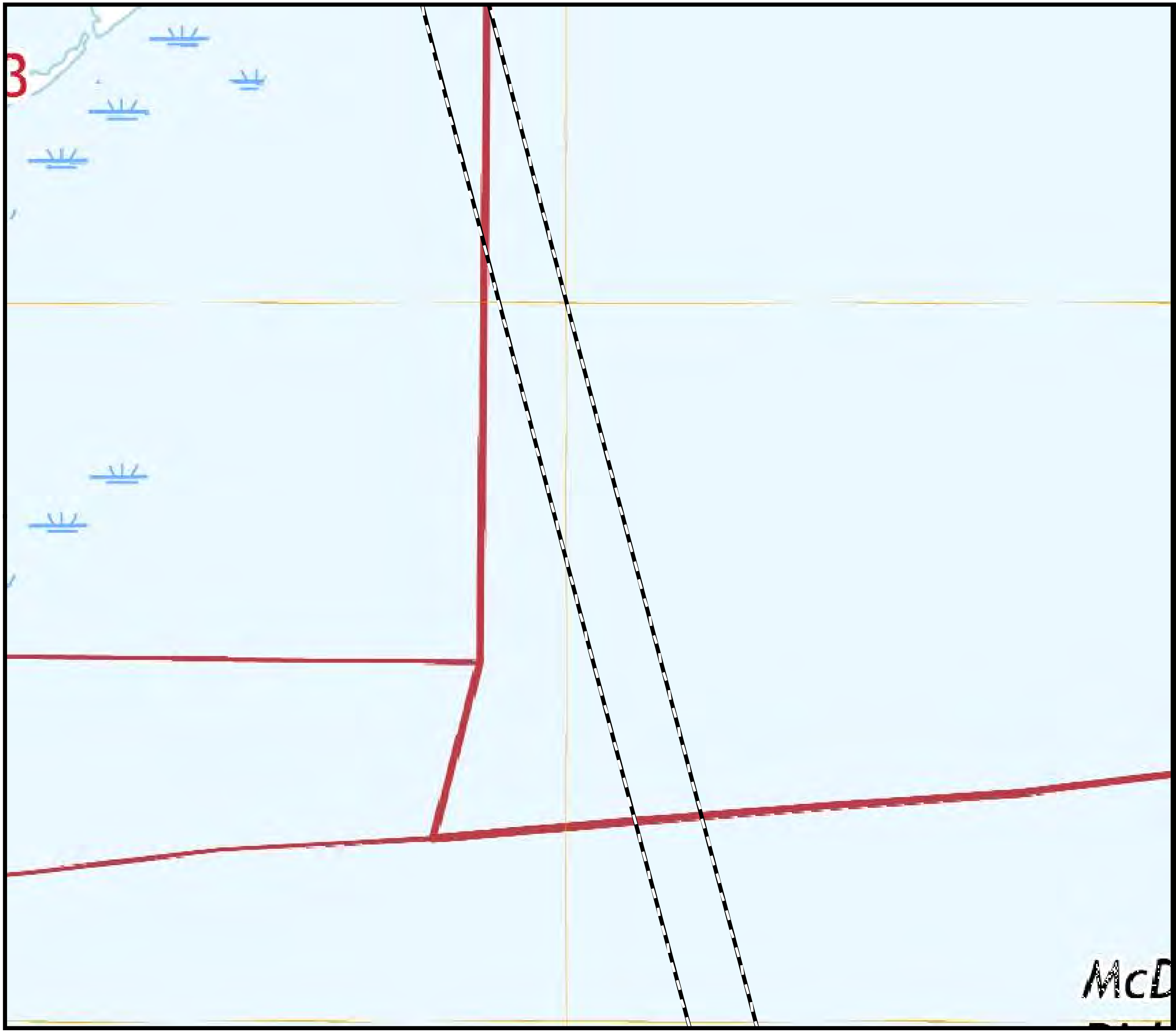
BESI
Benchmark
Ecological Services Inc.

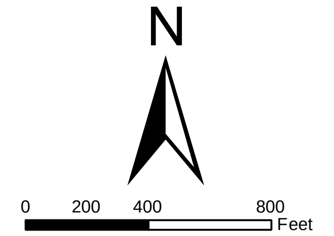
Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 71 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





Legend

▭ Survey Area

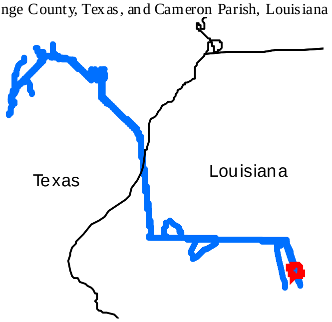
🟦 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

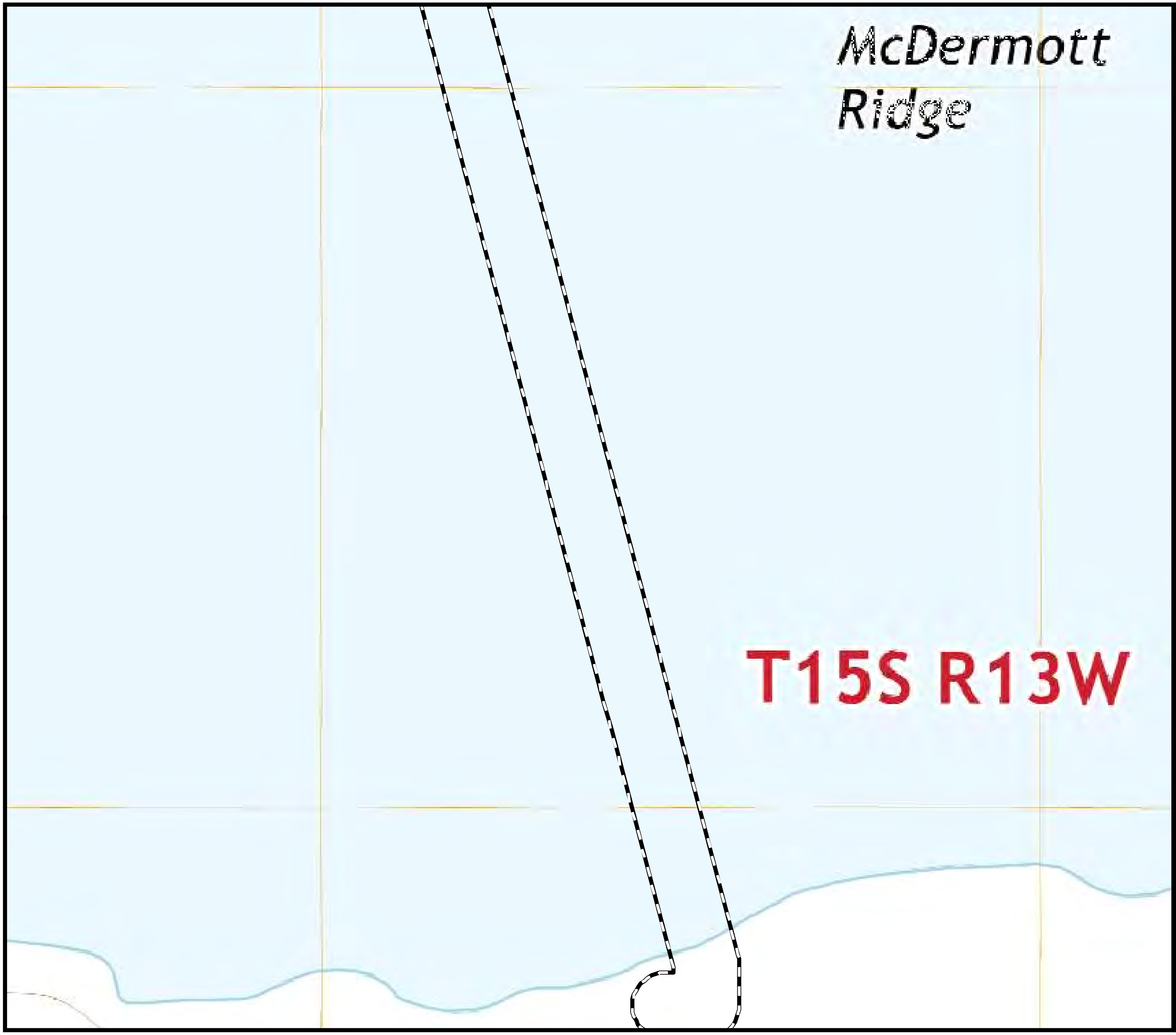
BESI Benchmark Ecological Services, Inc.

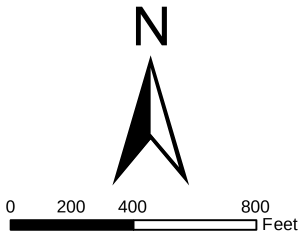
Project: 13004-014

Date: 7/1/2020

Figure 4
(Map 72 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd





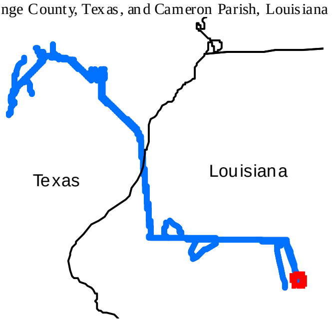
Legend

▭	Survey Area
🟦	100 Year Floodplain
●	Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 73 of 74)

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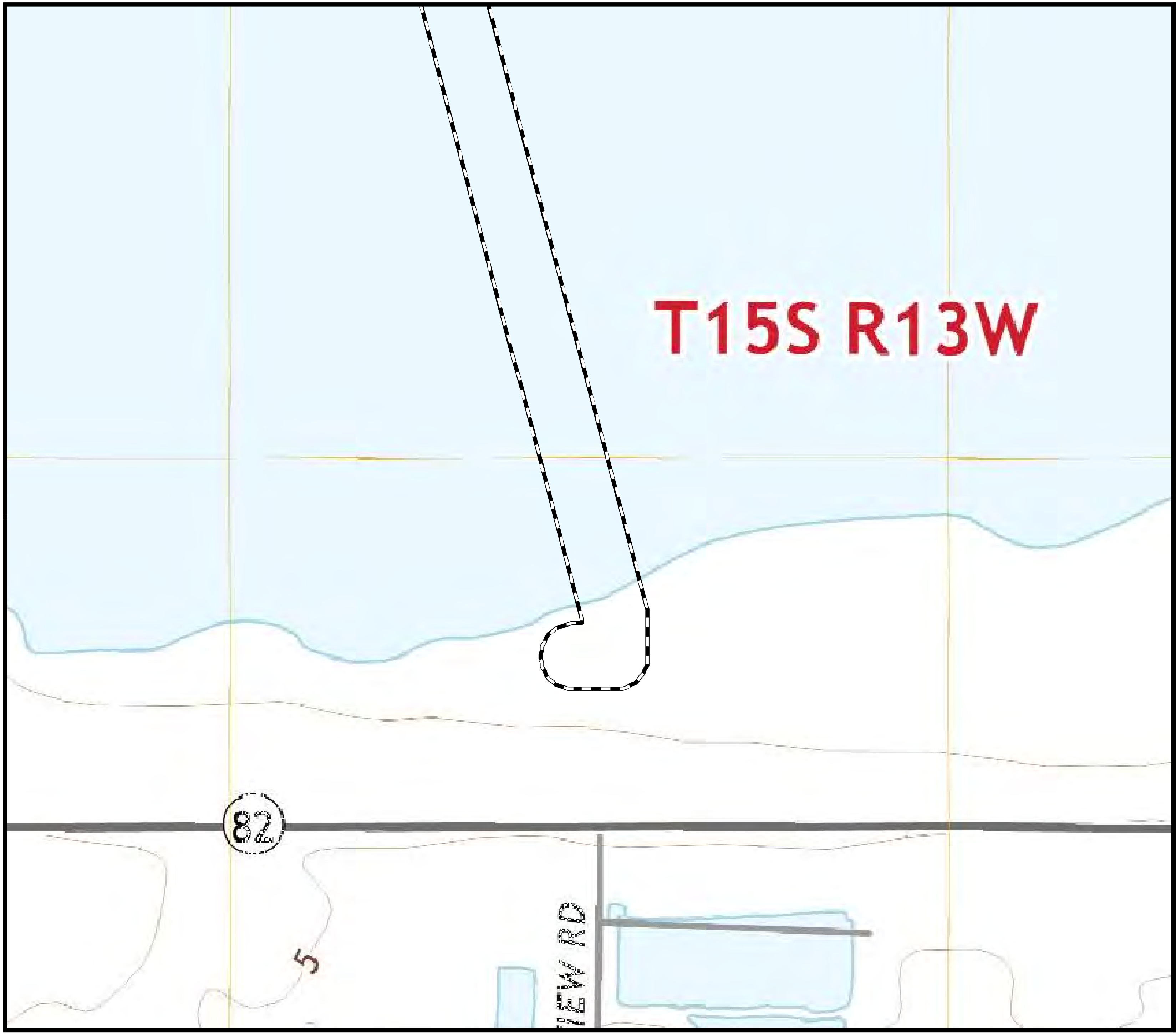


N

0 200 400 800
Feet

Legend

⬚ Survey Area

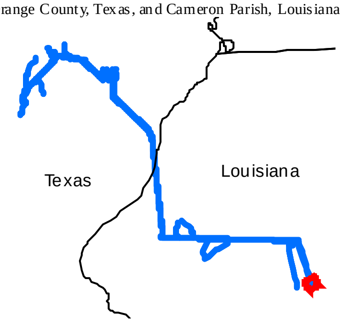
▨ 100 Year Floodplain

● Mile Marker

(Portions of the Survey Area are within the 100 year floodplain)

Notes

USGS Topographic Map and FEMA Floodplain Data
Orange County, Texas, and Cameron Parish, Louisiana



USGS Topographic Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 7/1/2020

Figure 4
(Map 74 of 74)

M:\13004\014\Arc\Figure4_Topo.mxd

Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

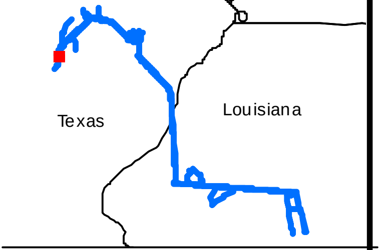
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 1 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

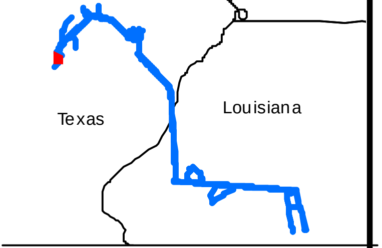
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 2 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

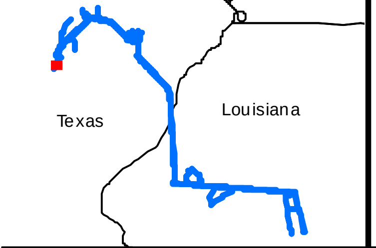
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 3 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

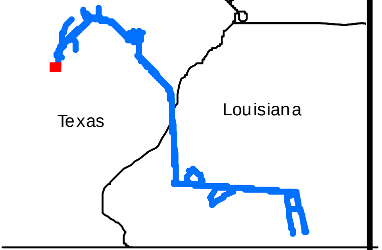
🔴	Upland
🔵	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
🟥	PFO
🟨	PSS
🟦	PUB
🟦	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

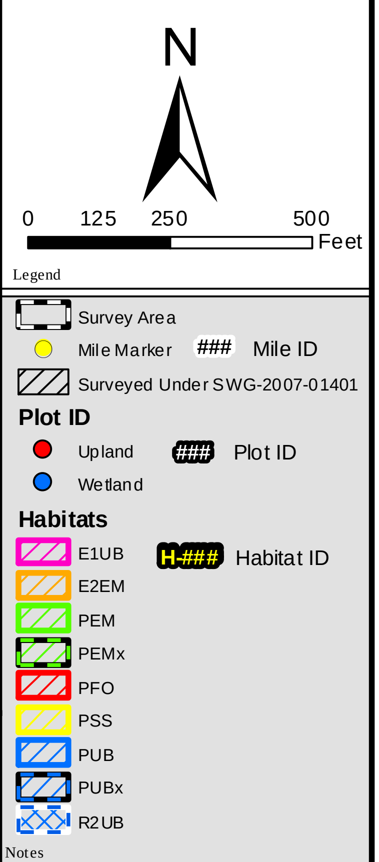
BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

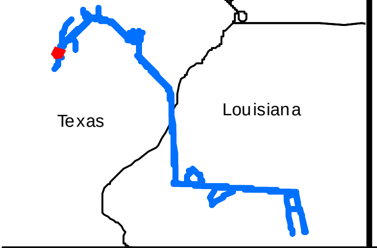
Figure 5
(Map 4 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd



Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

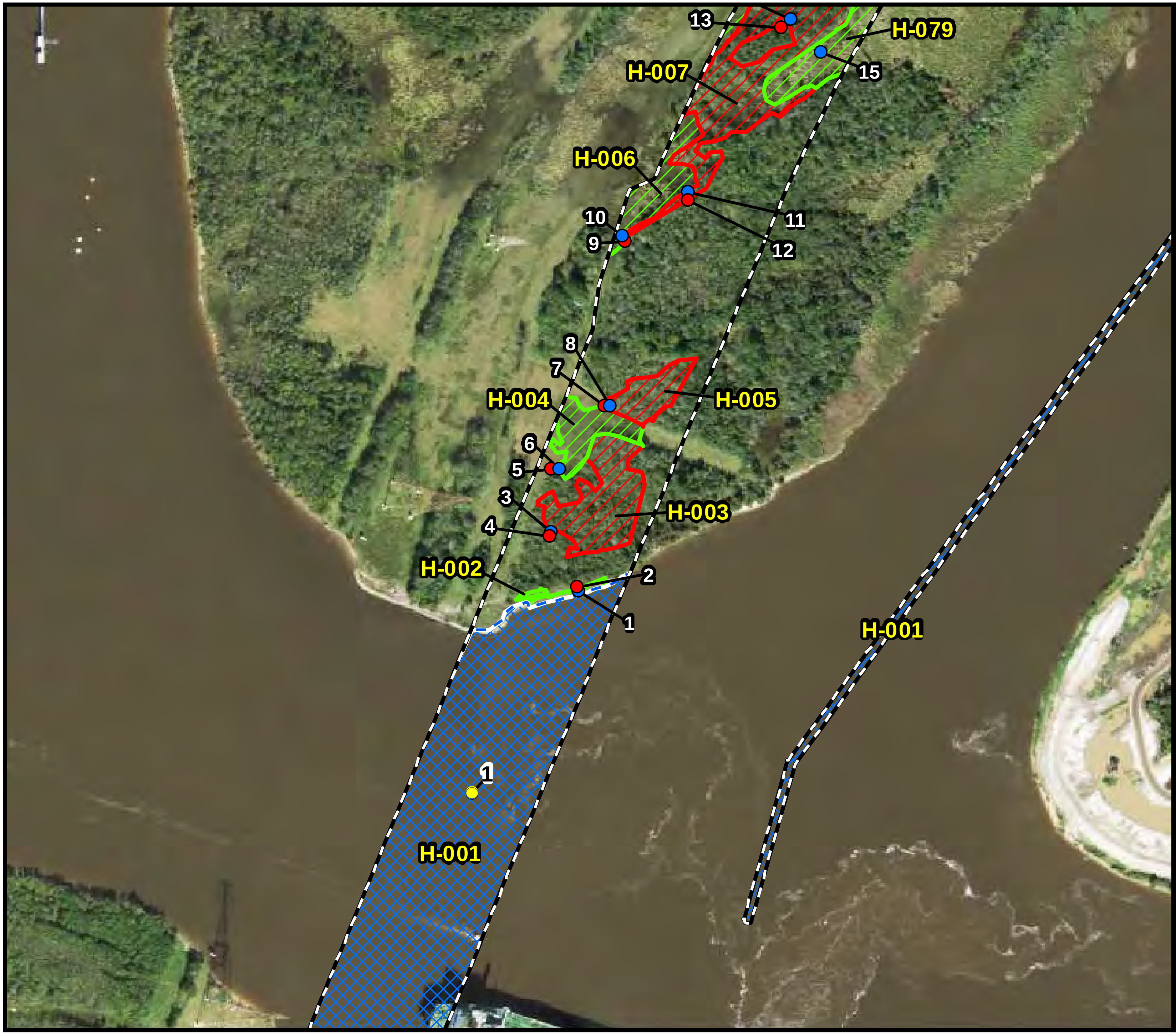
BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 5 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd



N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

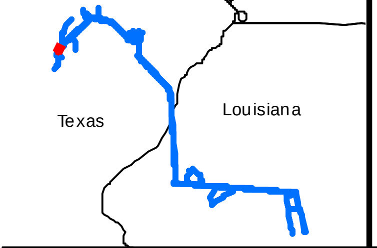
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 6 of 151)

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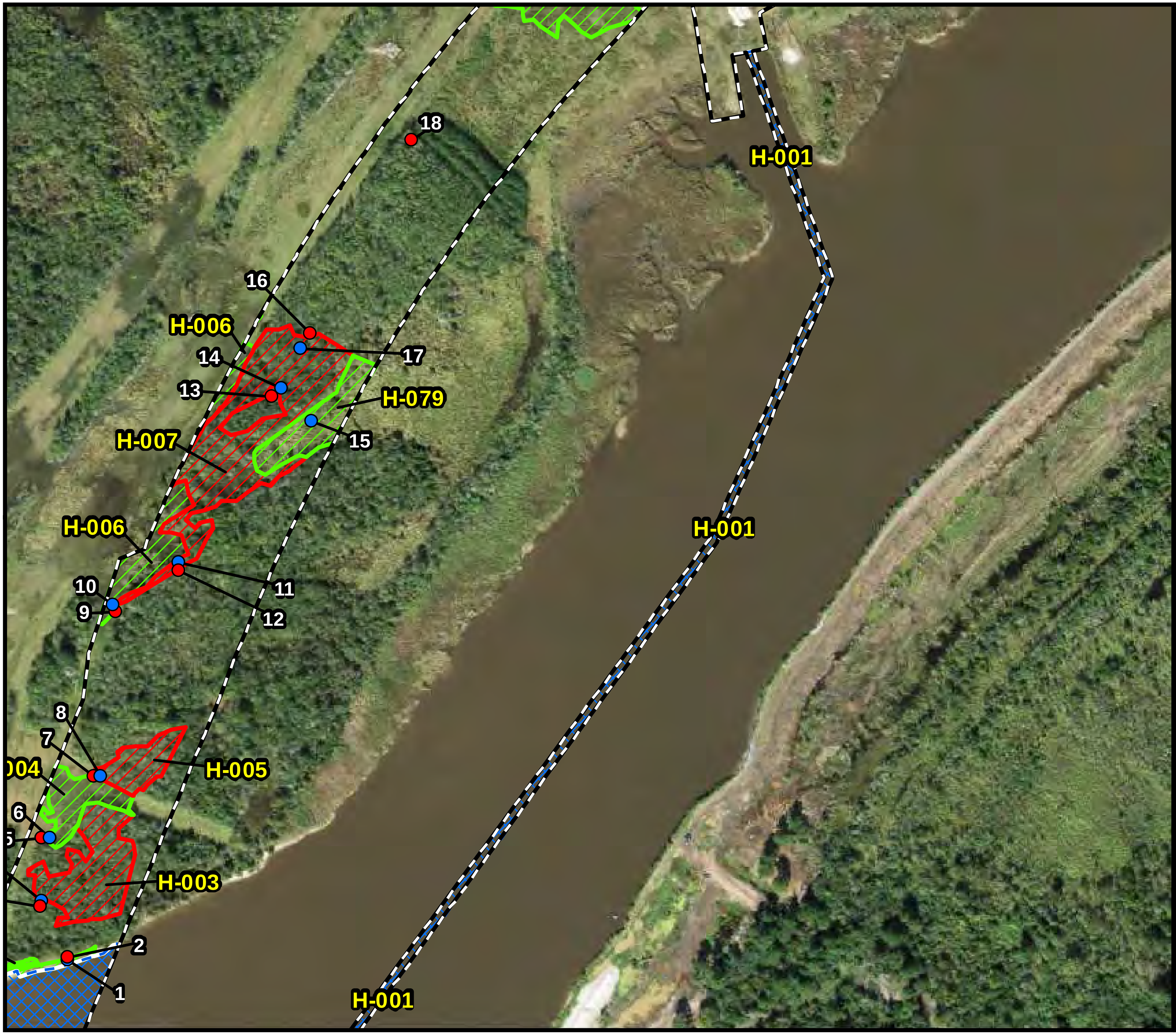


Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

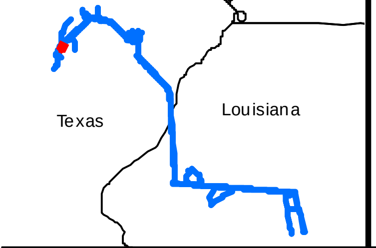
- 🔴 Upland
- 🔵 Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 7 of 151)

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Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 8 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

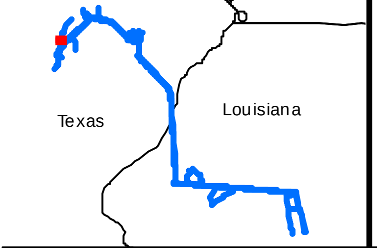
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 9 of 151)

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

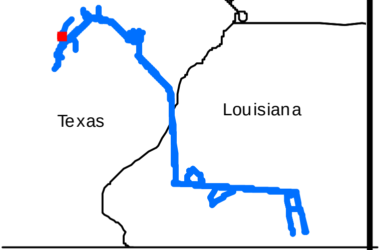
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB **H-###** Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 10 of 151)

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Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

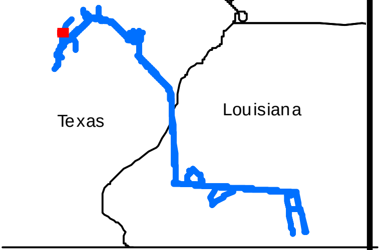
●	Upland
●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 11 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

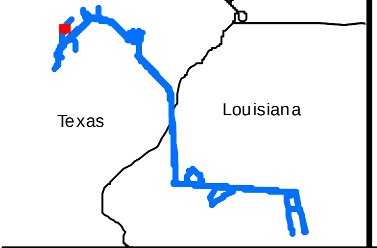
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

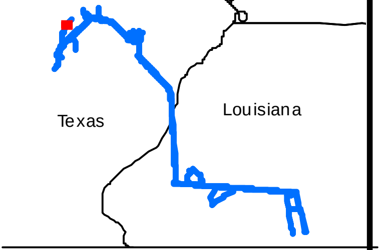
Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 12 of 151)

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 13 of 151)

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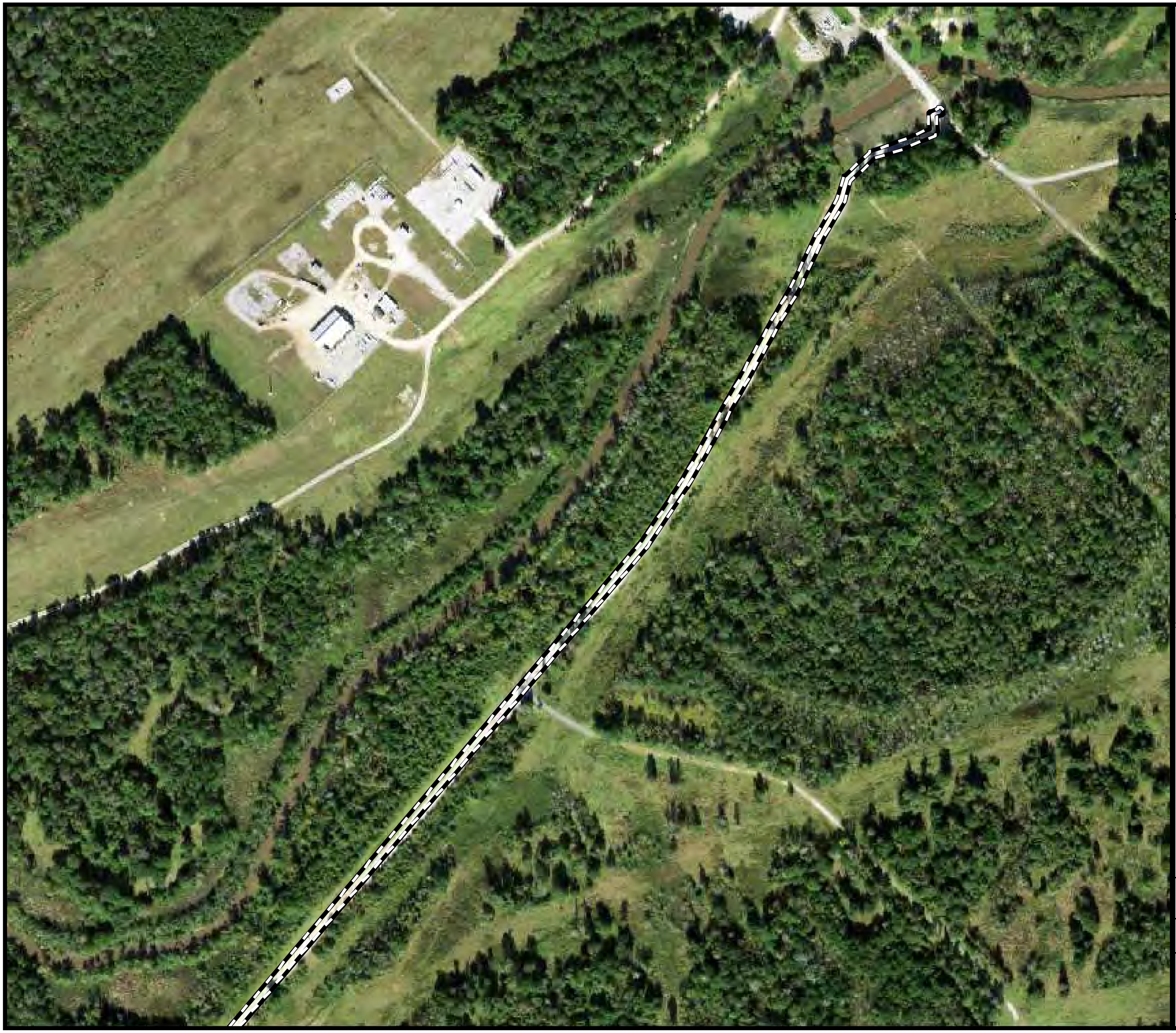
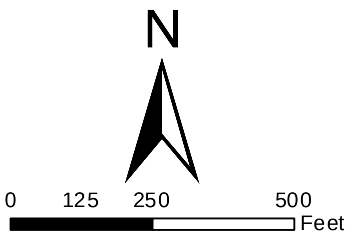




Legend

- ▨ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

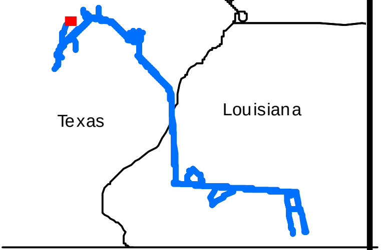
- 🔴 Upland
- 🔵 Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 14 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- Survey Area
- 🟡 Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

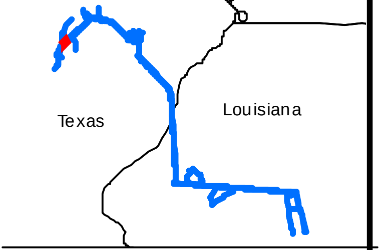
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 15 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

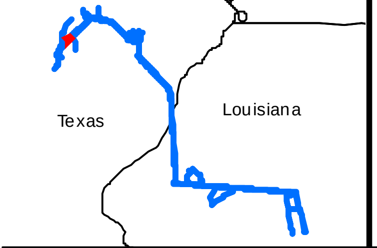
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 16 of 151)

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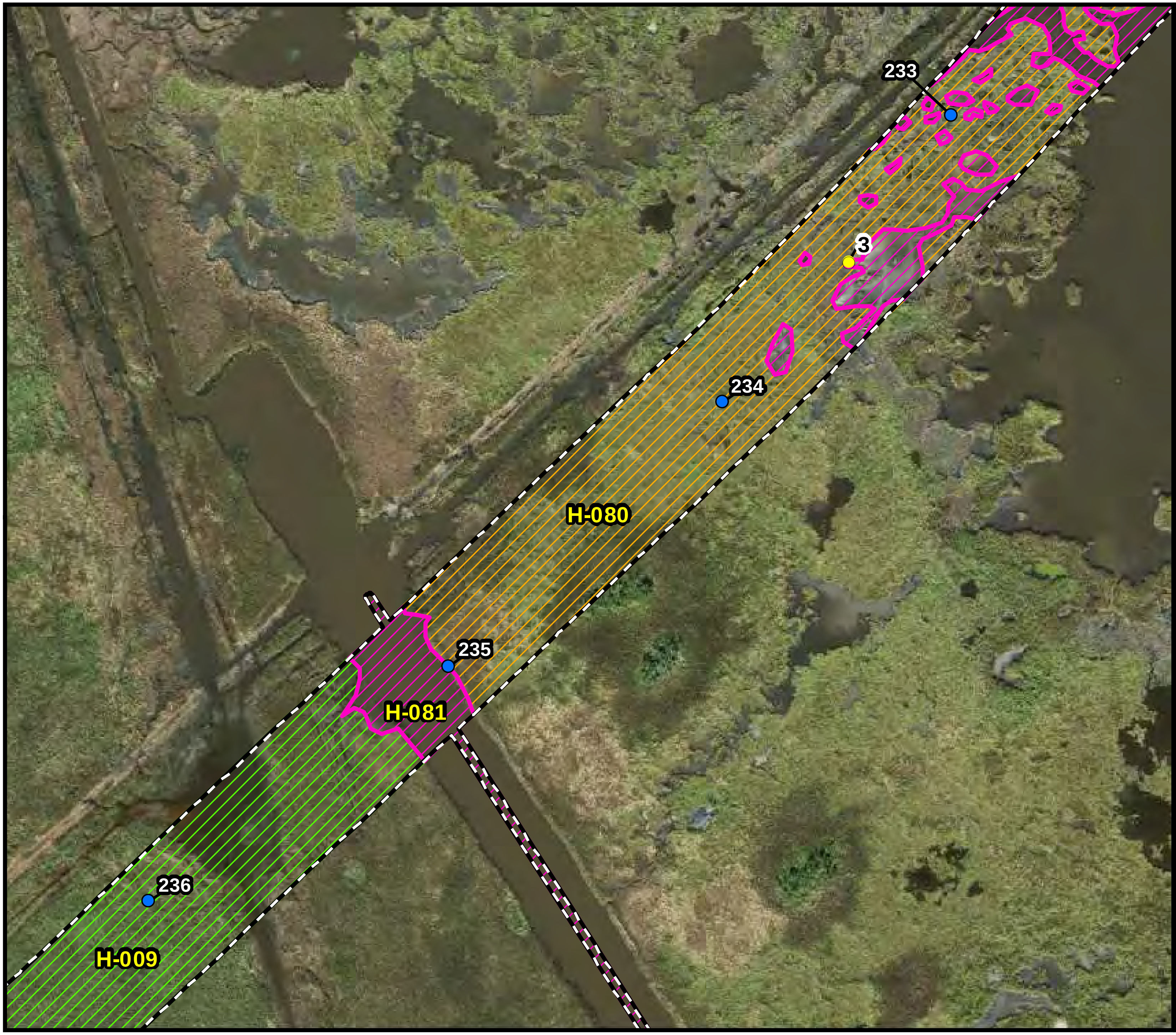
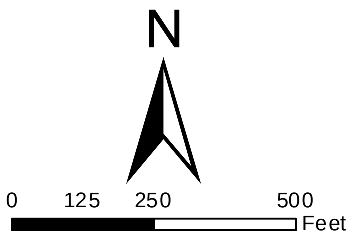




Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

🔴 Upland ### Plot ID

🔵 Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

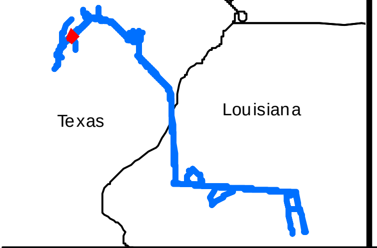
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 17 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker   ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

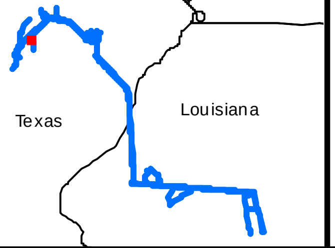
- ● Upland   ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB   H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

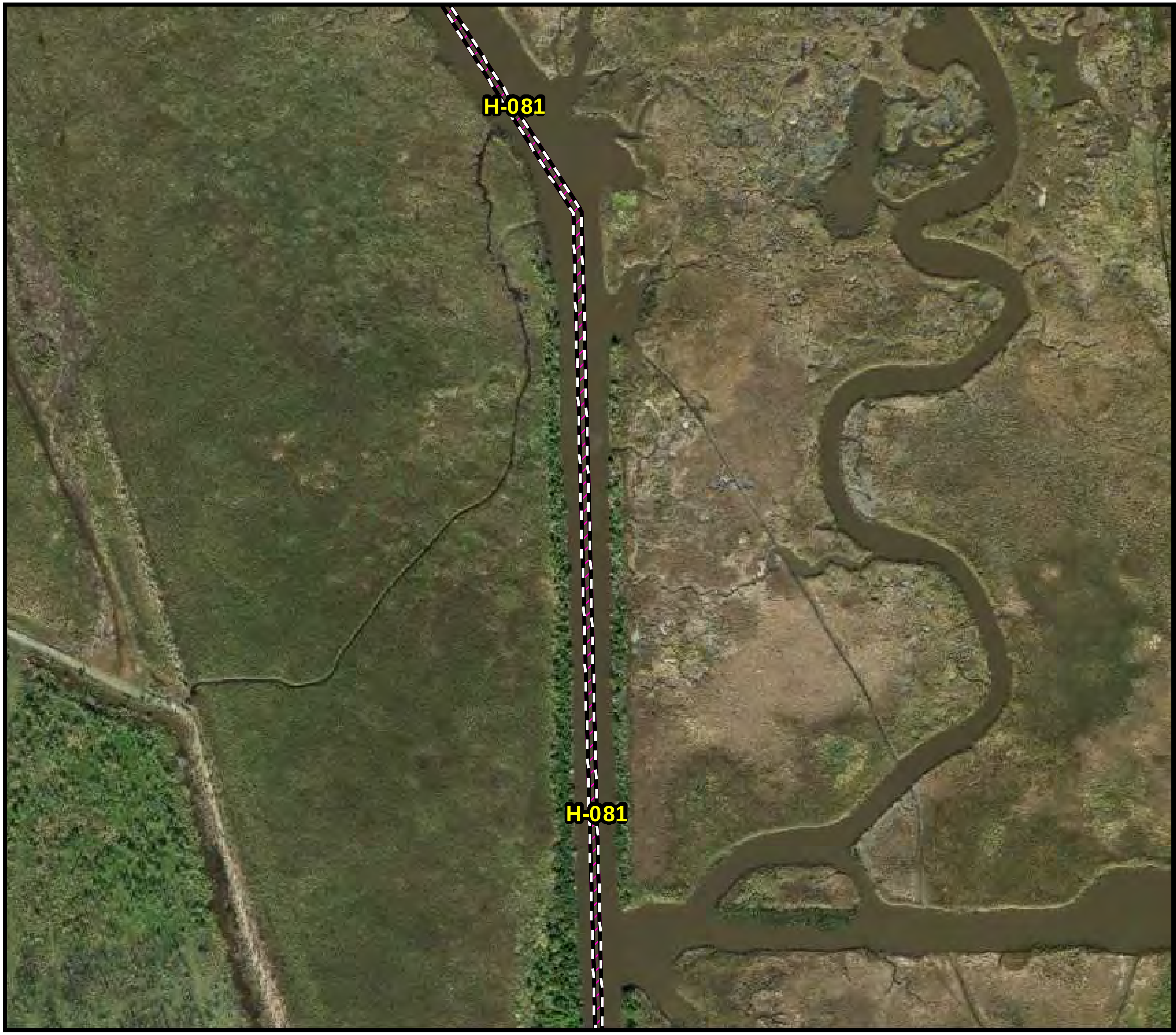
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 18 of 151)



Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

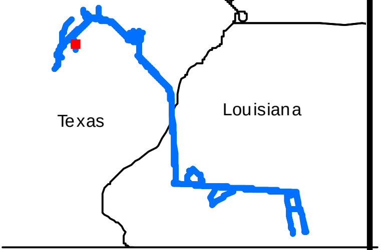
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 19 of 151)

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

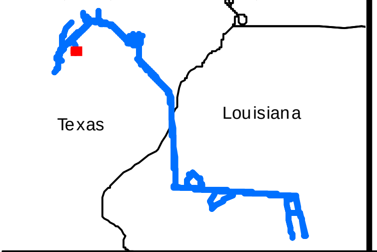
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

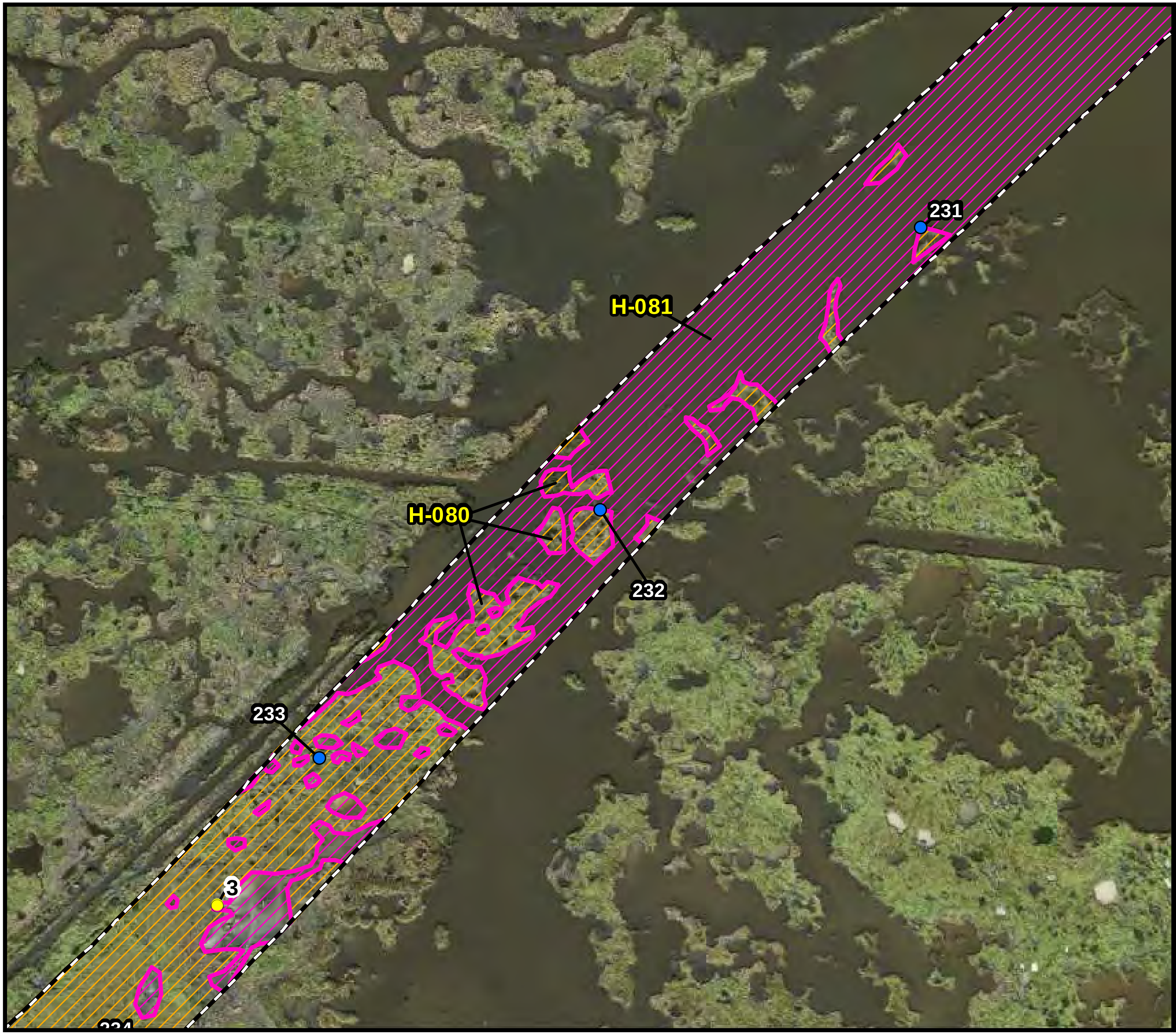
Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 20 of 151)



N

0 125 250 500
Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

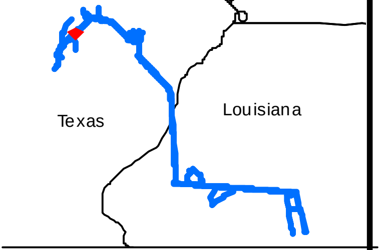
🟥	Upland
🟦	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 21 of 151)

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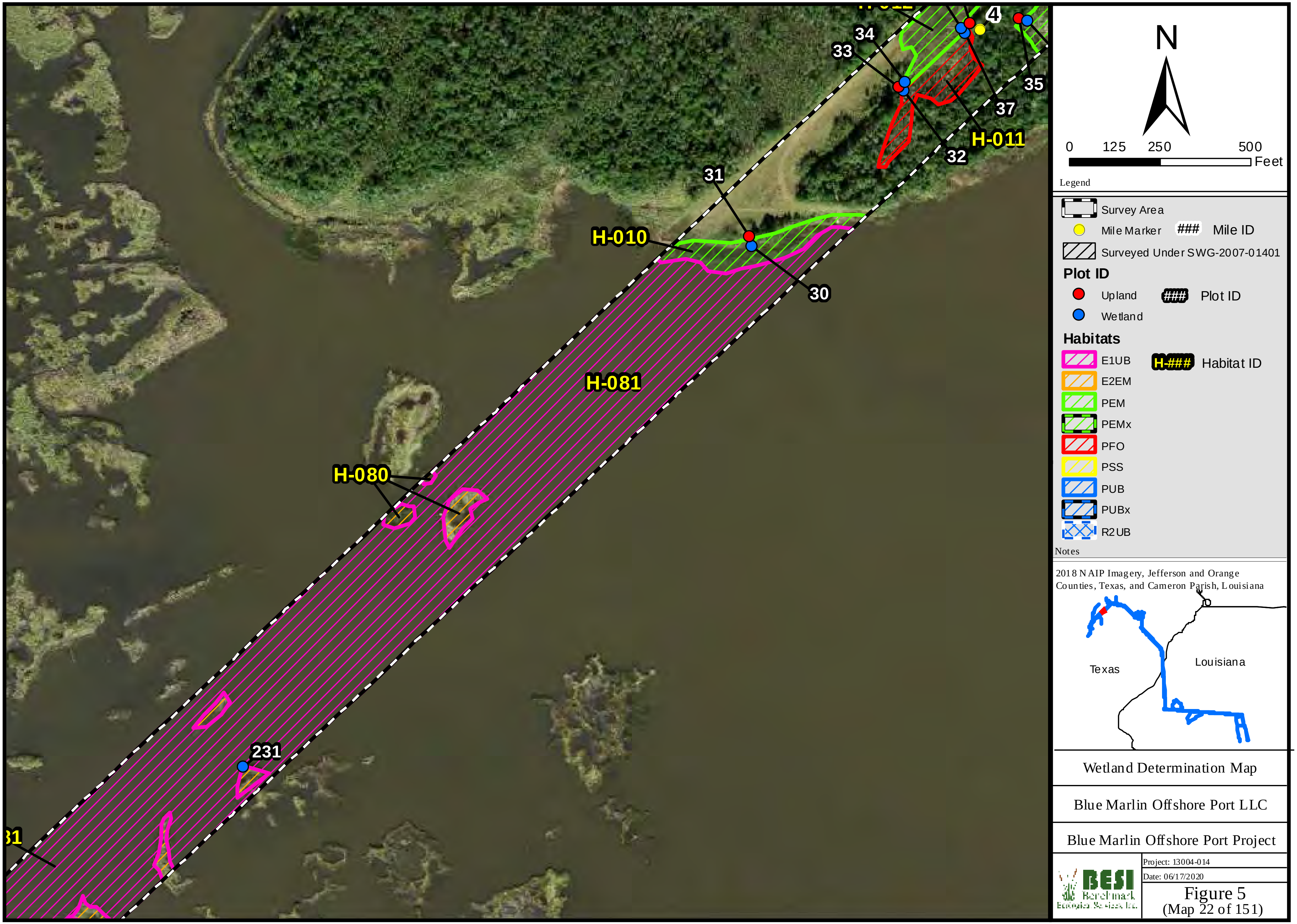

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 22 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

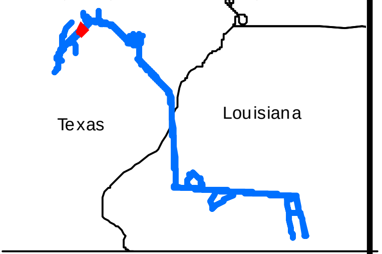
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 23 of 151)

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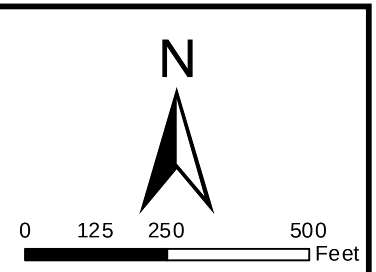


Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

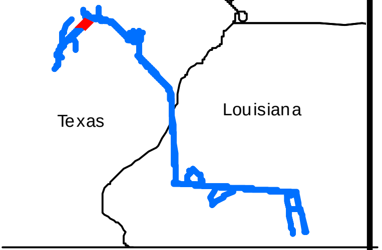
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 24 of 151)

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Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

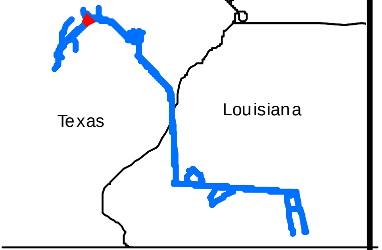
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 25 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

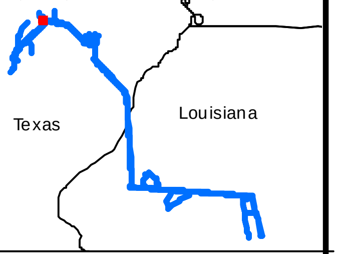
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 26 of 151)

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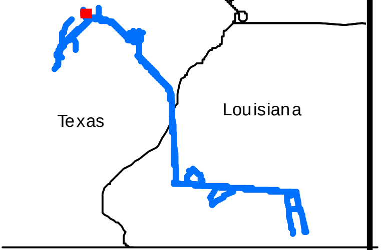
Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 27 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

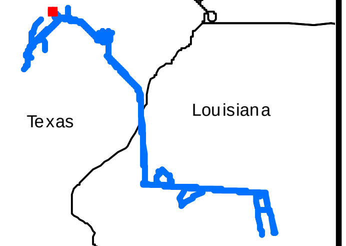
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

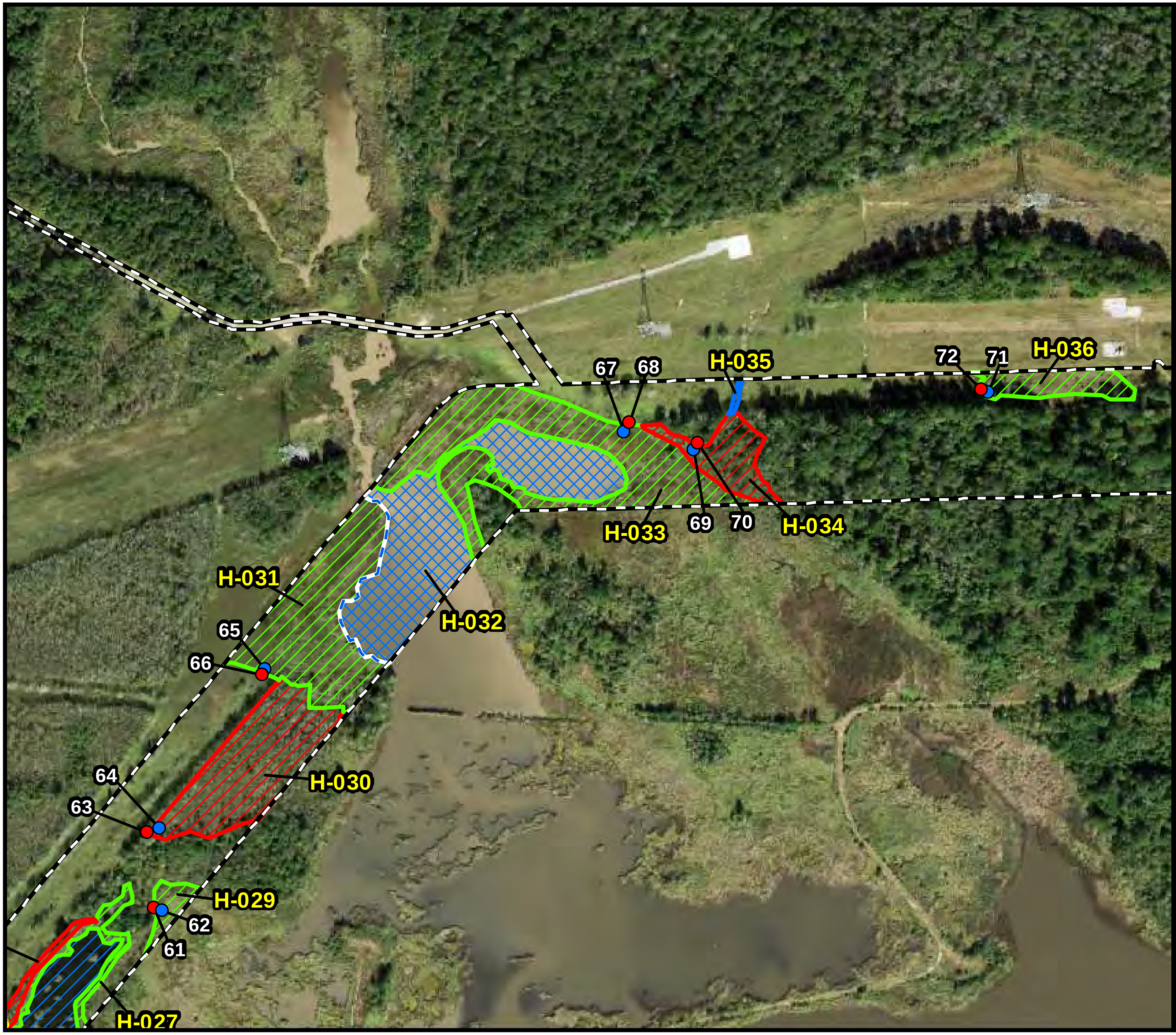
Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 28 of 151)



N

0 125 250 500 Feet

Legend

- Survey Area
- 🟡 Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

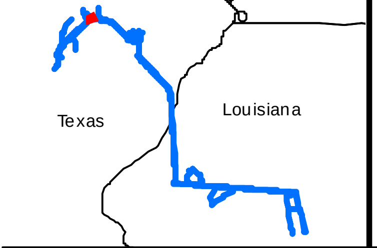
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 29 of 151)

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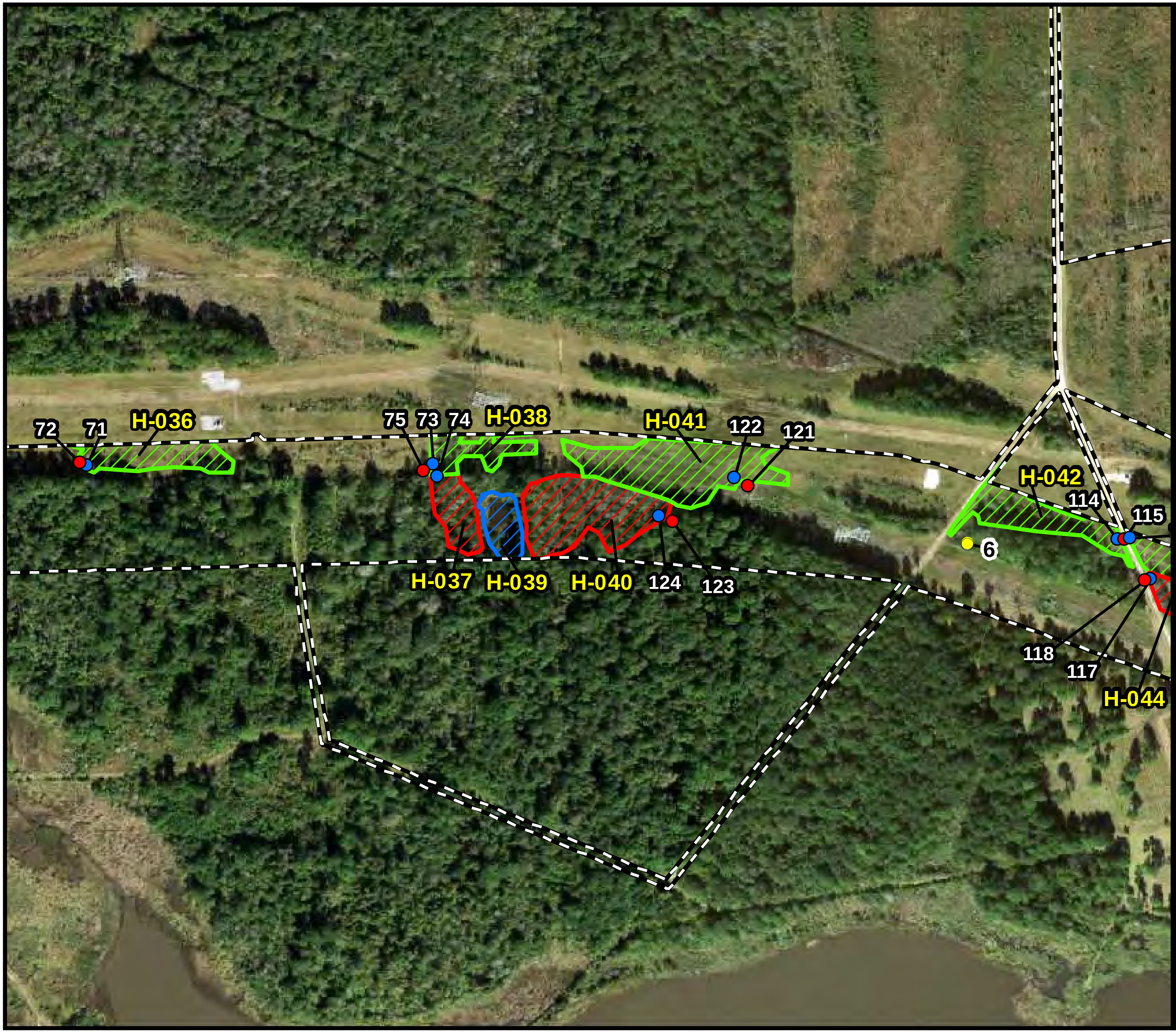


N

0 125 250 500 Feet

Legend

Survey Area

🟡 Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

🔴 Upland ### Plot ID

🔵 Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

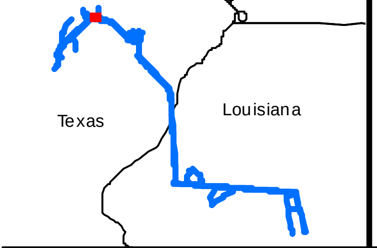
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 30 of 151)

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N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

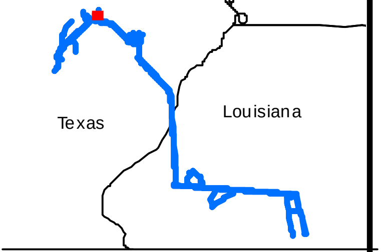
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 31 of 151)

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N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

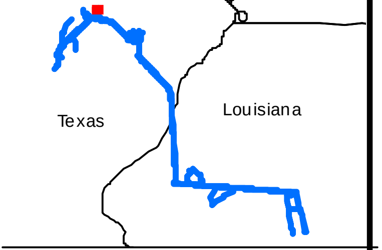
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 32 of 151)

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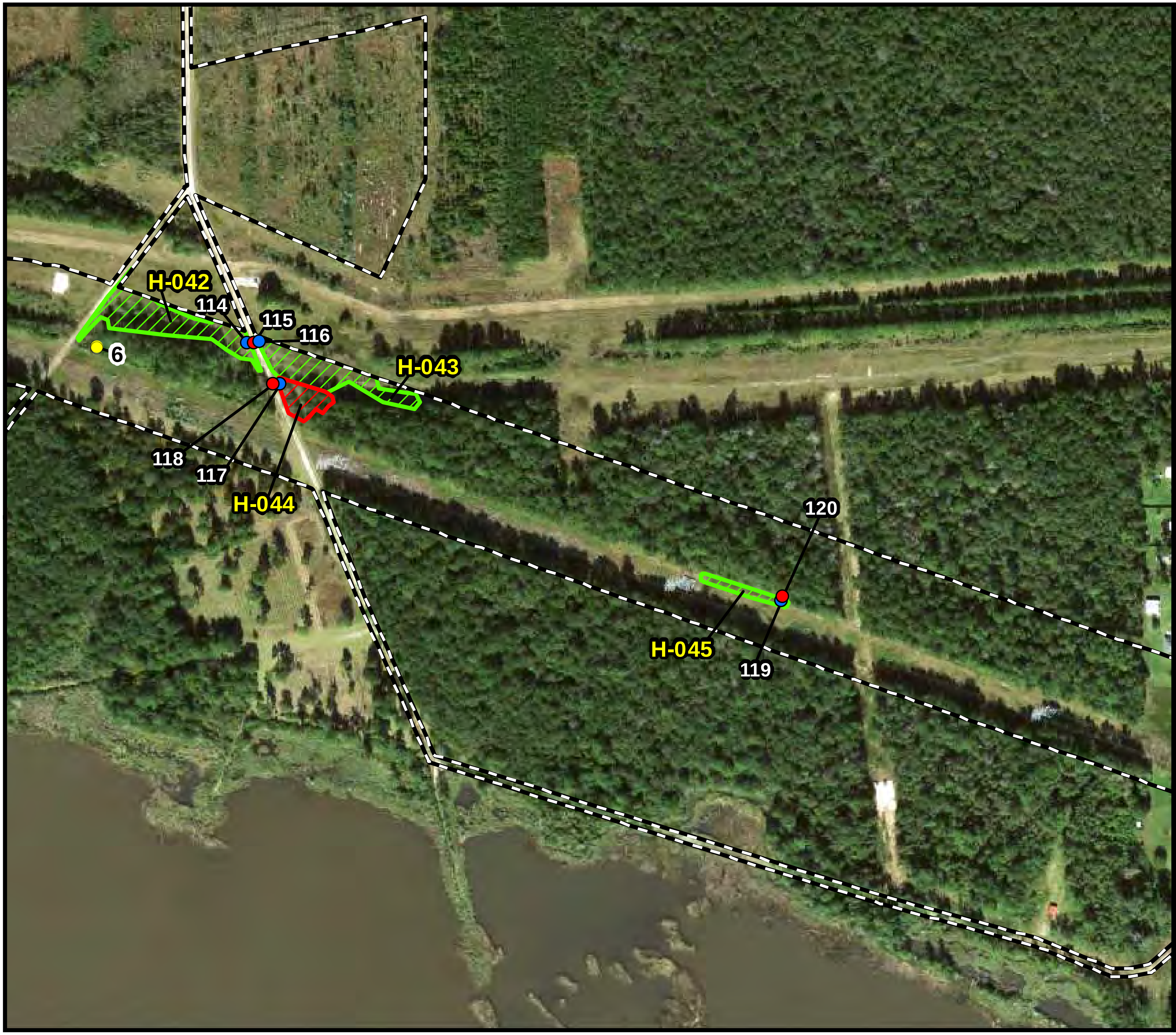


N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker   ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

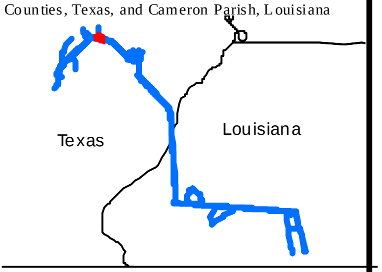
- ● Upland   ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB   H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 33 of 151)

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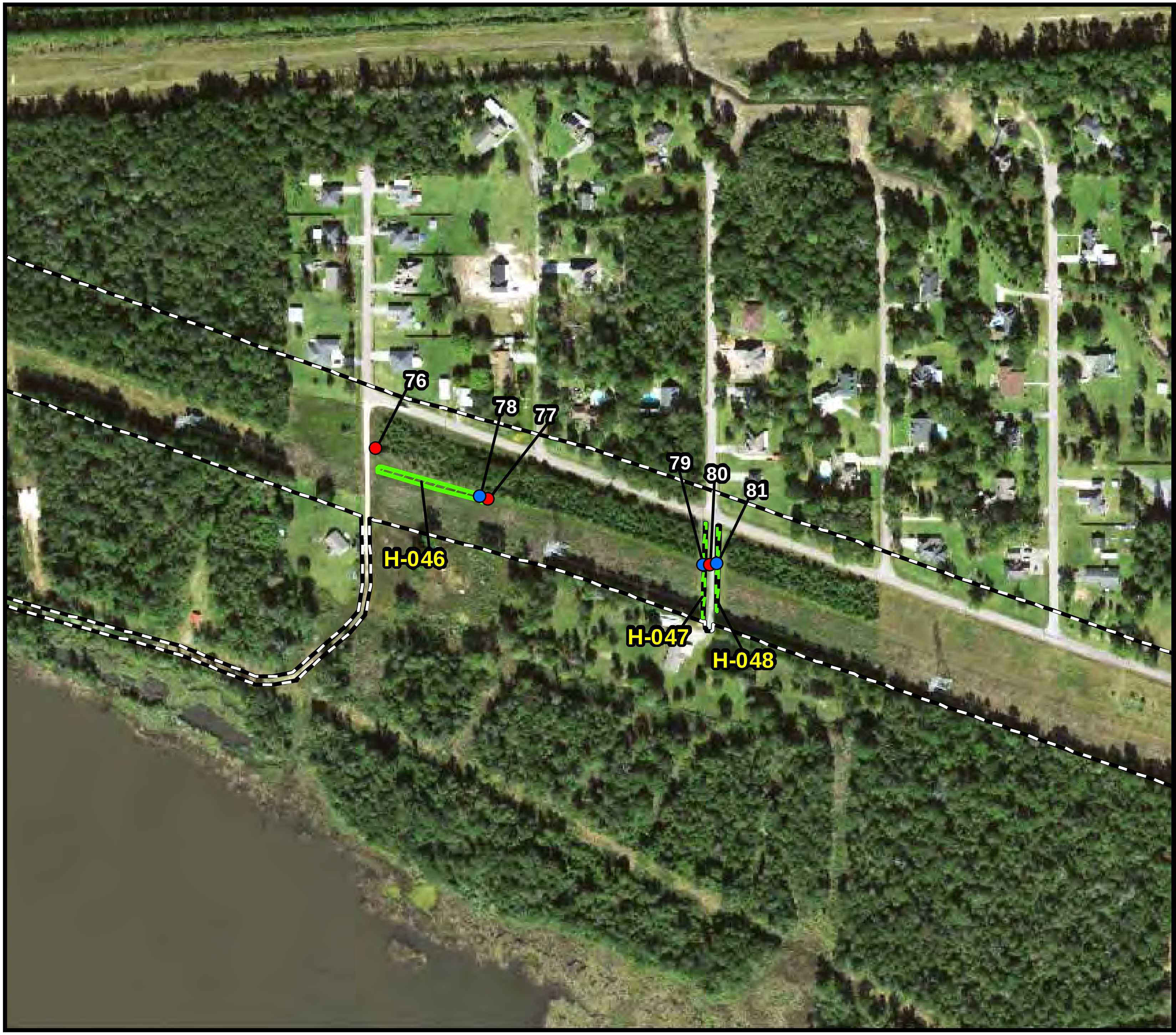


N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

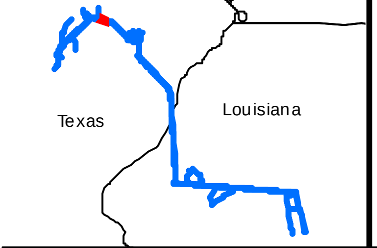
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 34 of 151)

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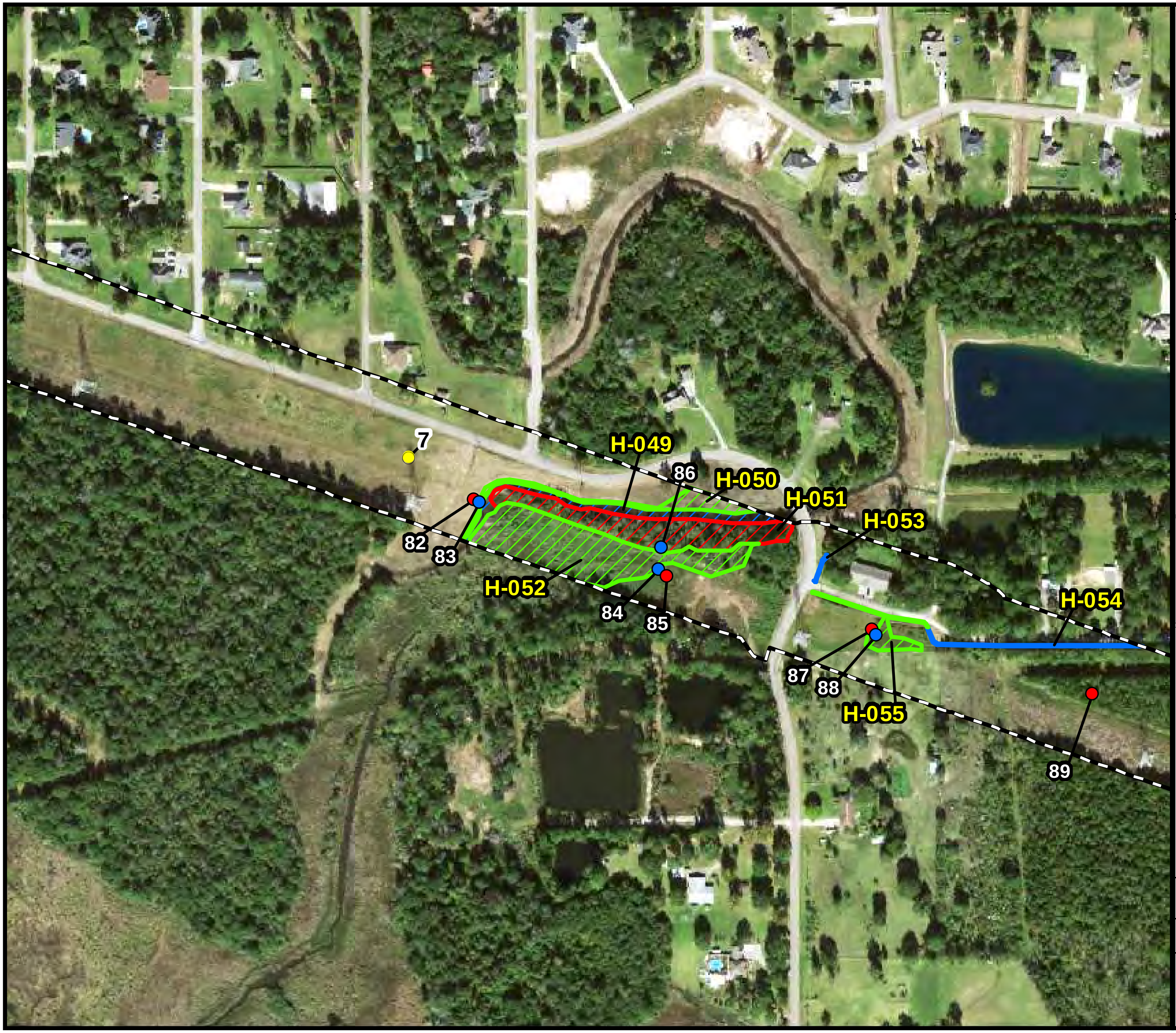
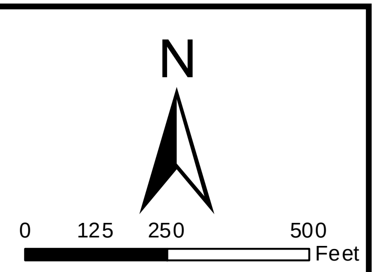




Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

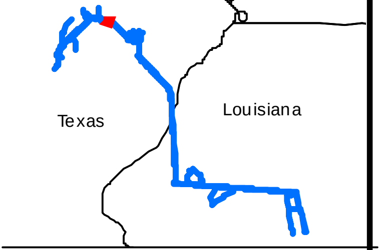
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 35 of 151)

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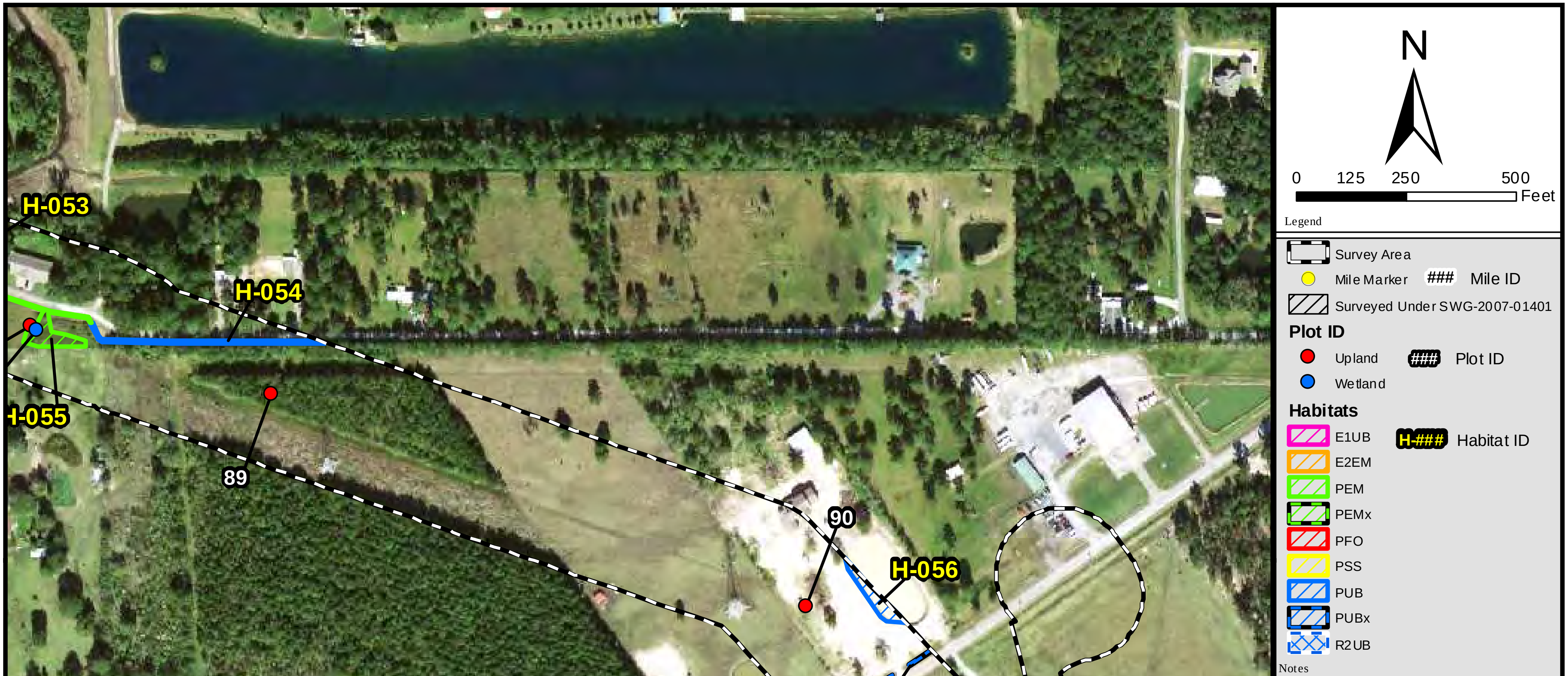
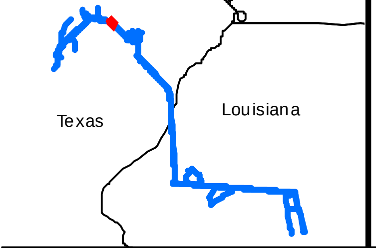


Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 36 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

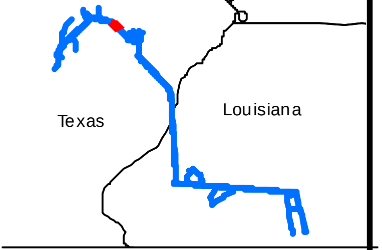
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 37 of 151)

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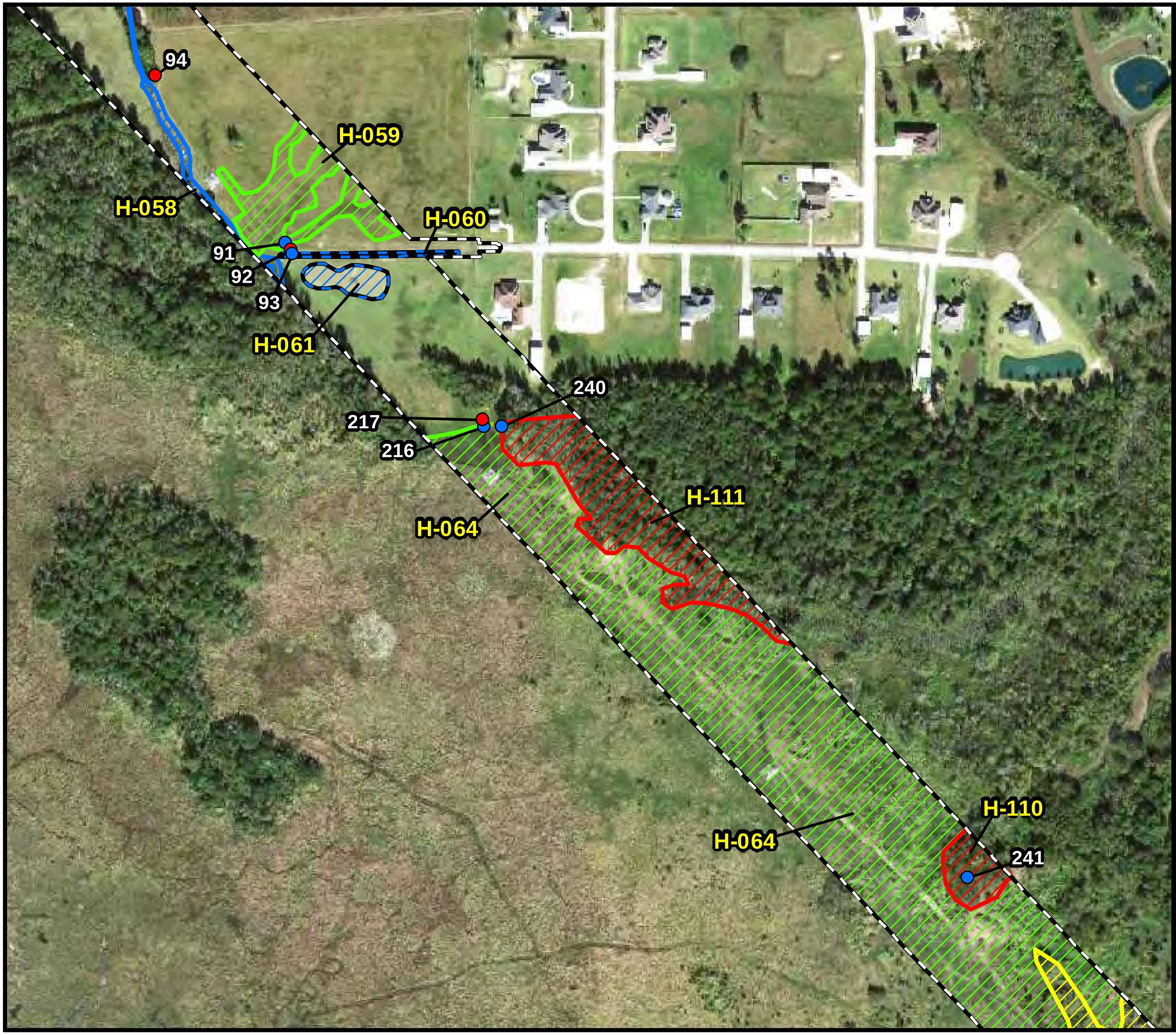


Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

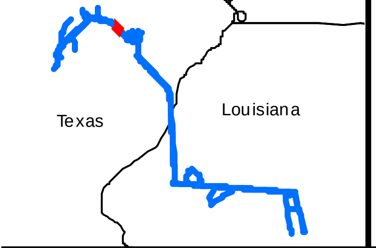
- 🔴 Upland
- 🔵 Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5

(Map 38 of 151)

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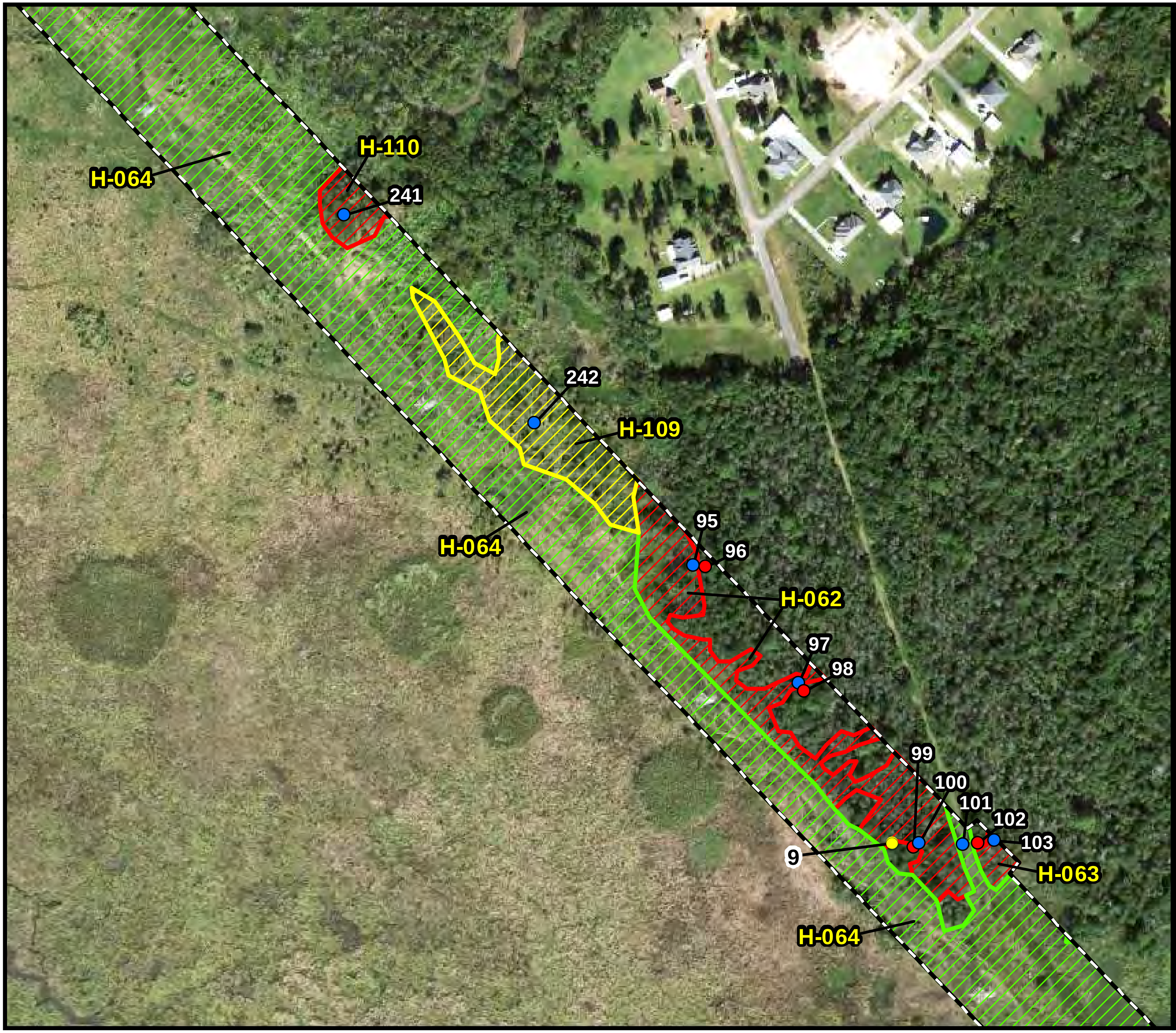
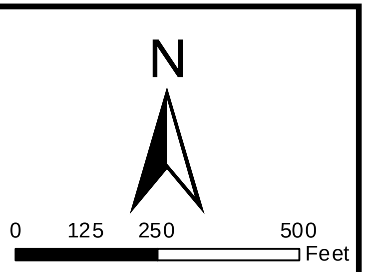




Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

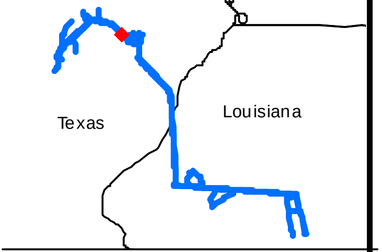
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 39 of 151)

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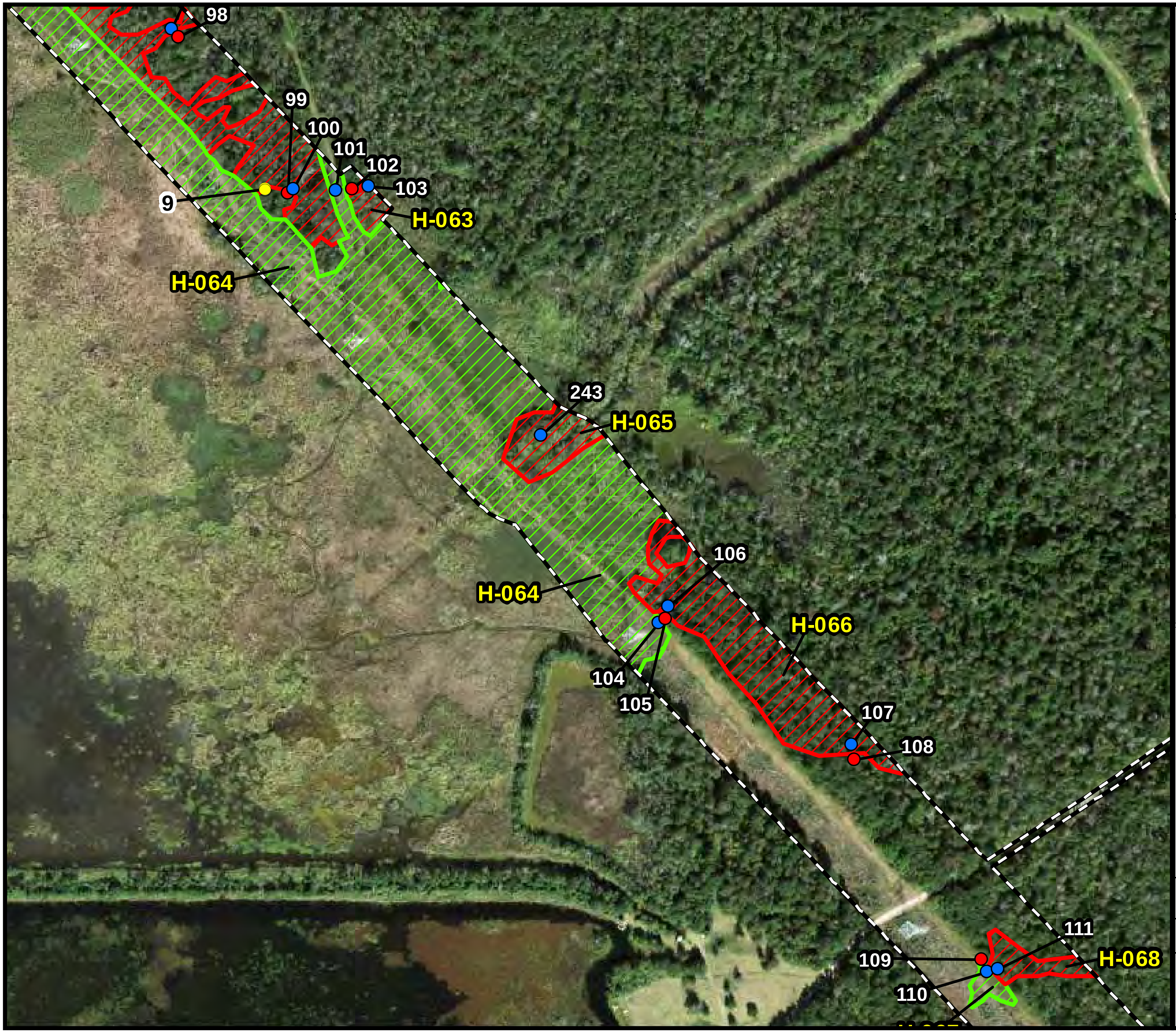


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

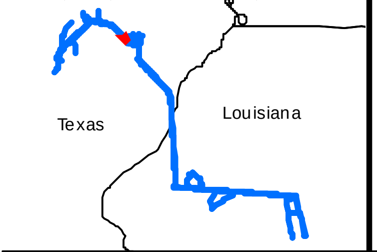
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB **H-###** Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 40 of 151)

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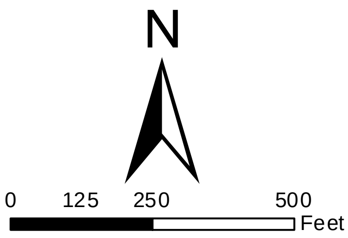


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

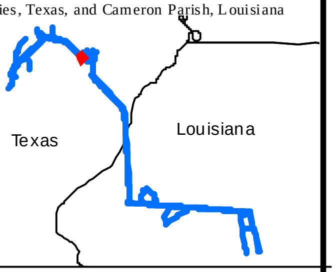
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 41 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

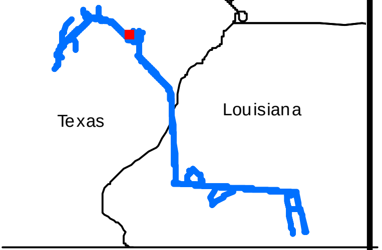
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 42 of 151)

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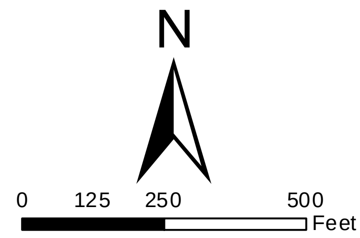


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

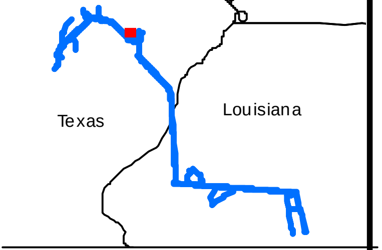
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 43 of 151)

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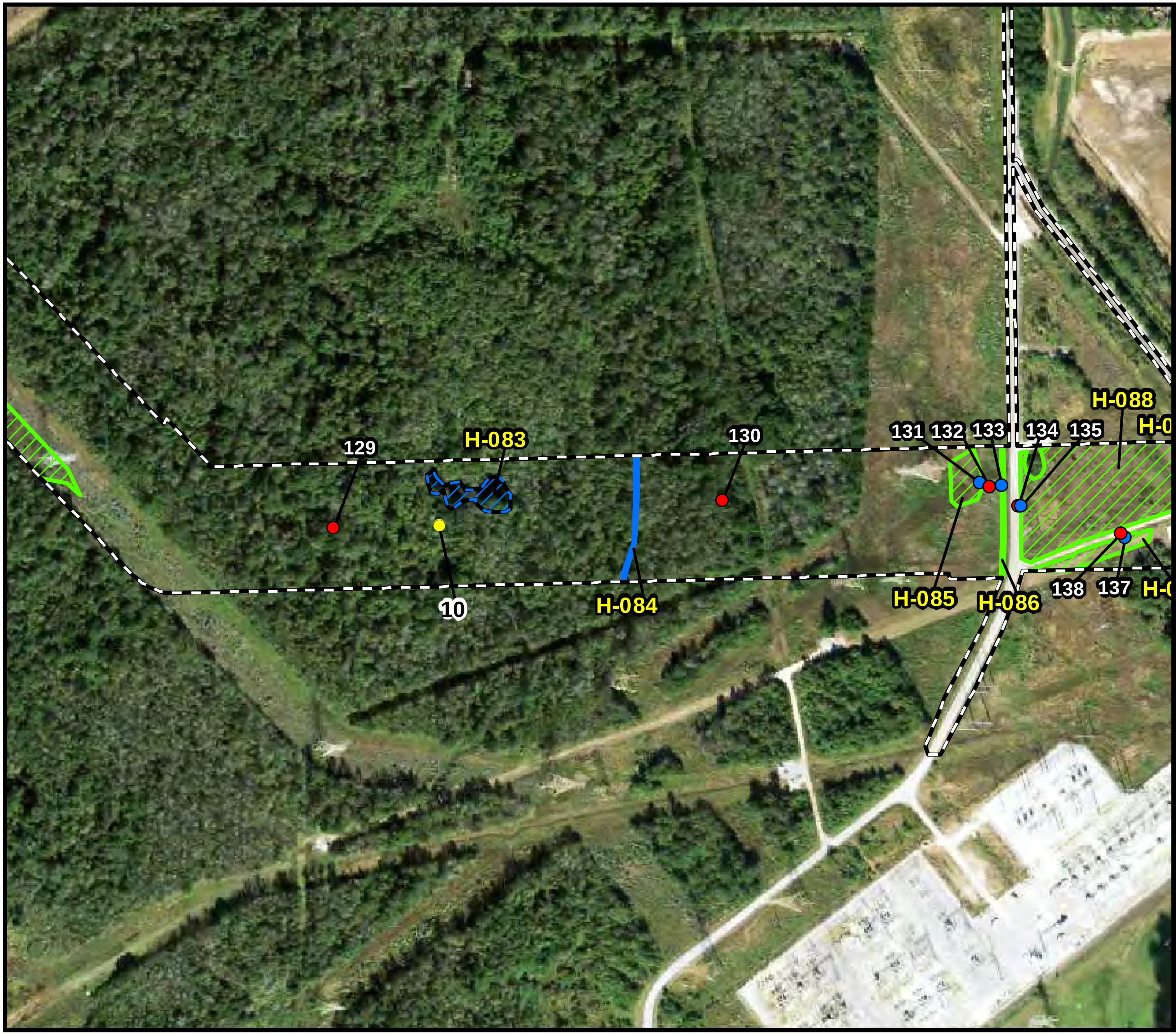
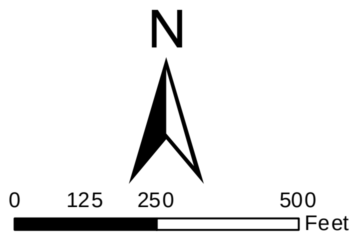




Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

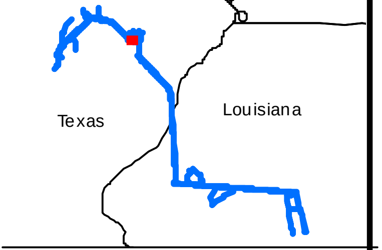
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 44 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

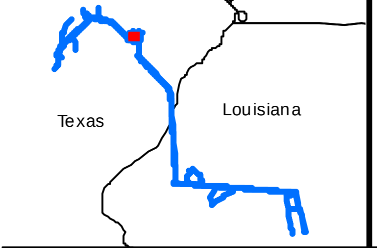
●	Upland
●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 45 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

▭ Survey Area
● Mile Marker
Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

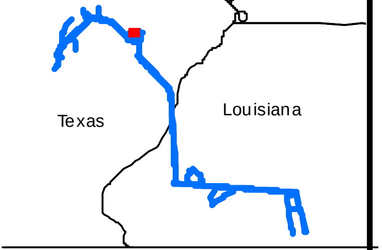
● Upland
● Wetland
Plot ID

Habitats

▨ E1UB
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB
H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 46 of 151)

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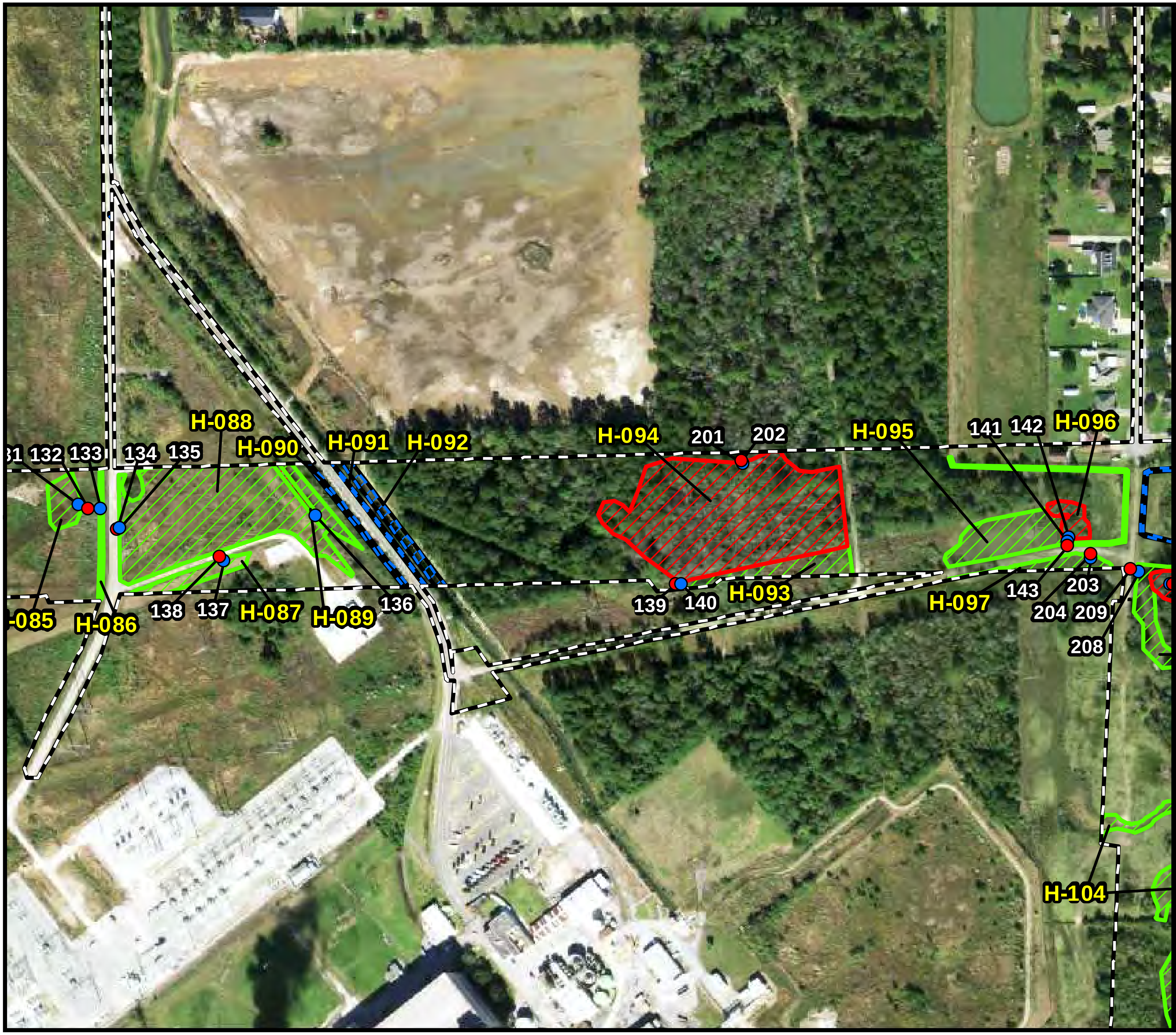


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

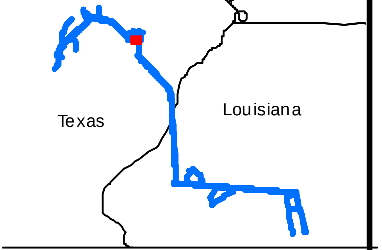
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 47 of 151)

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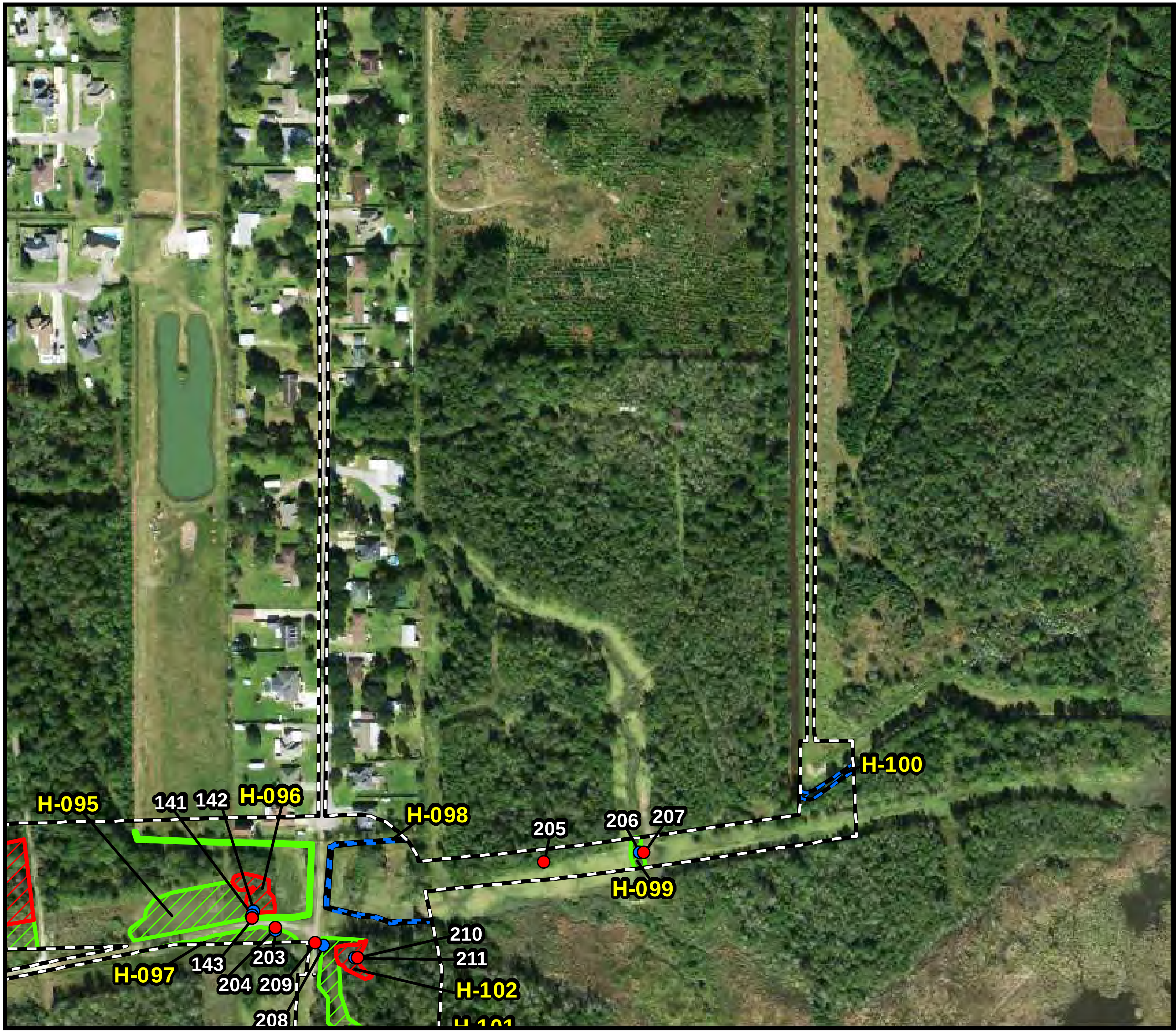


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

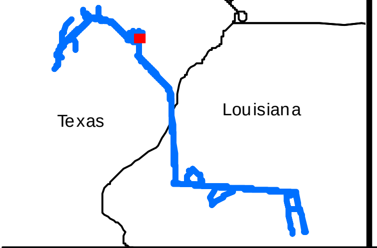
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 48 of 151)

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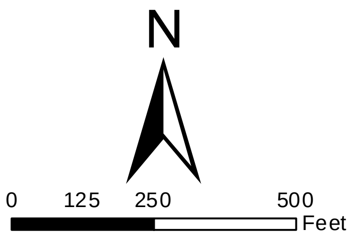


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

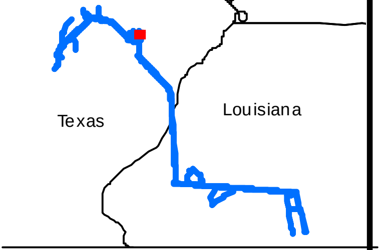
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 49 of 151)

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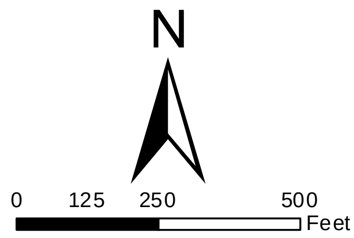


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

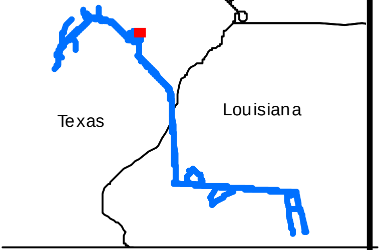
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 50 of 151)

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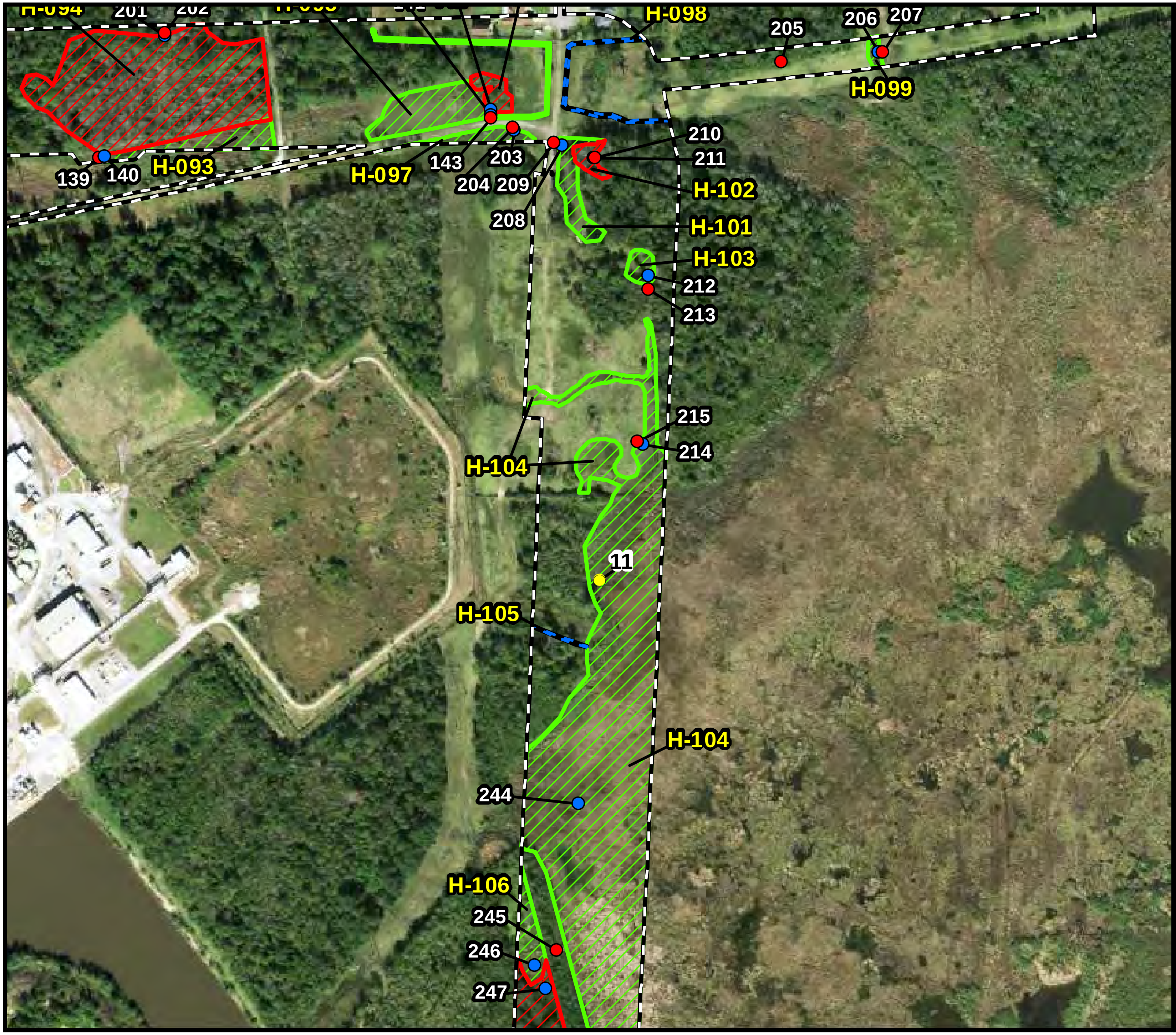


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

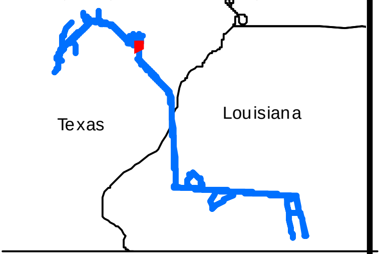
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 51 of 151)

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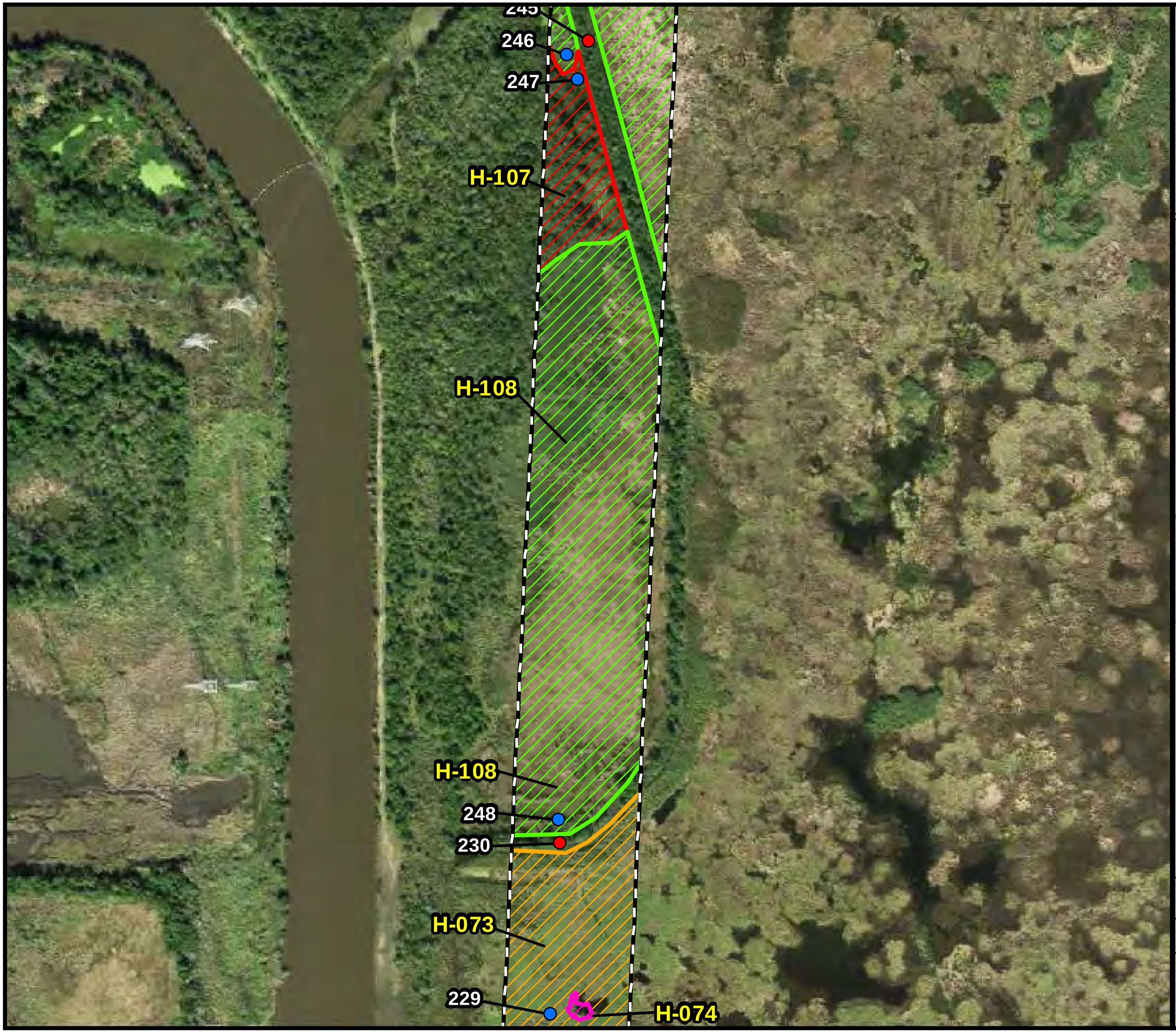


Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

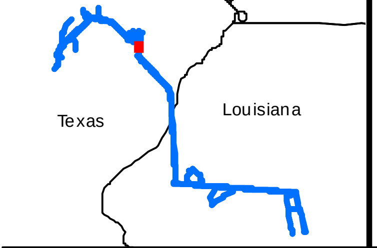
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 52 of 151)

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Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 53 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

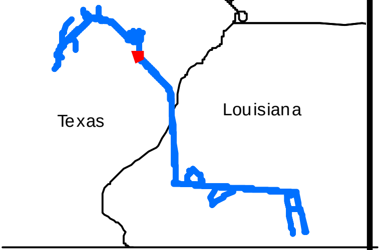
● Upland ### Plot ID
● Wetland

Habitats

▨	E1UB	H-###	Habitat ID
▨	E2EM		
▨	PEM		
▨	PEMx		
▨	PFO		
▨	PSS		
▨	PUB		
▨	PUBx		
▨	R2UB		

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 54 of 151)

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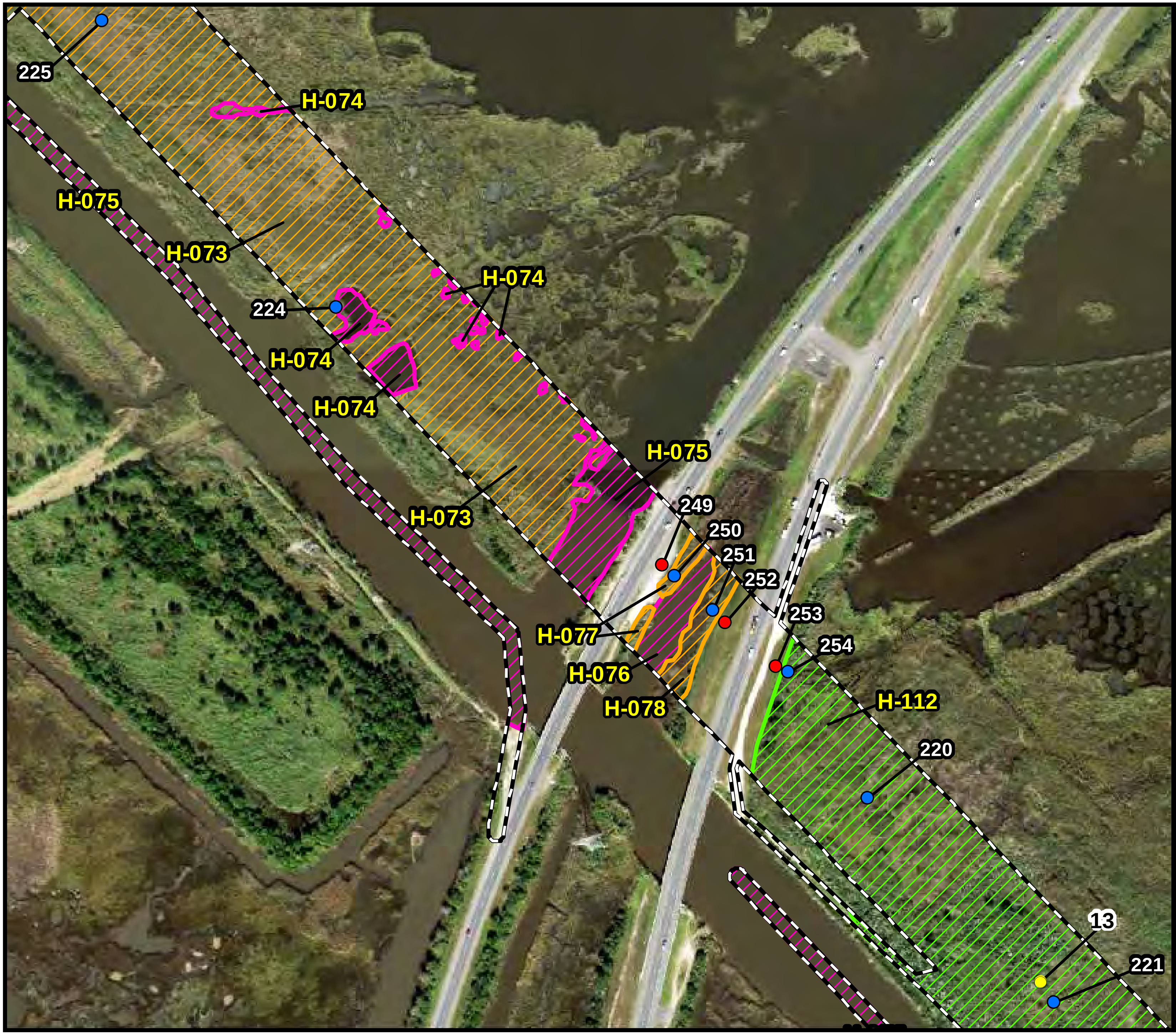


N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

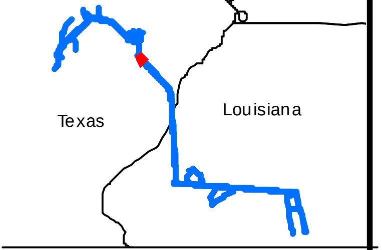
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 55 of 151)

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Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 56 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

⬚ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

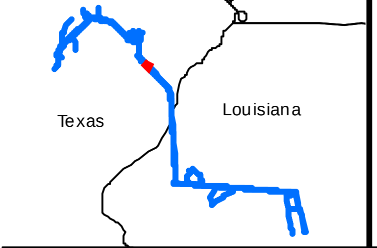
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 57 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

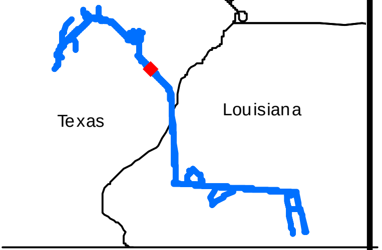
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB **H-###** Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 58 of 151)

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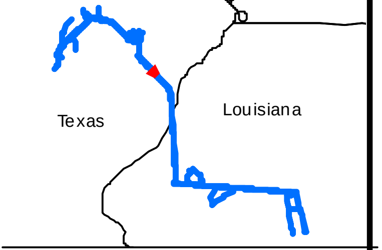
Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 59 of 151)

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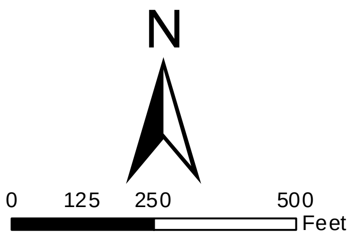


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

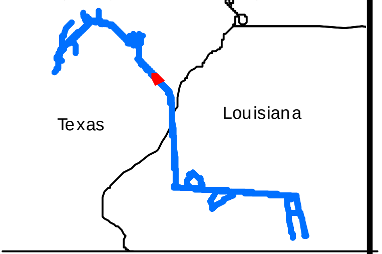
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 60 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

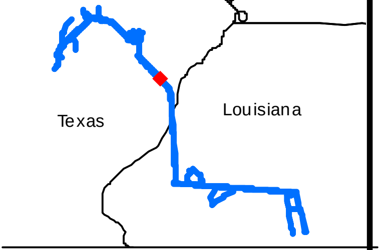
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB **H-###** Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 61 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

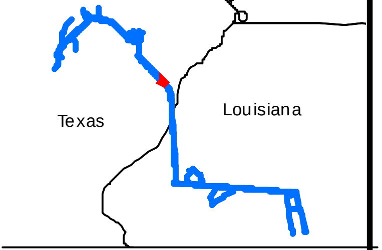
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 62 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

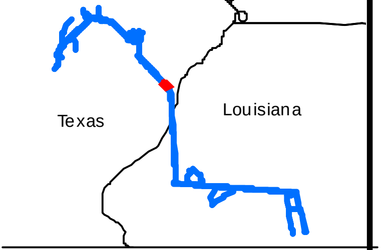
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 63 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

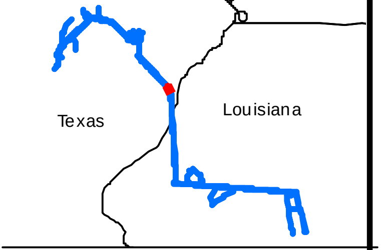
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 64 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

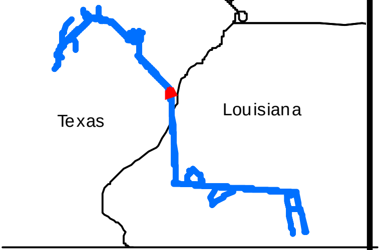
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 65 of 151)

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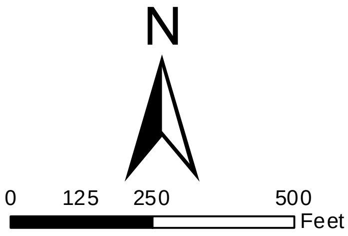


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

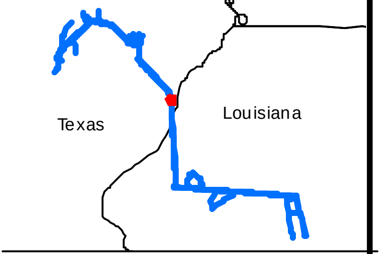
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 66 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

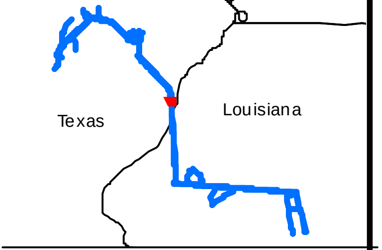
🔴	Upland
🔵	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 67 of 151)

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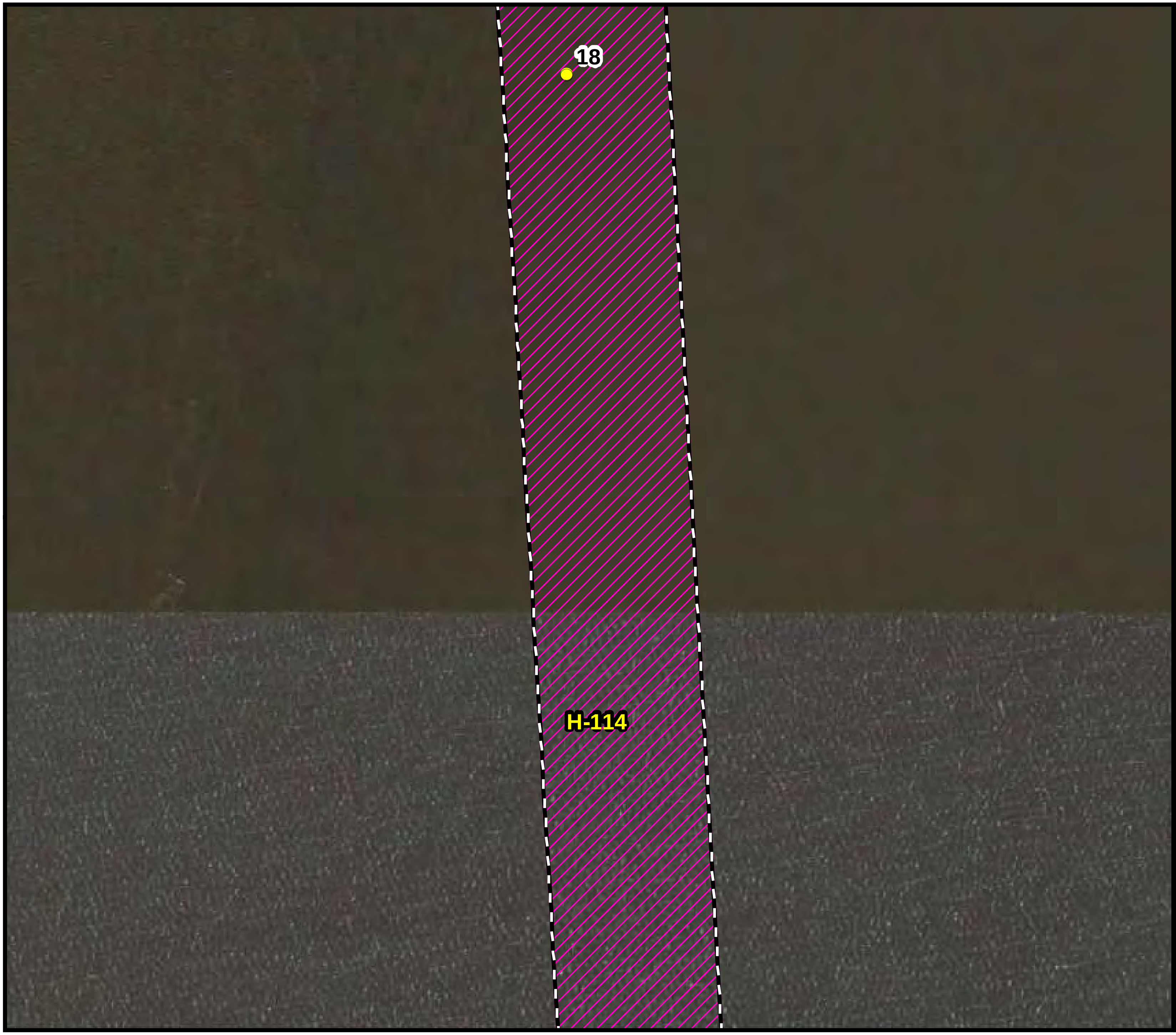


N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

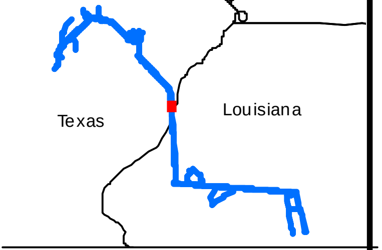
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 68 of 151)

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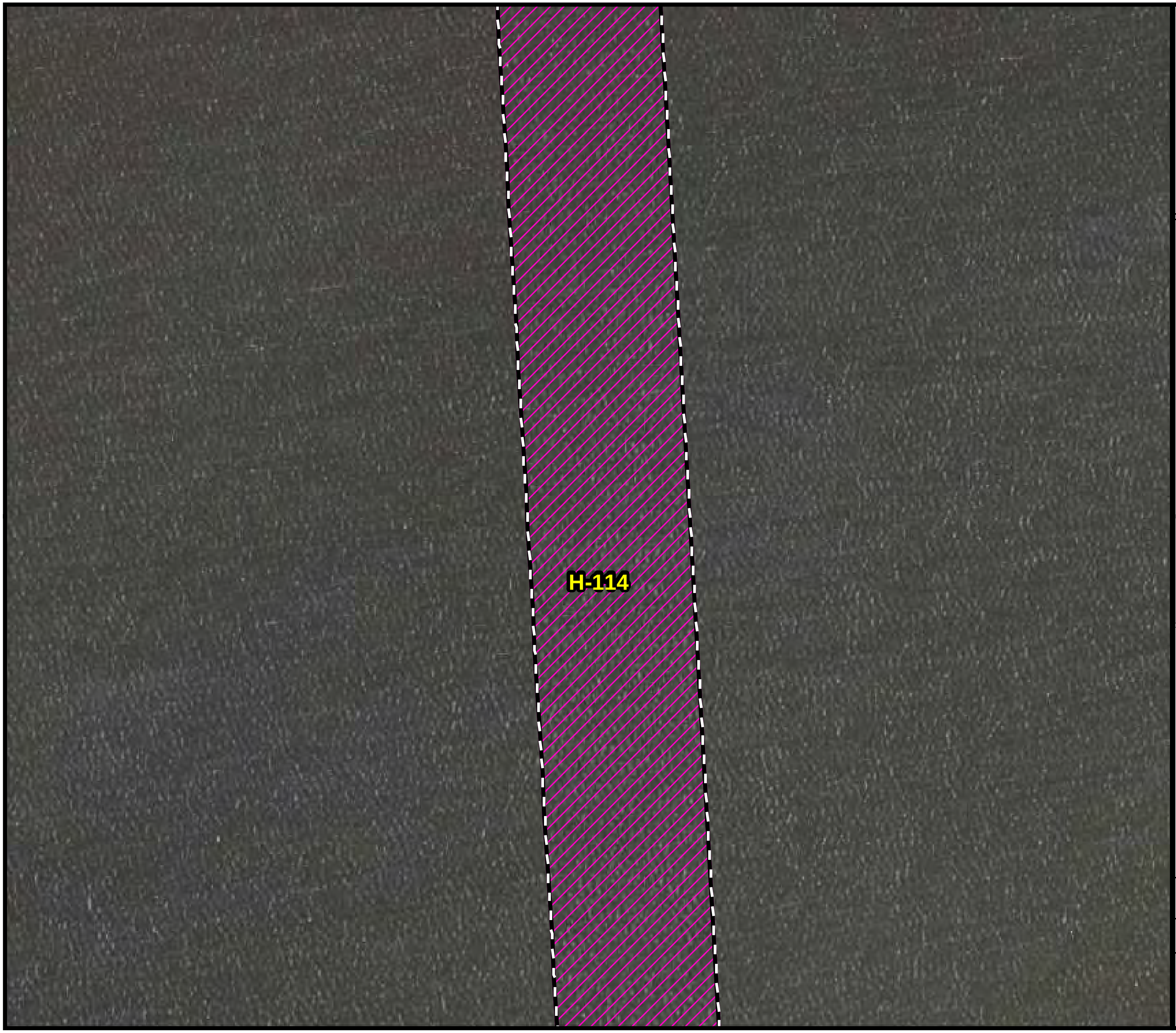
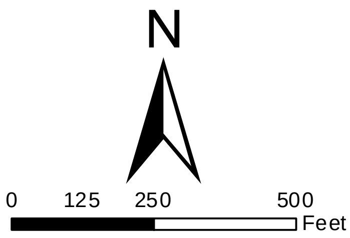




Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

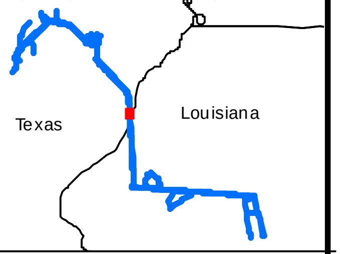
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 69 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

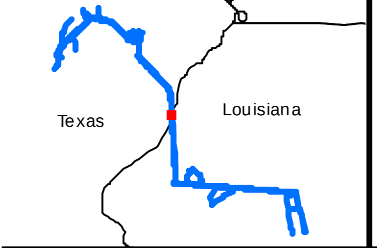
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 70 of 151)

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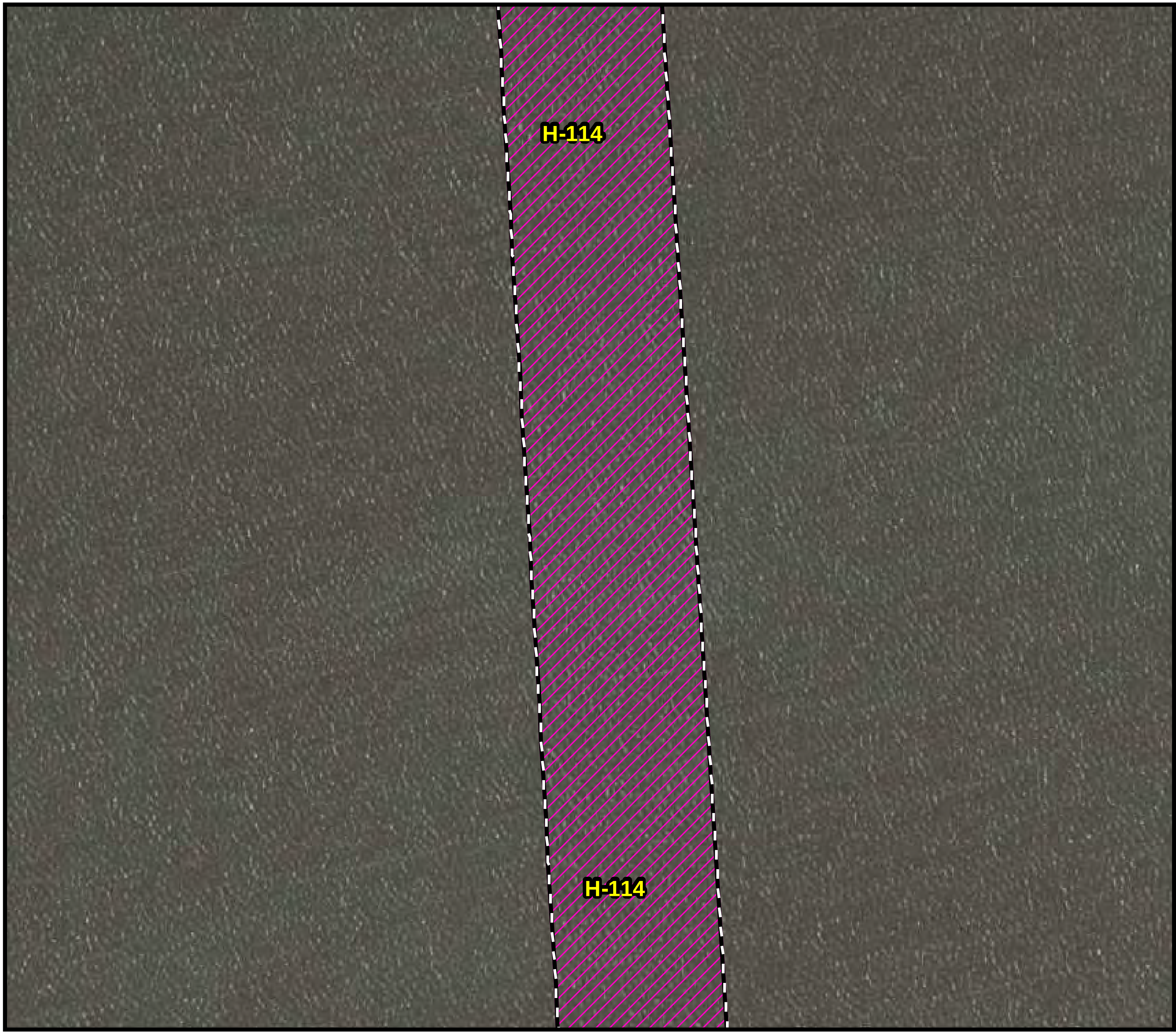


N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker — ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

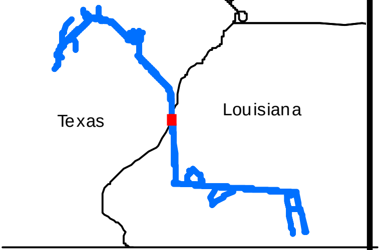
- ● Upland — ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB — H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 71 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

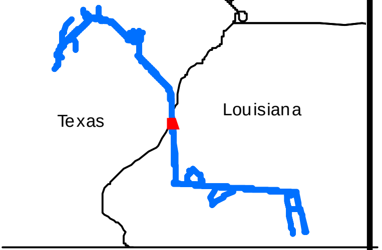
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 72 of 151)

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Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 73 of 151)

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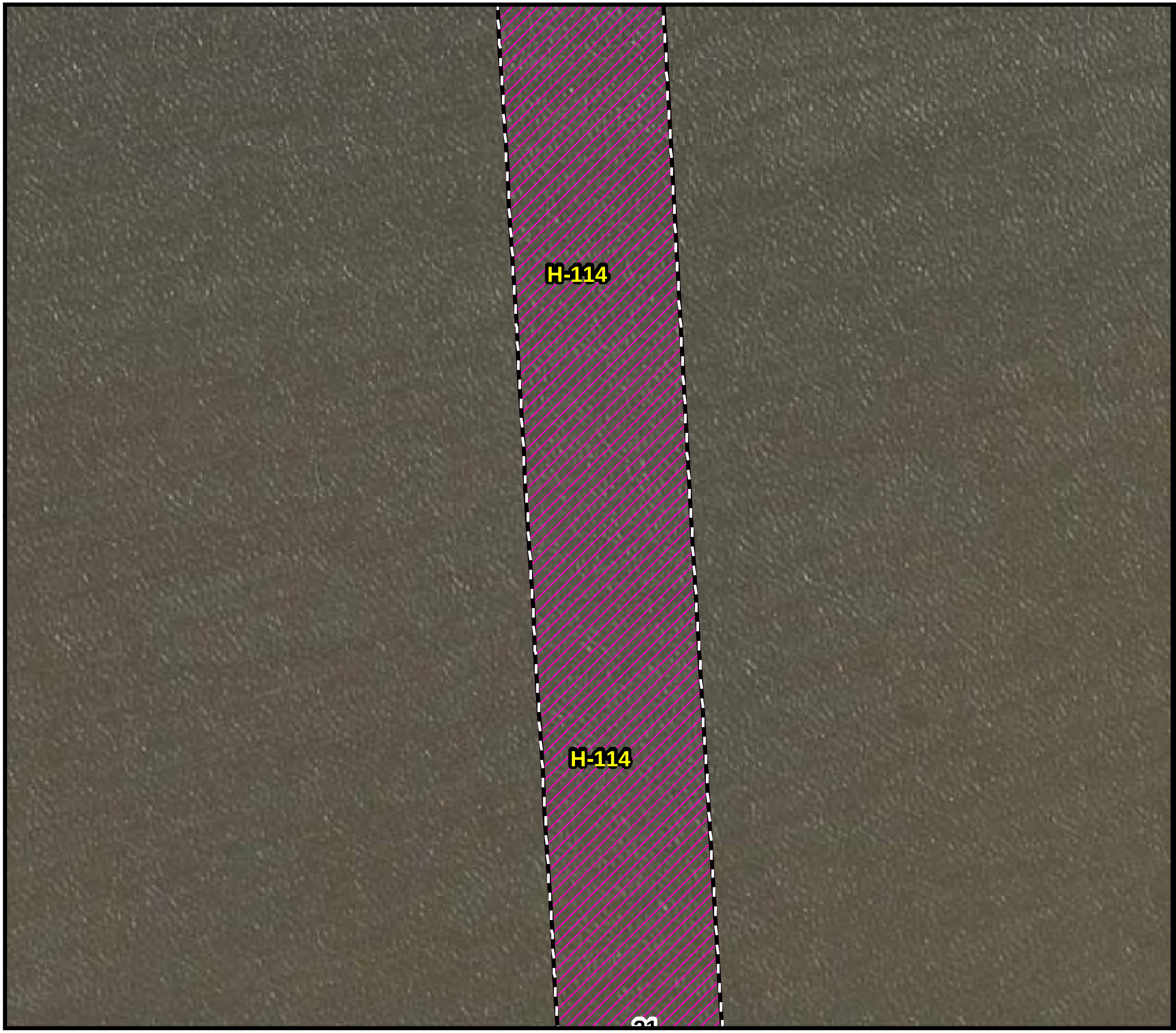
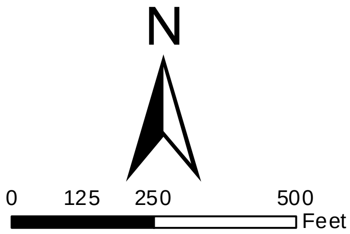




Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

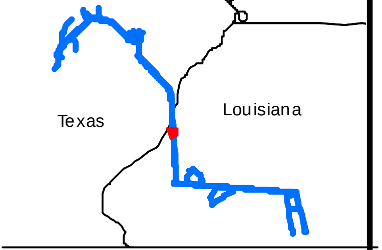
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 74 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

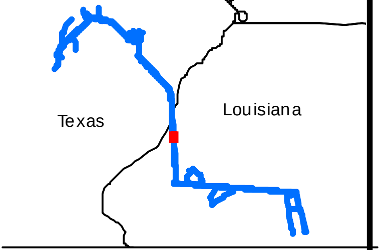
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 75 of 151)

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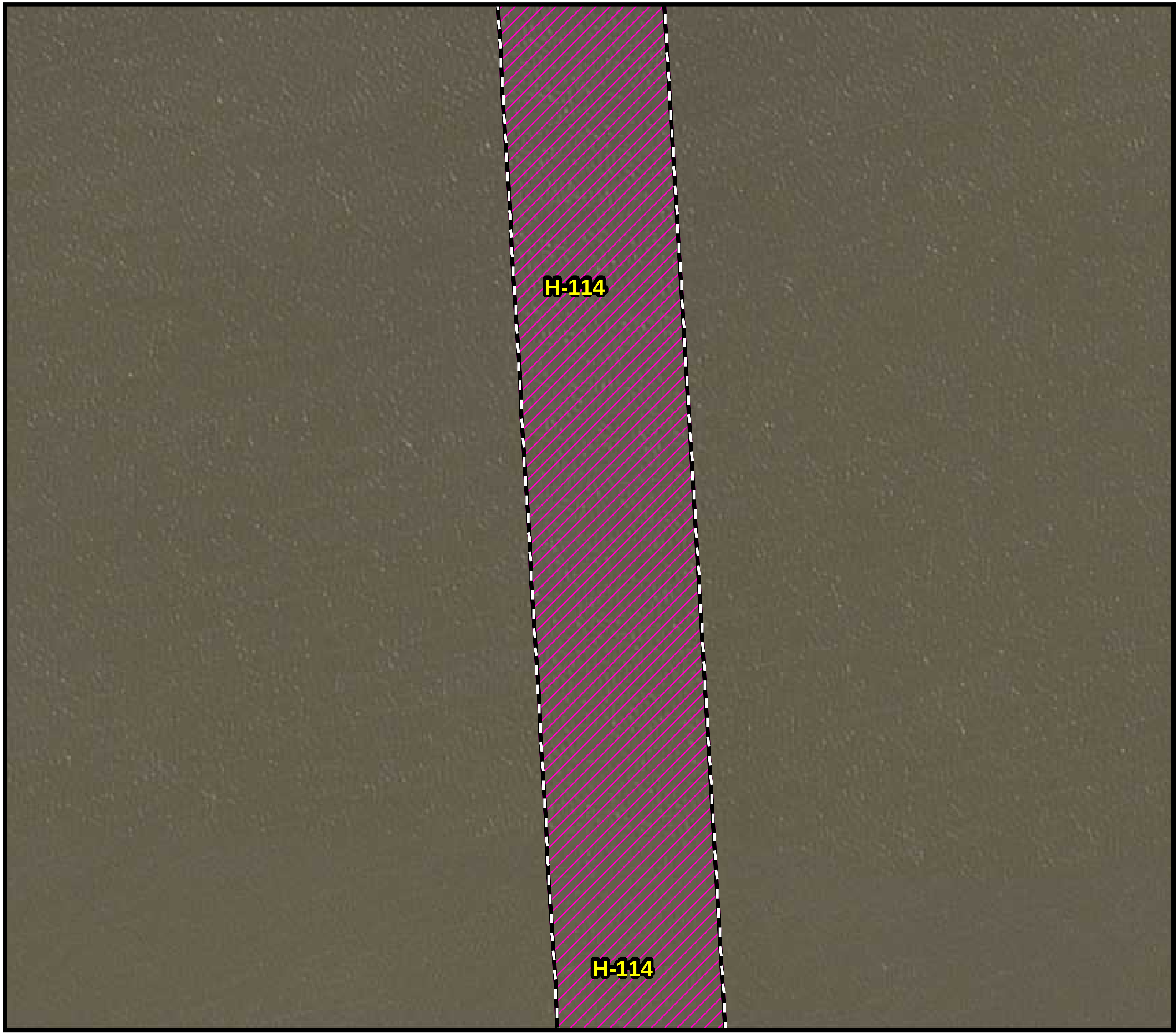


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

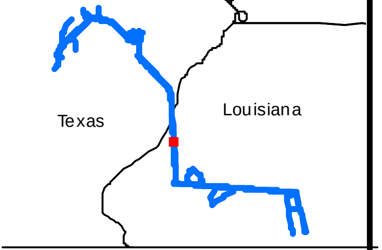
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 76 of 151)

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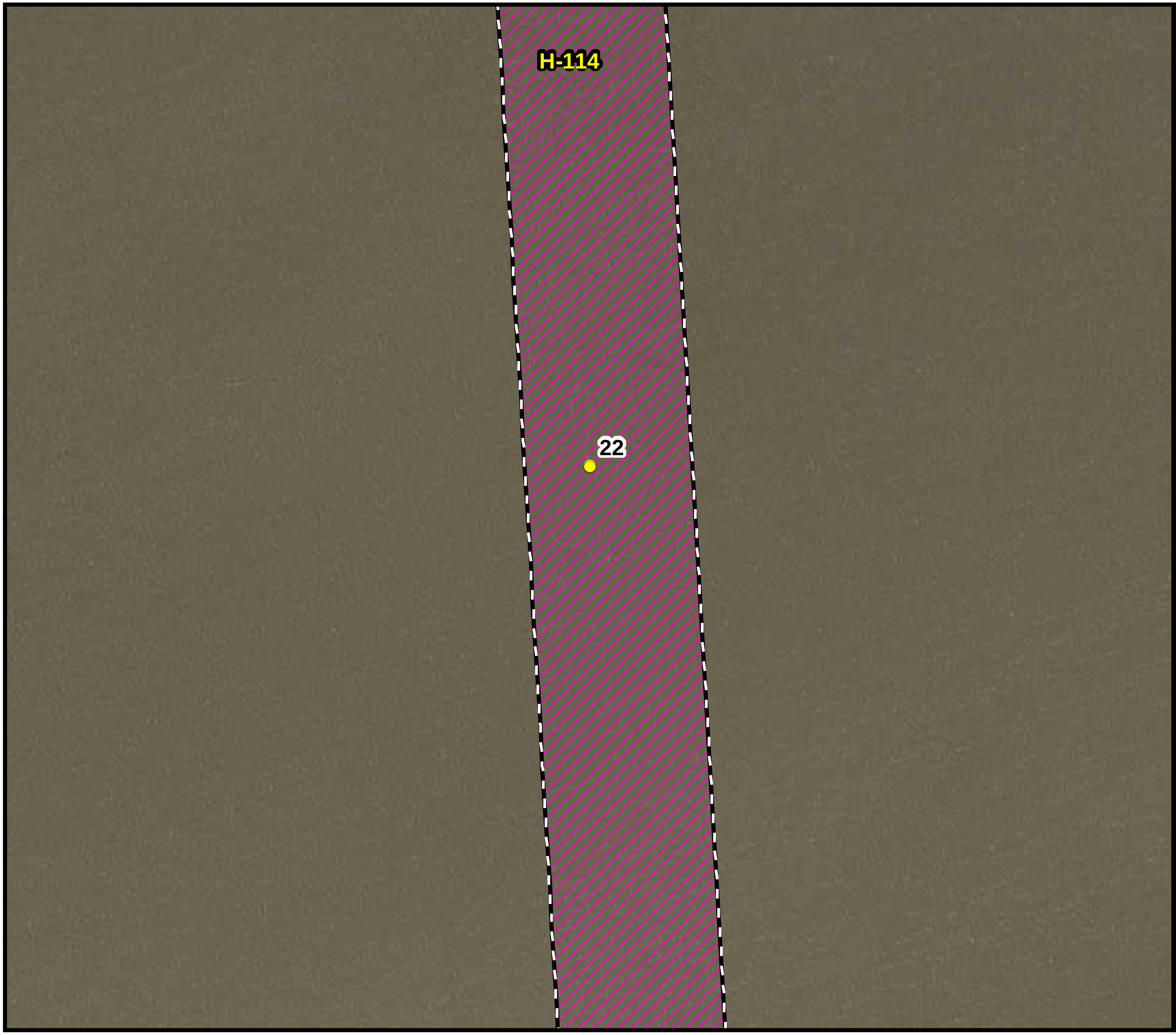


N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

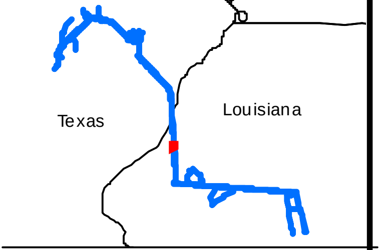
- 🔴 Upland
- 🔵 Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 77 of 151)

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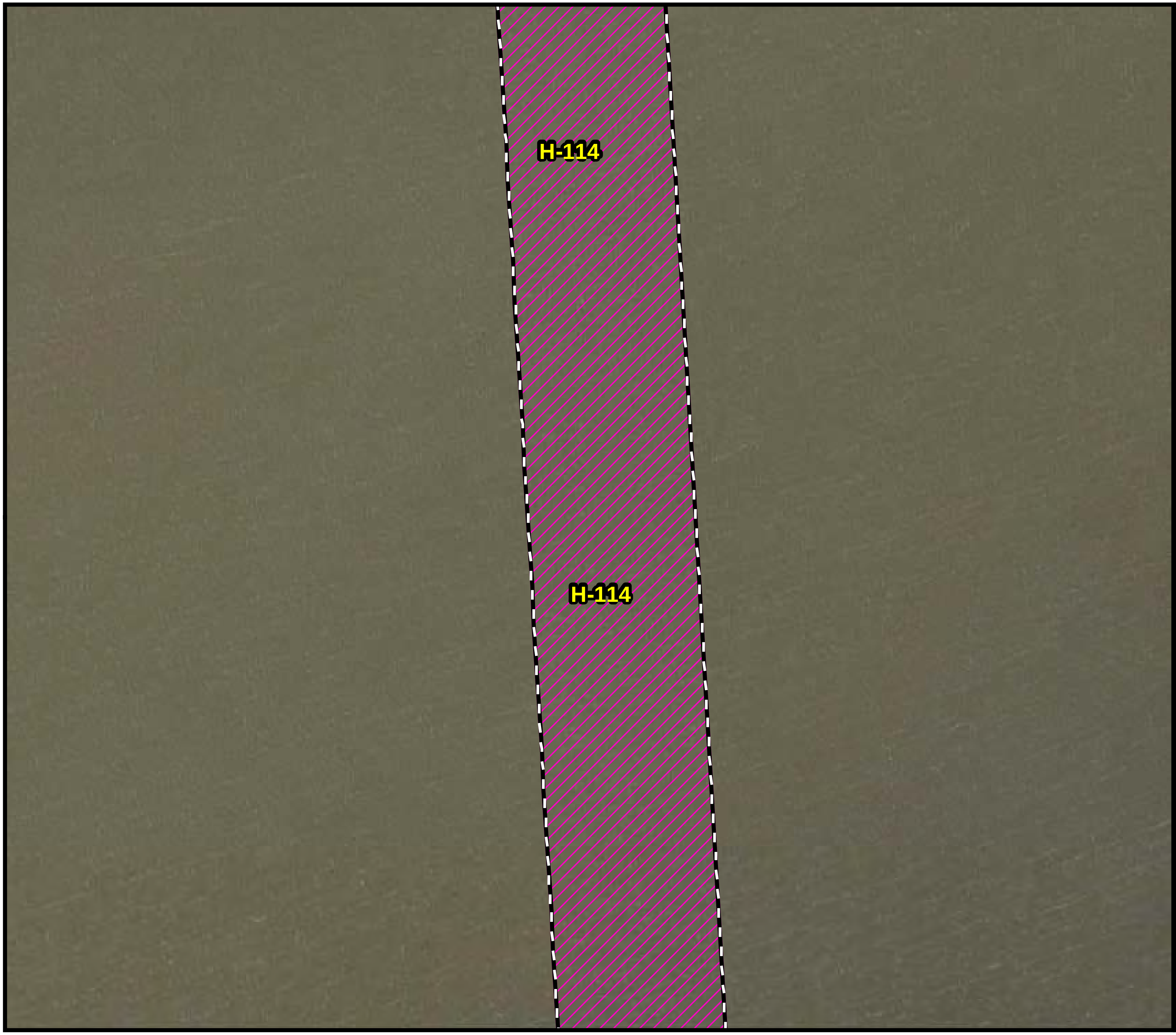


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

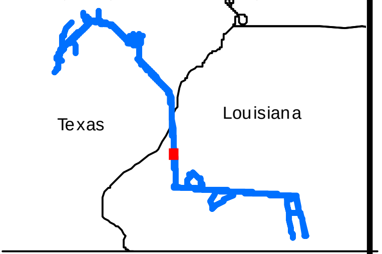
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 78 of 151)

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Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

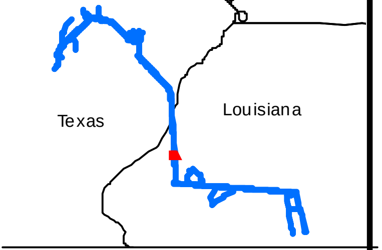
- 🟥 Upland ### Plot ID
- 🟦 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 79 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

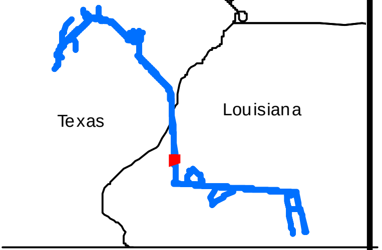
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 80 of 151)

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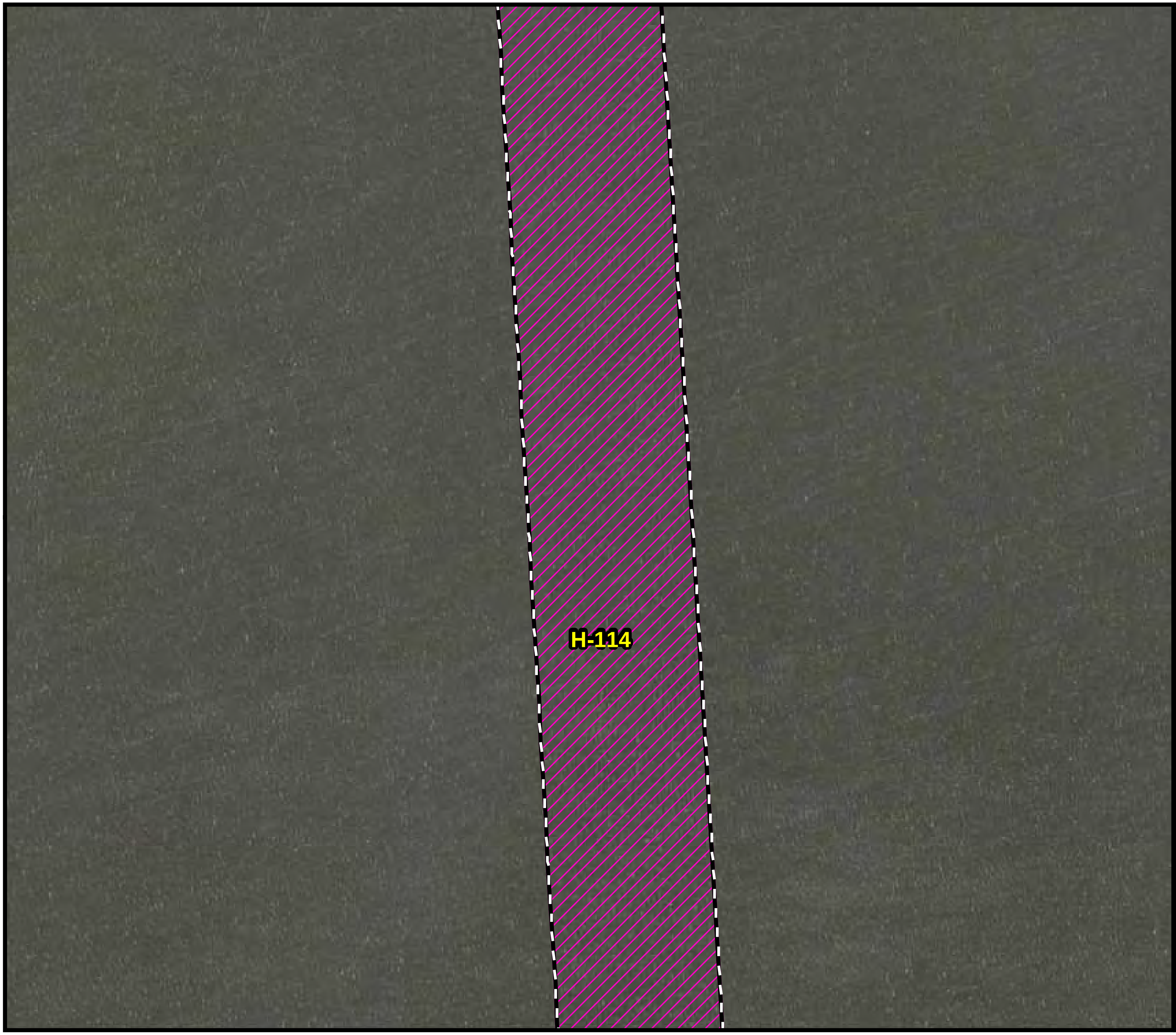


Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

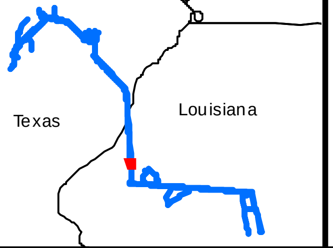
● Upland ### Plot ID
● Wetland

Habitats

🟪 E1UB **H-###** Habitat ID
🟧 E2EM
🟩 PEM
▨ PEMx
🟥 PFO
🟨 PSS
🟦 PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 81 of 151)

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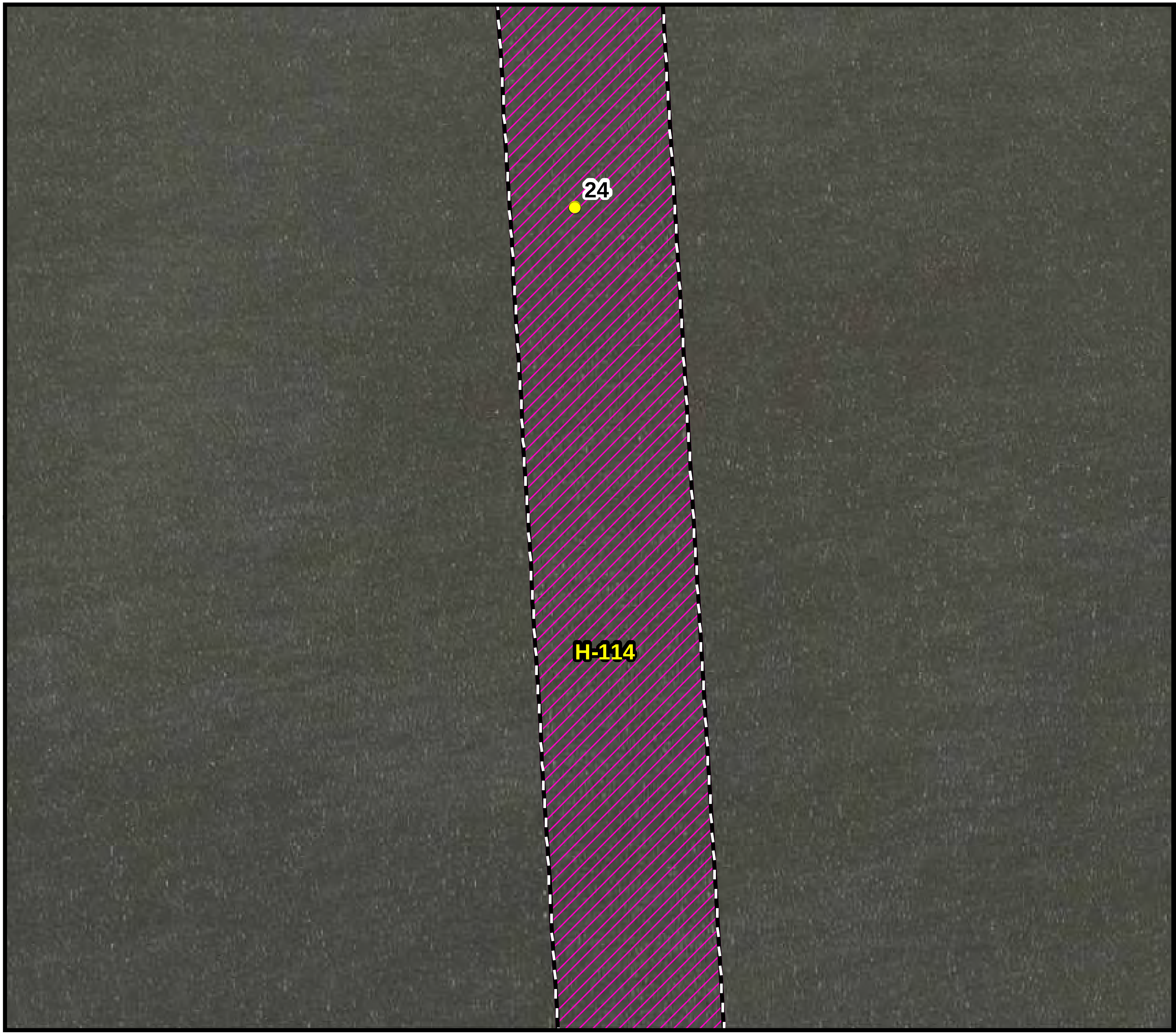


N

0 125 250 500
Feet

Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

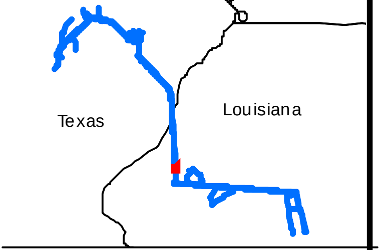
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 82 of 151)

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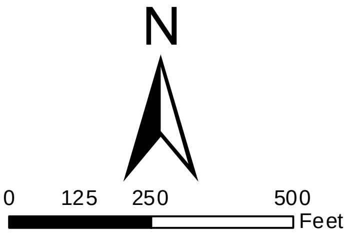


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

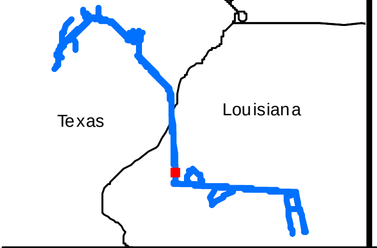
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 83 of 151)

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Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

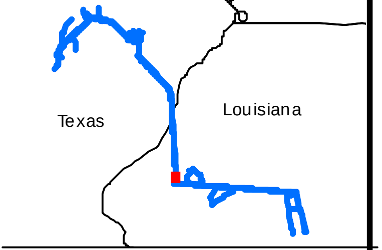
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 84 of 151)

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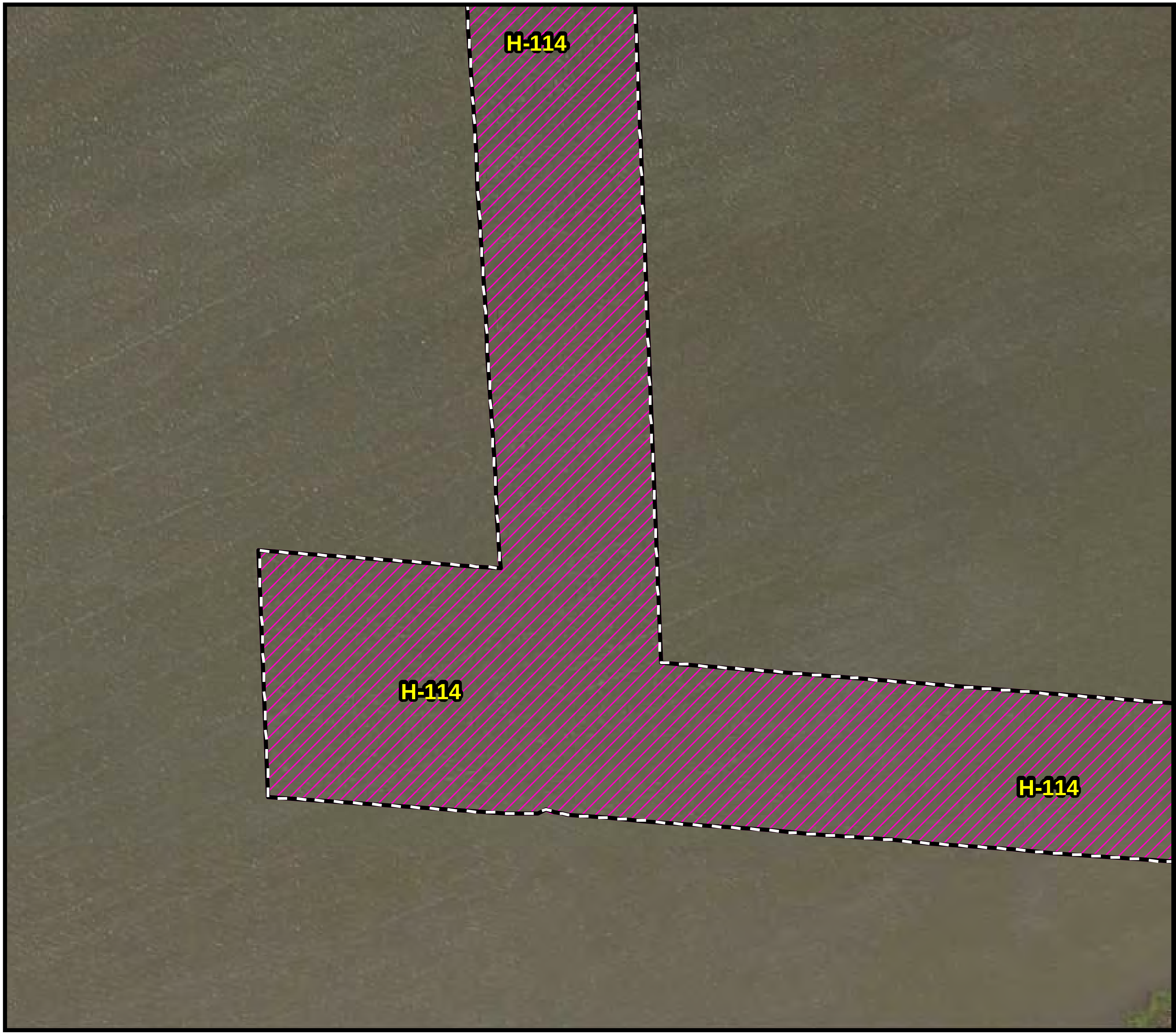


N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

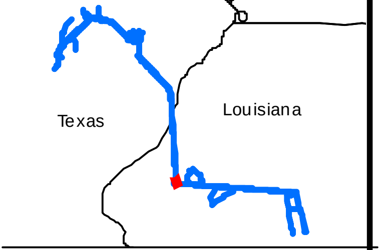
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 85 of 151)

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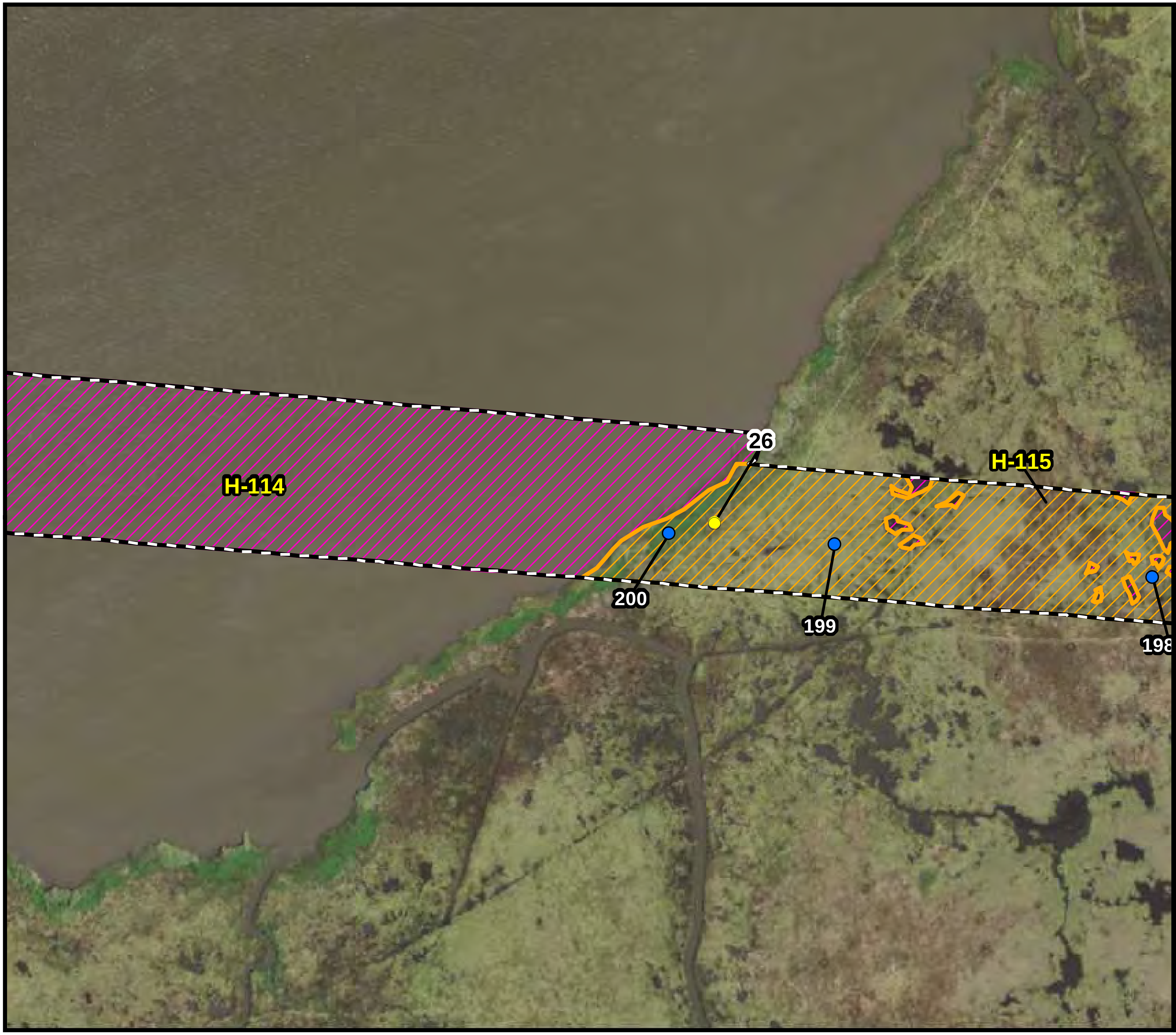
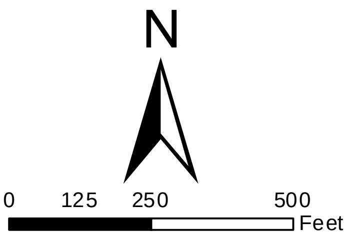




Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

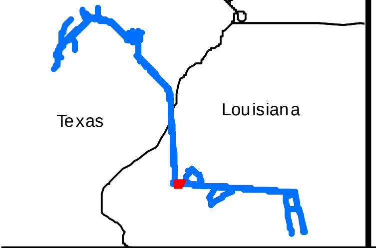
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 86 of 151)

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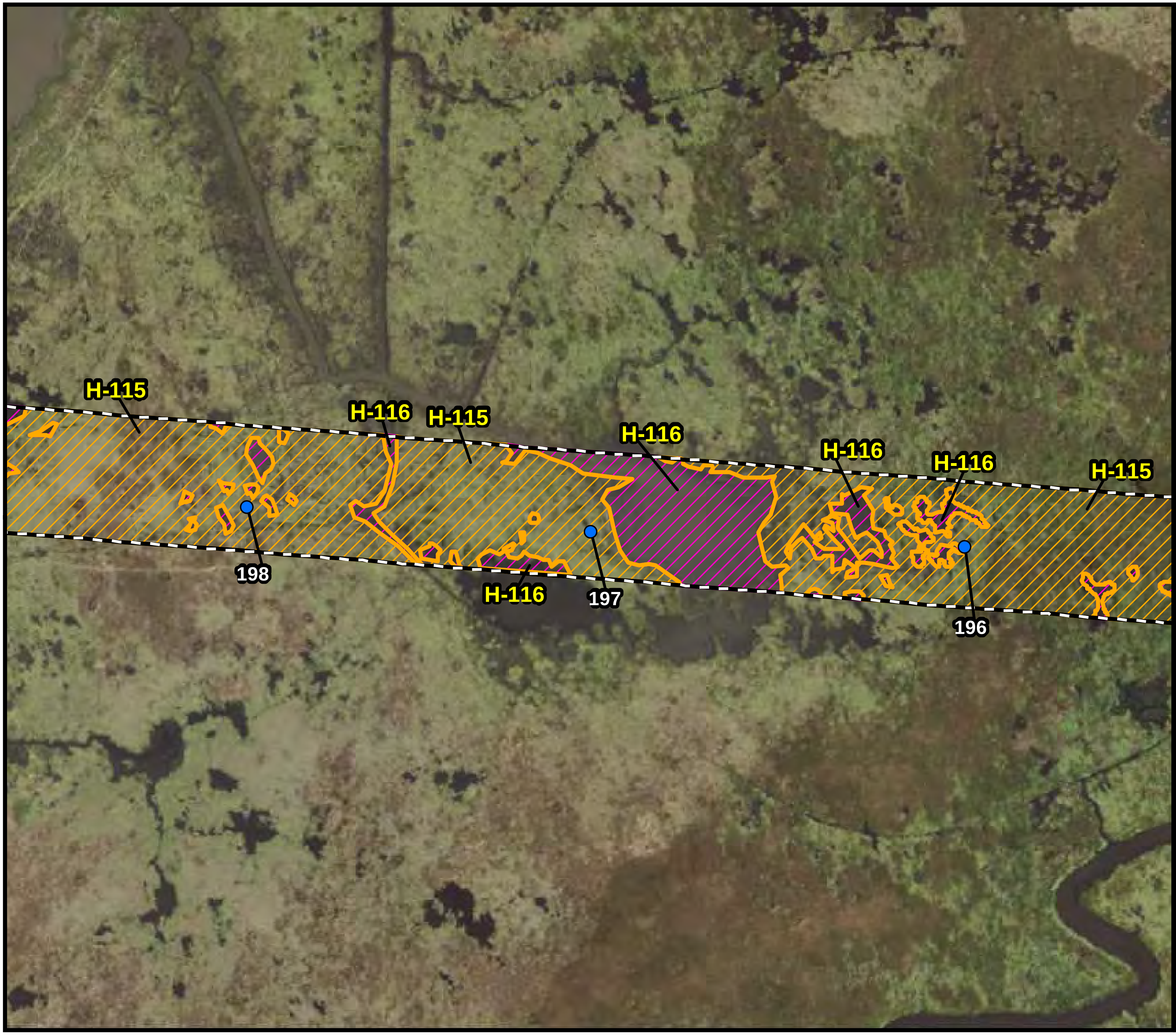


N

0 125 250 500
Feet

Legend

Survey Area
Mile Marker ### Mile ID
Surveyed Under SWG-2007-01401

Plot ID

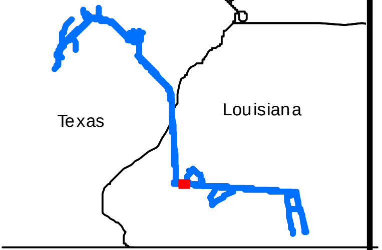
Upland ### Plot ID
Wetland

Habitats

E1UB H-### Habitat ID
E2EM
PEM
PEMx
PFO
PSS
PUB
PUBx
R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 87 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

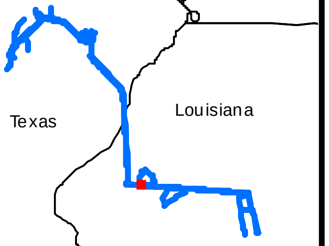
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 88 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

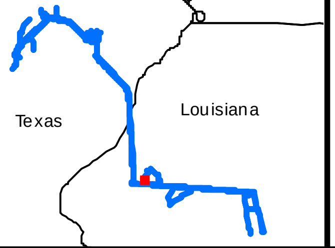
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 89 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

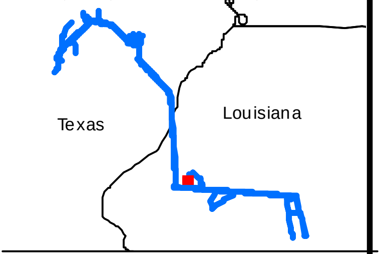
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 90 of 151)

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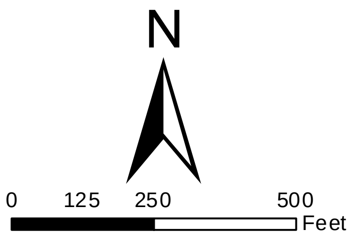


Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

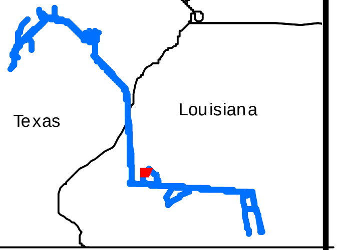
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 91 of 151)

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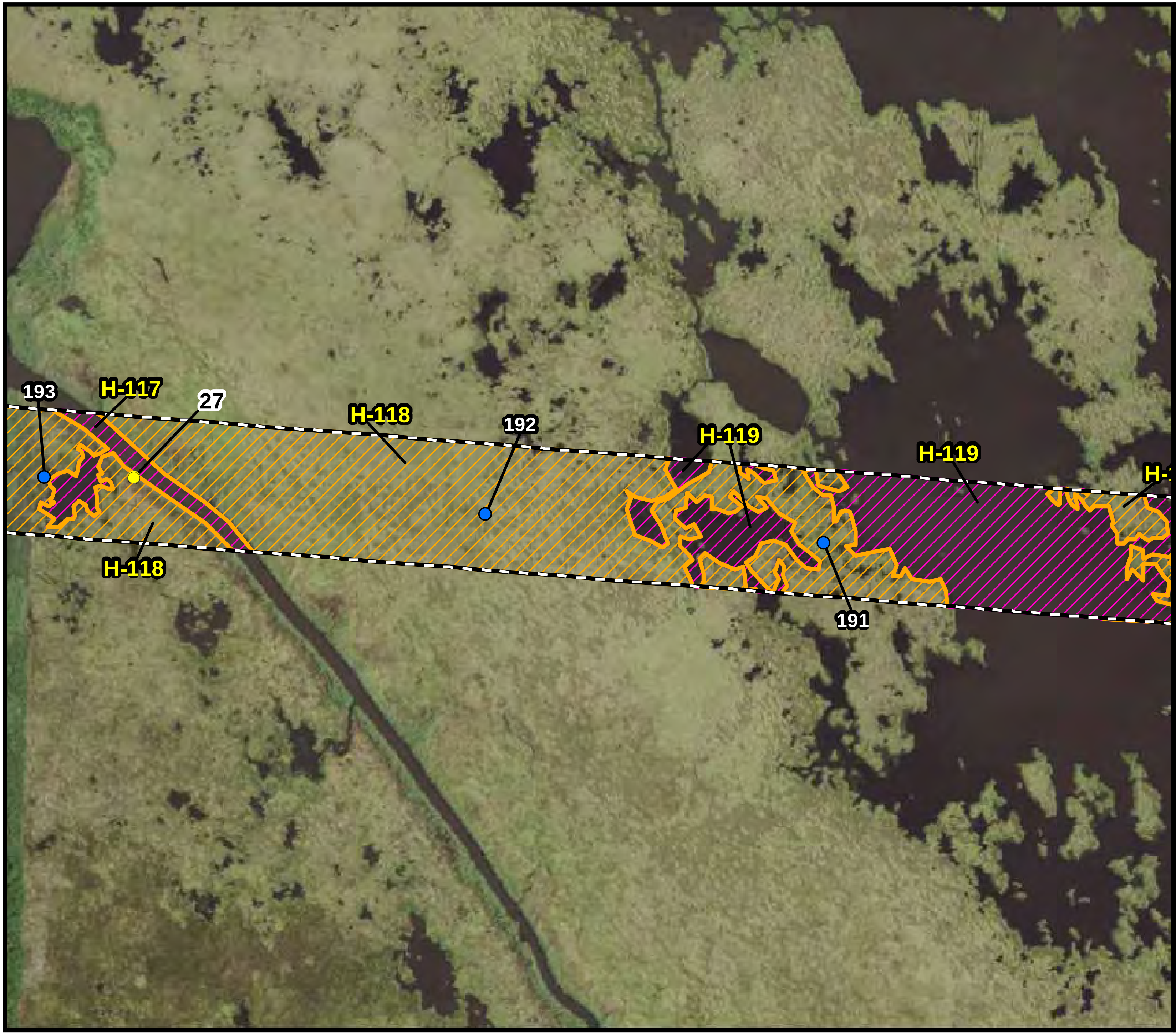


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

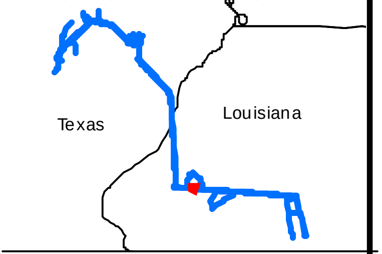
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
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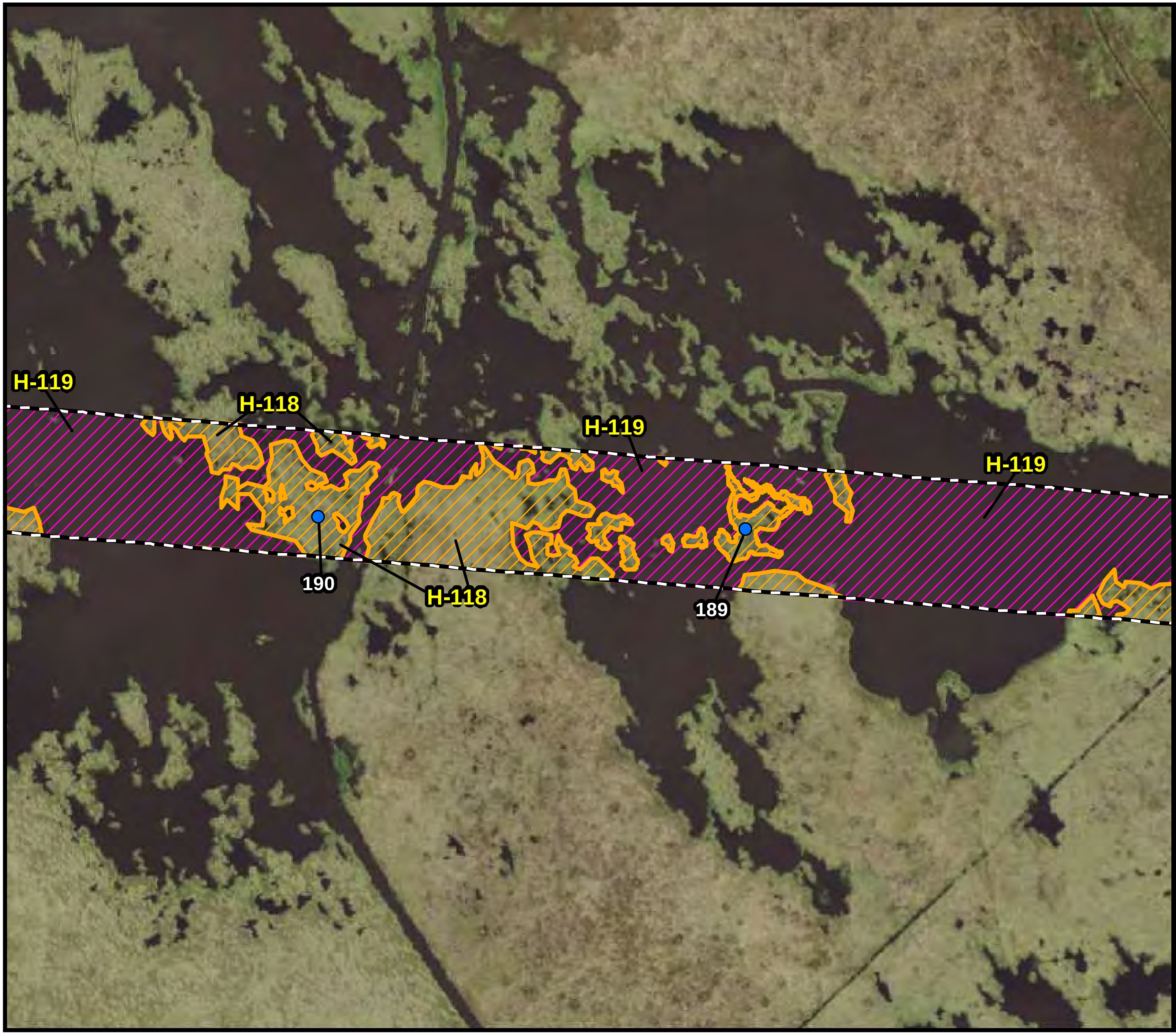


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

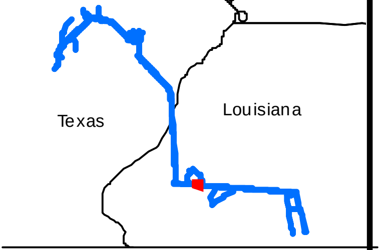
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

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Date: 06/17/2020

Figure 5
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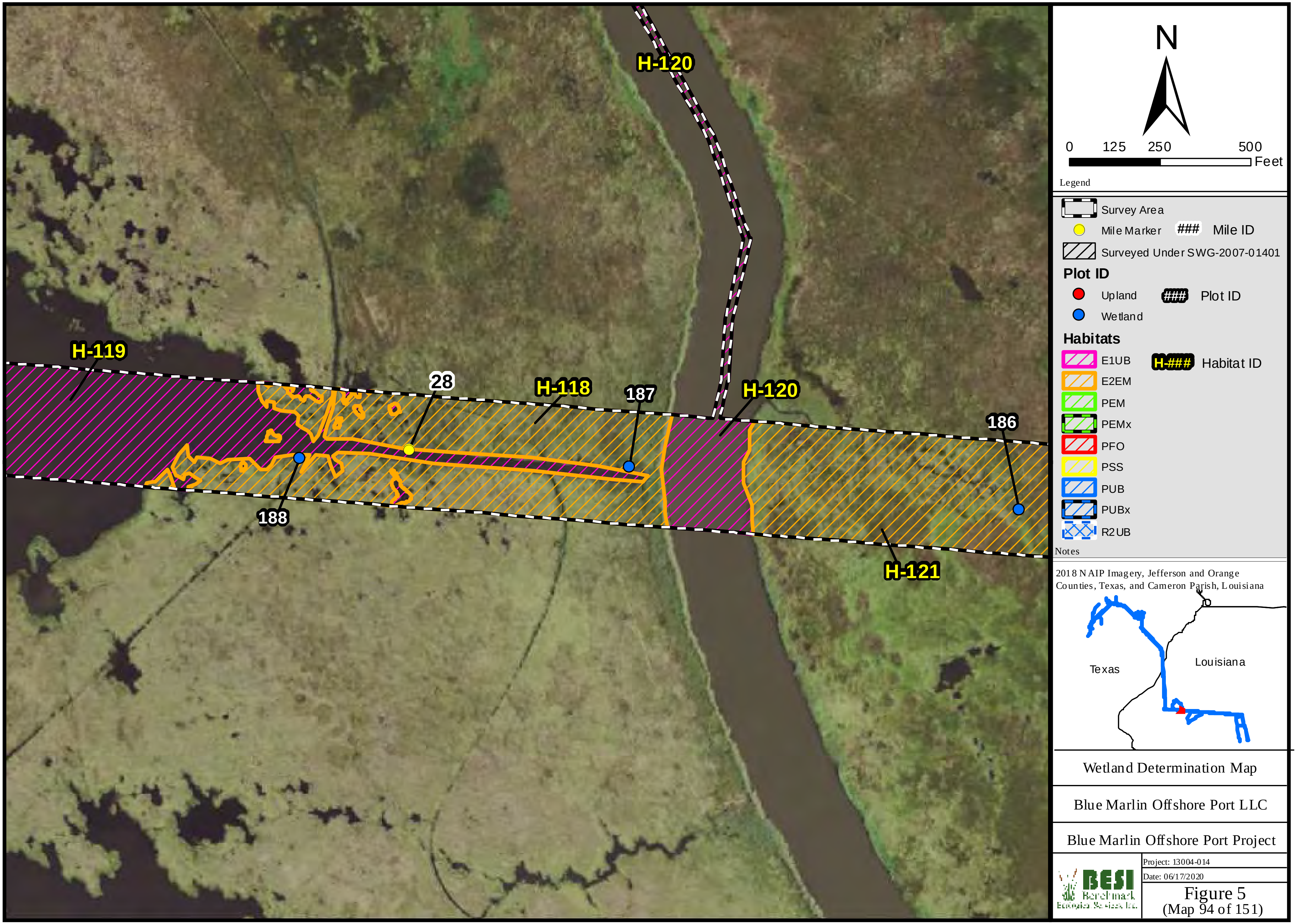


Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 94 of 151)

N

0 125 250 500 Feet

Legend

Survey Area

Mile Marker ### Mile ID

Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

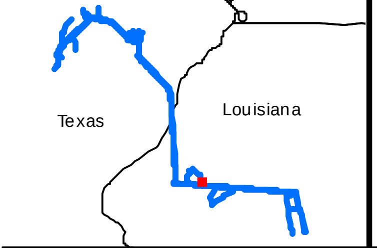
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 95 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

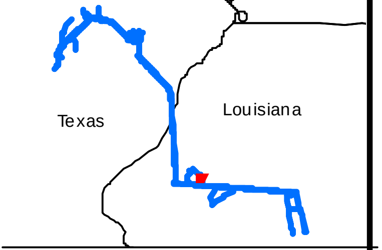
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

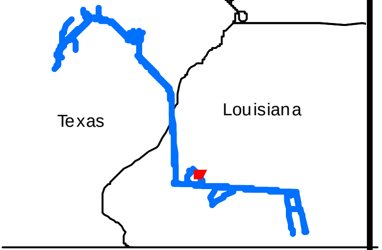
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 97 of 151)

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N

0 125 250 500
Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

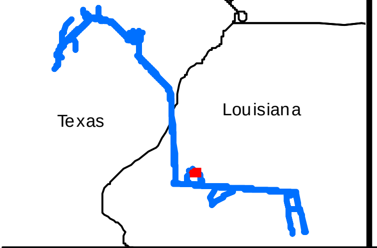
●	Upland
●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

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Figure 5
(Map 98 of 151)

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Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

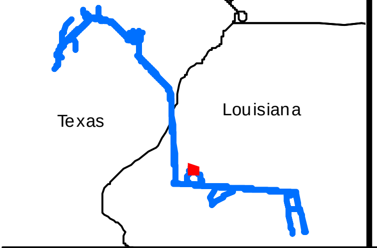
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 99 of 151)

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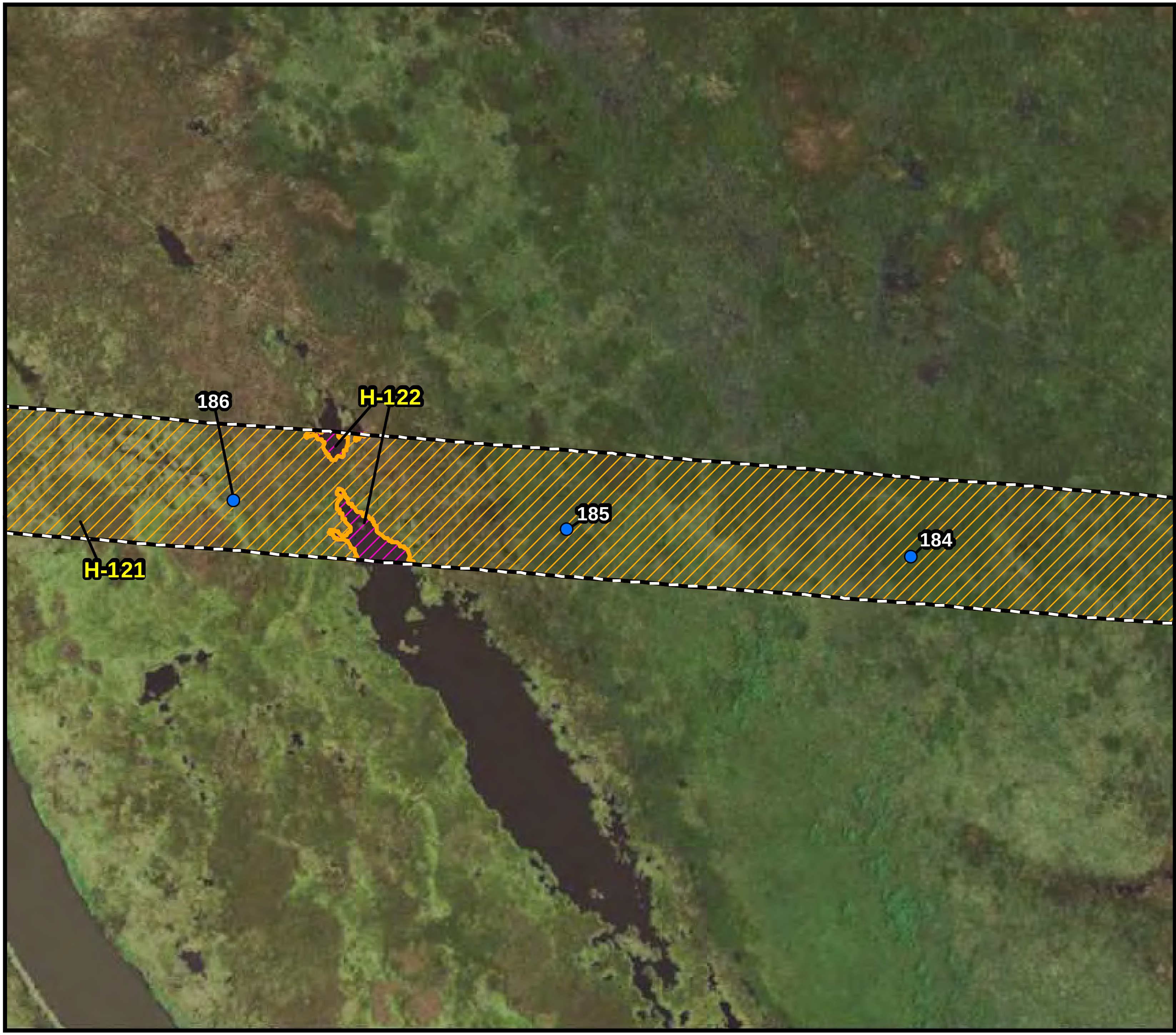


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

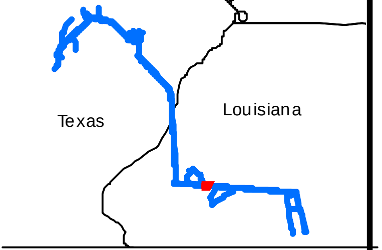
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 100 of 151)

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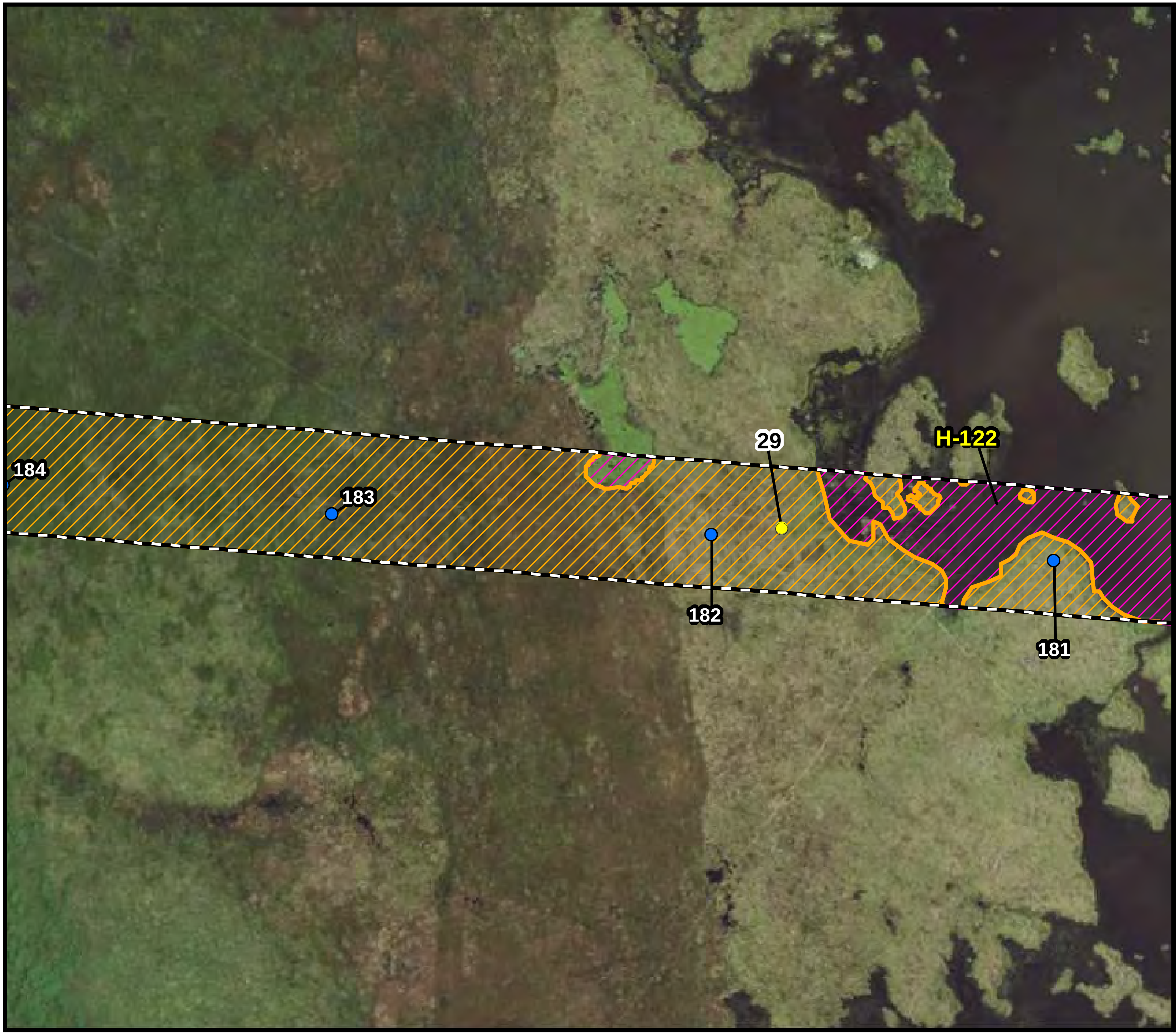
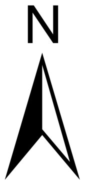




0 125 250 500
Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

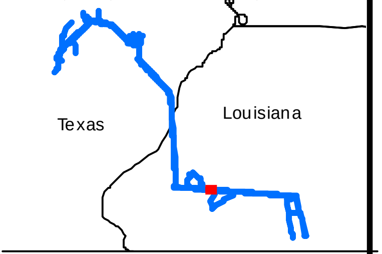
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 101 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

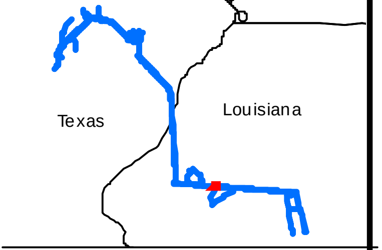
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 102 of 151)

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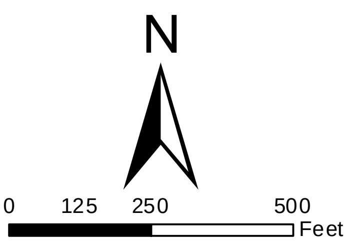


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

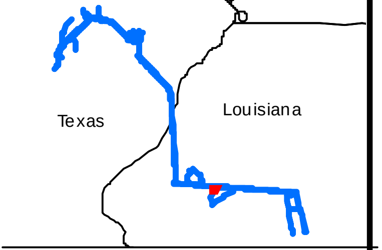
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

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Date: 06/17/2020

Figure 5
(Map 103 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

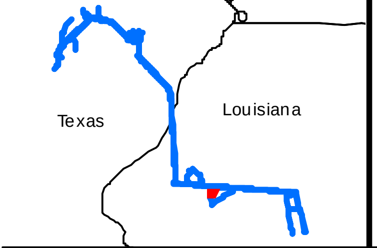
●	Upland
●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 104 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

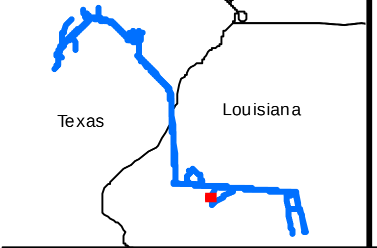
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

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Date: 06/17/2020

Figure 5
(Map 105 of 151)

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Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

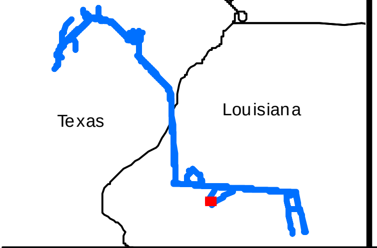
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 106 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

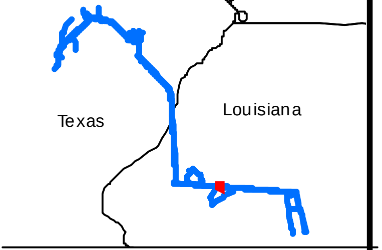
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 107 of 151)

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N

0 125 250 500
Feet

Legend

- Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

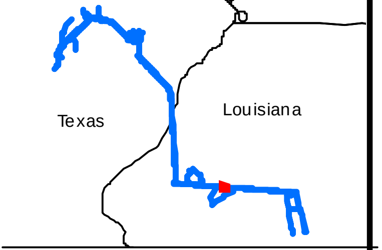
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 108 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

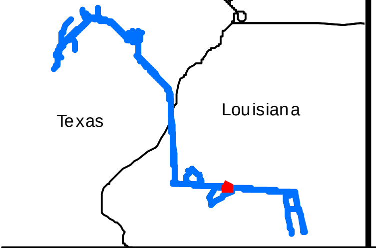
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 109 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

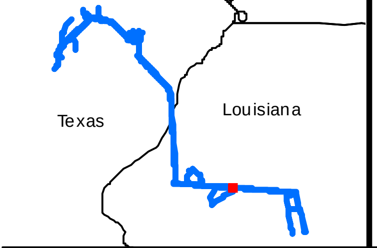
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 110 of 151)

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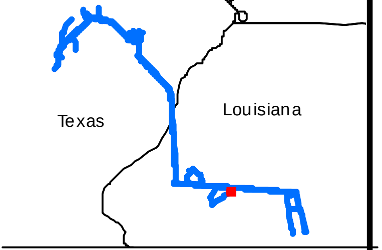
Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 111 of 151)

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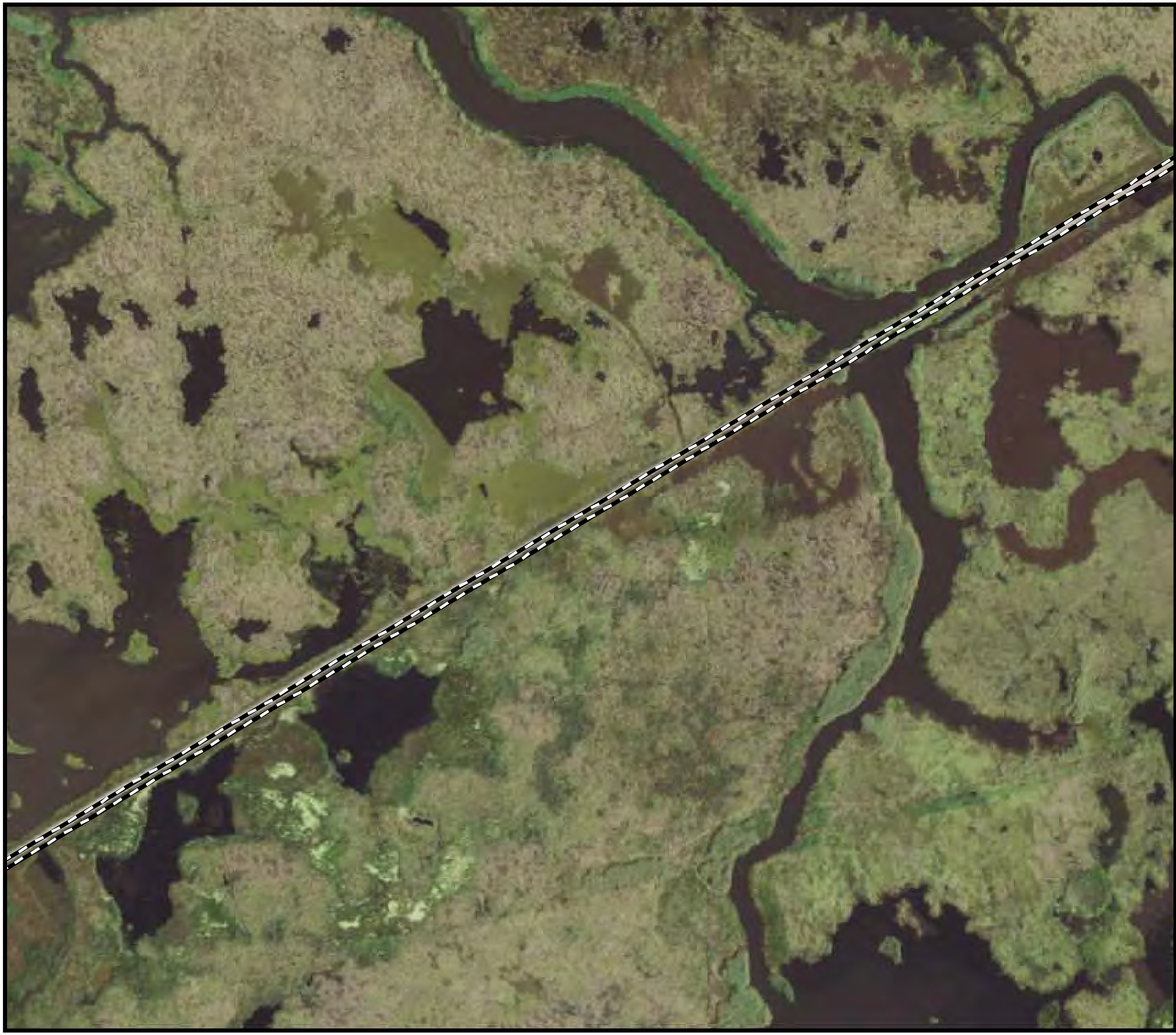


Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

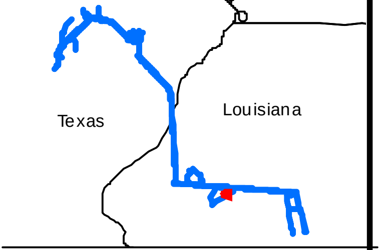
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 112 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

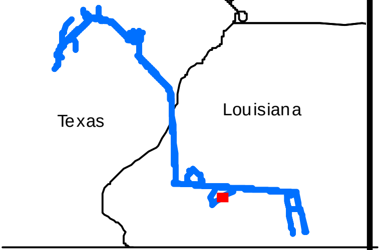
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 113 of 151)

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N

0 125 250 500 Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

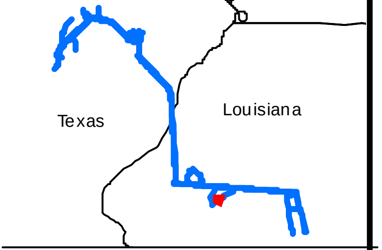
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 114 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▨ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

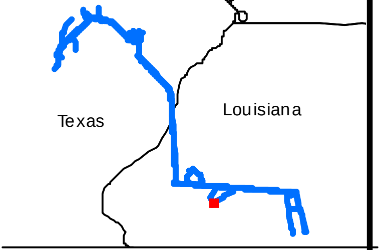
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 115 of 151)

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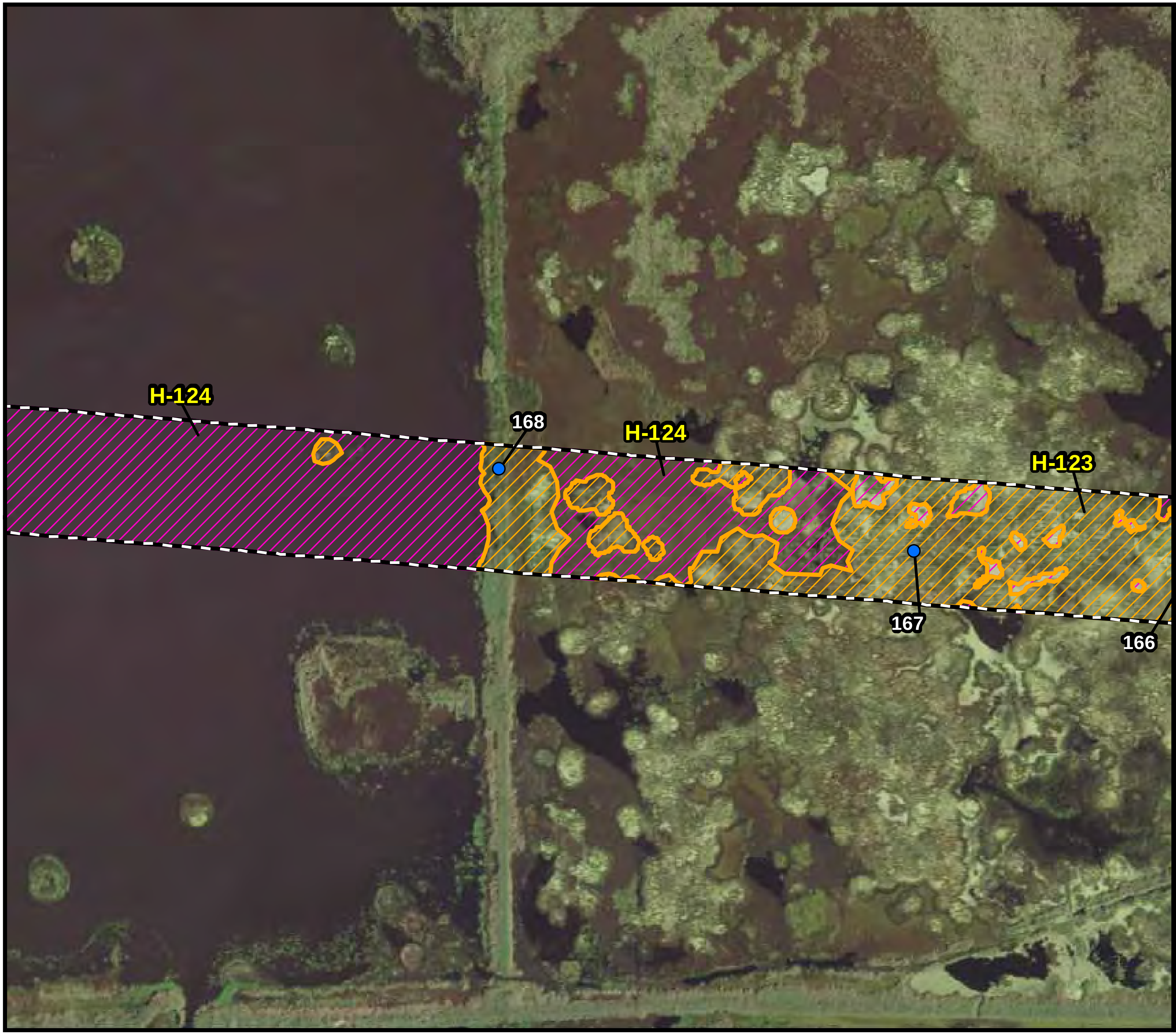


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

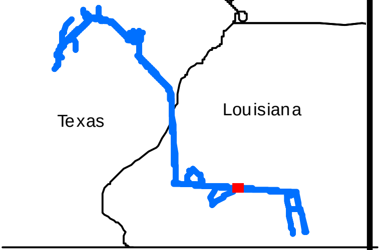
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

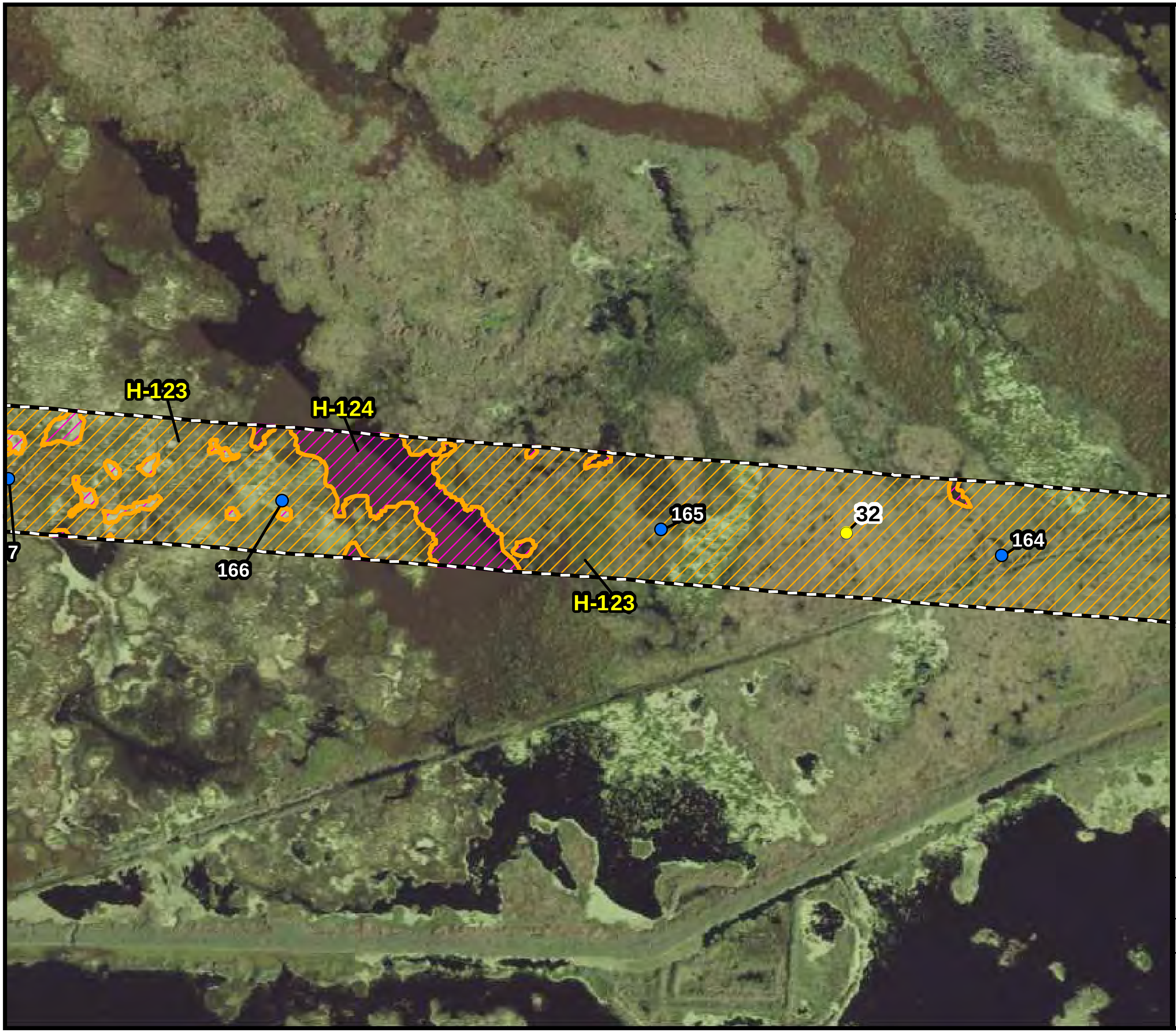
Blue Marlin Offshore Port Project

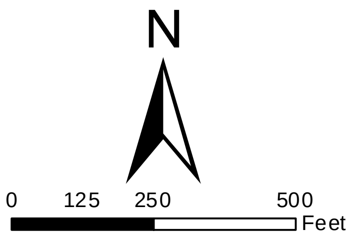
BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 116 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd





Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

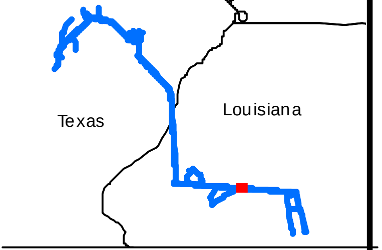
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 117 of 151)

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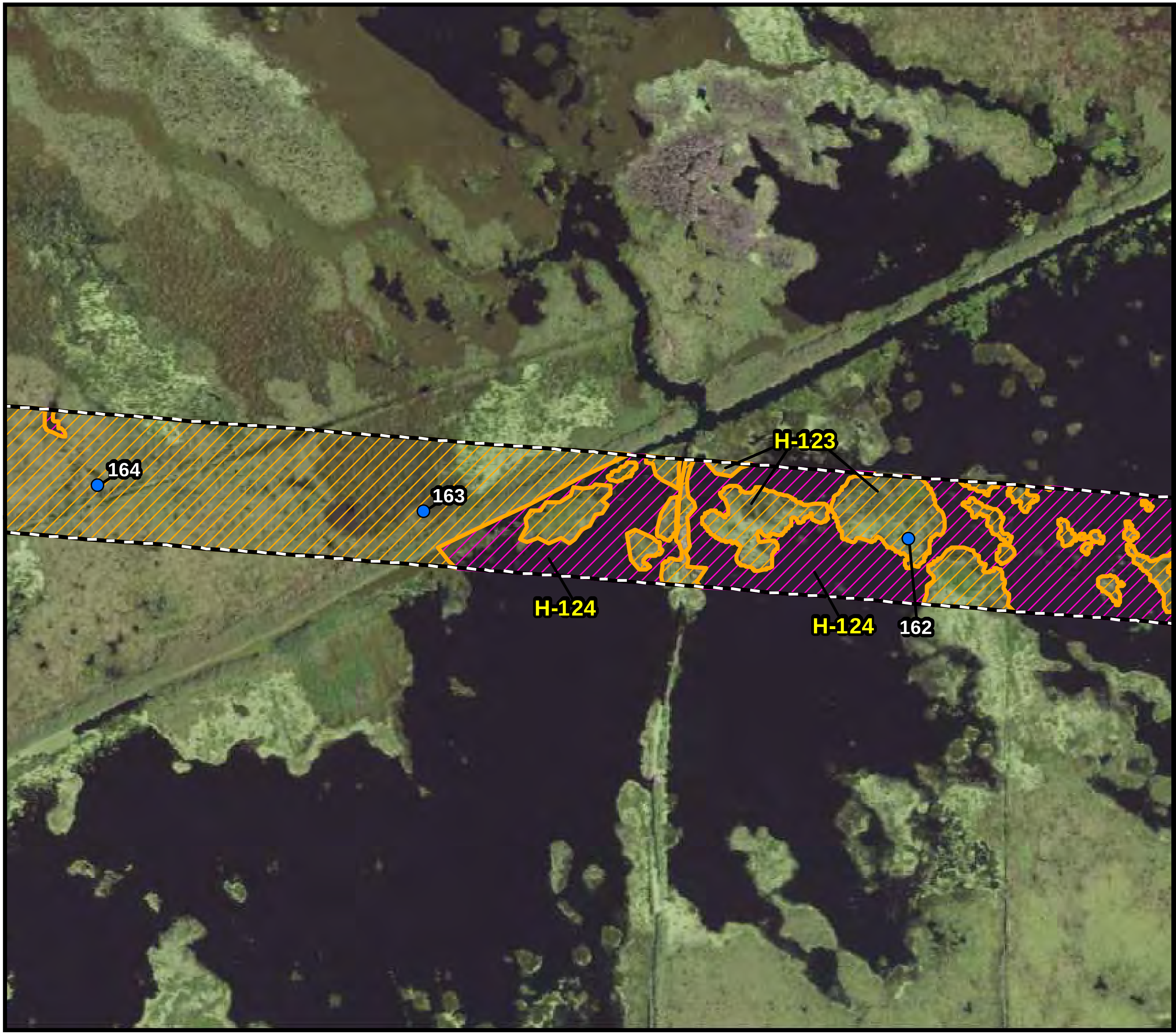
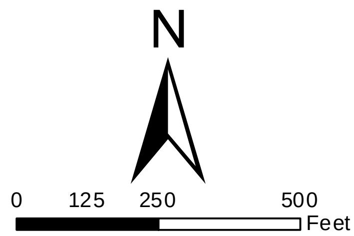




Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

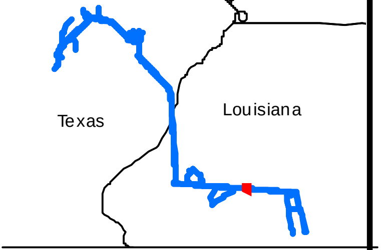
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 118 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

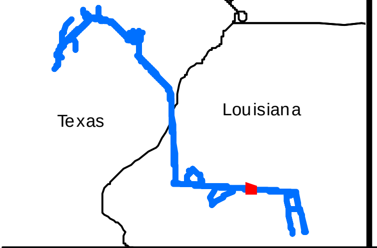
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 119 of 151)

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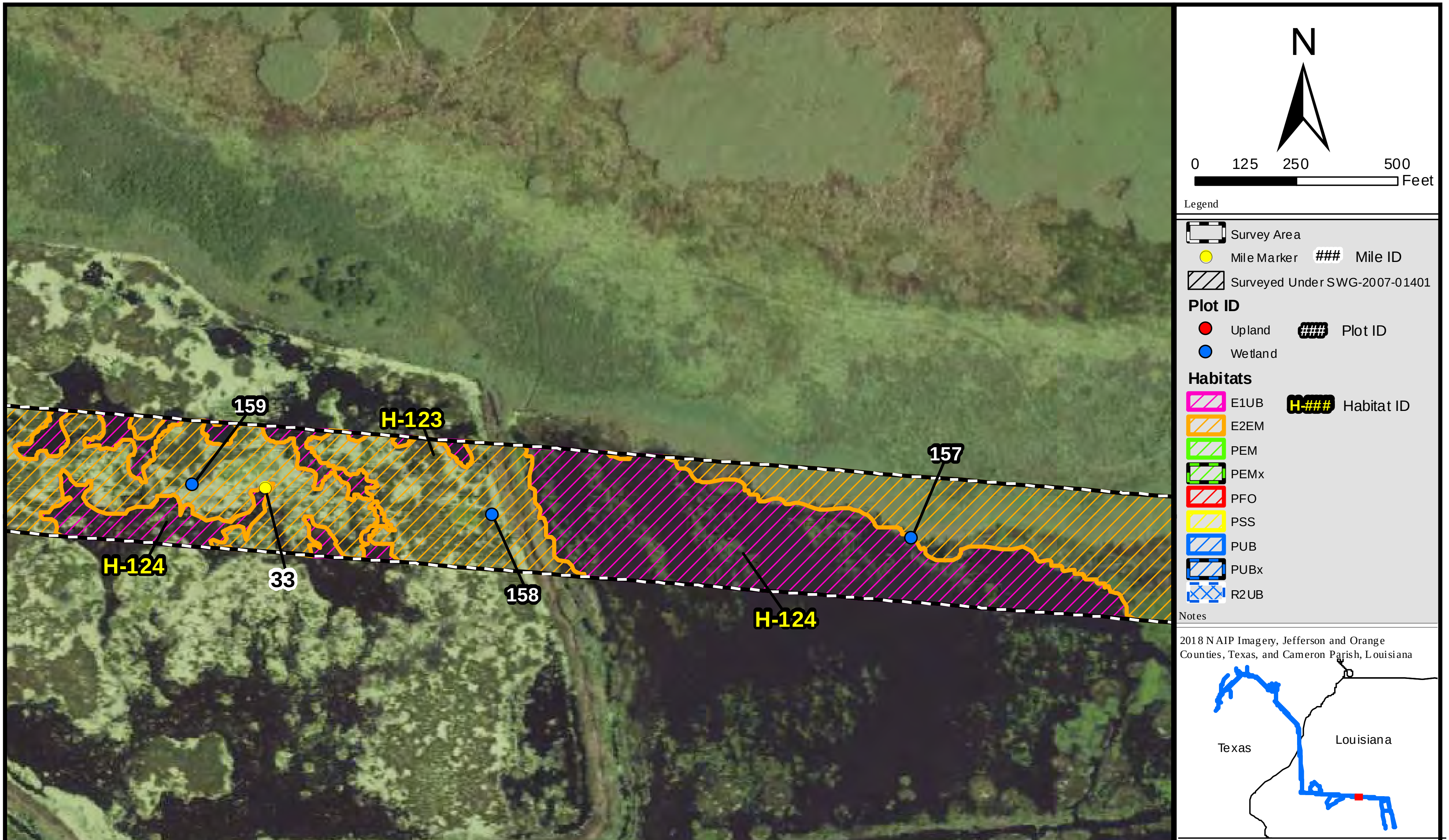

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 120 of 151)

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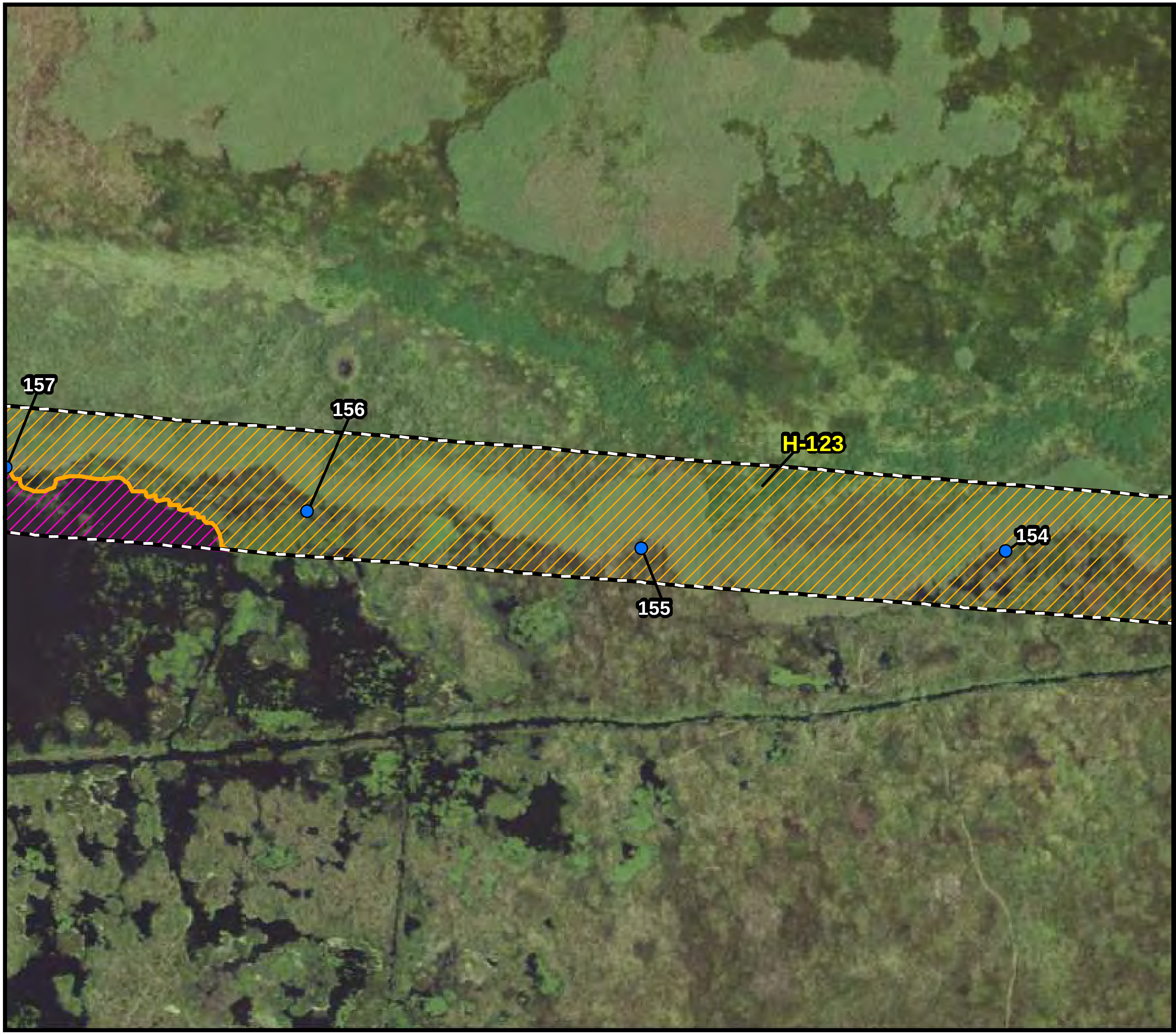


N

0 125 250 500
Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB **H-###** Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

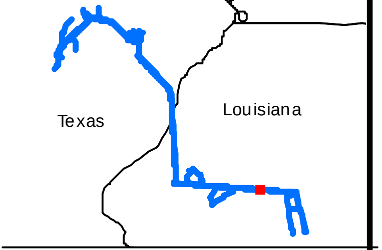
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 121 of 151)

N

0 125 250 500
Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

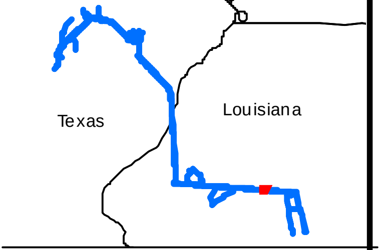
●	Upland
●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark
Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 122 of 151)

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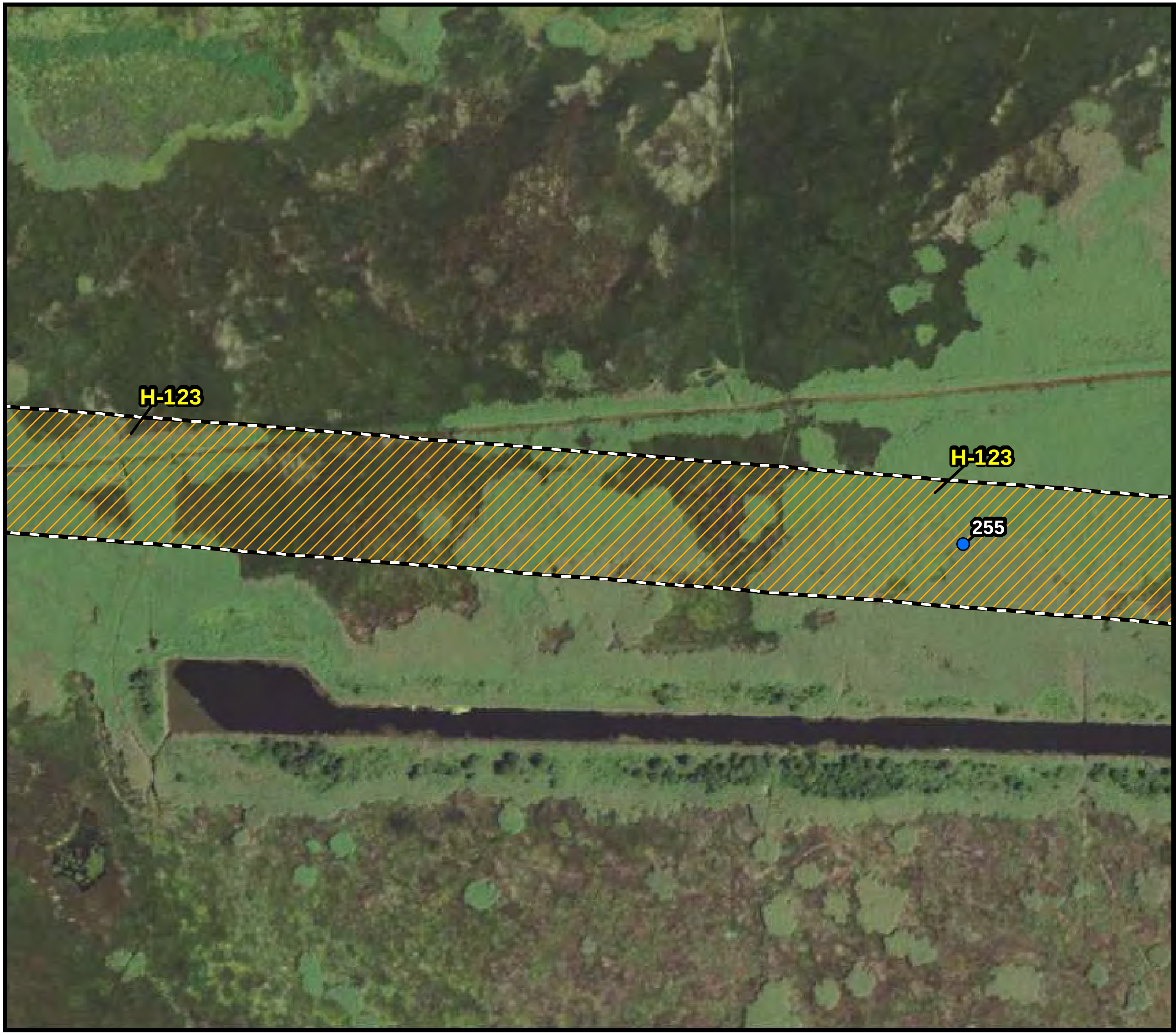


N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

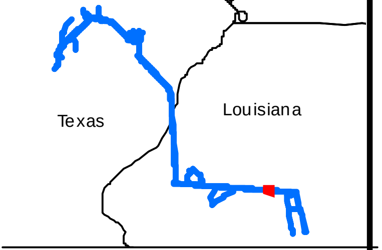
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 123 of 151)

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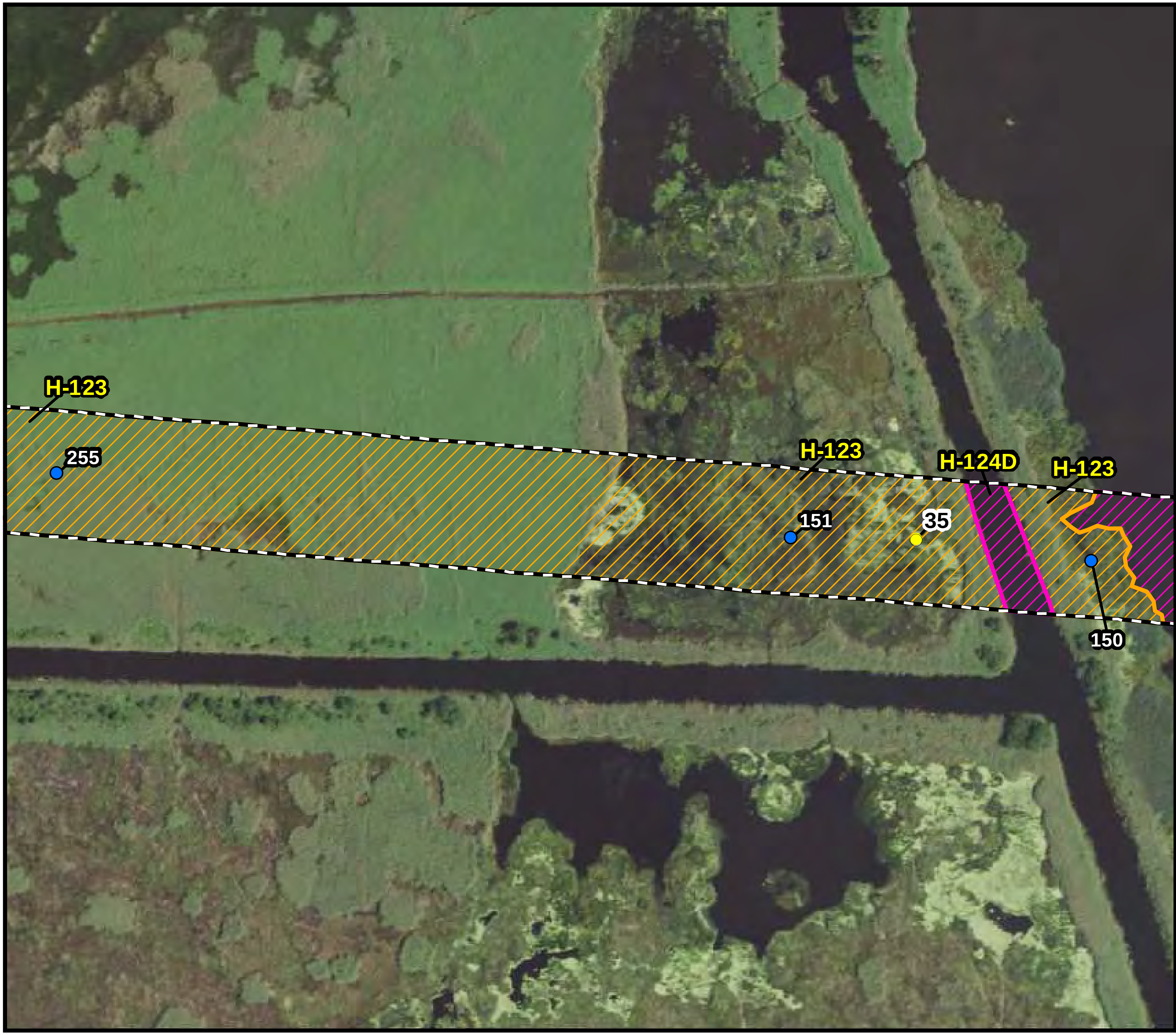


Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

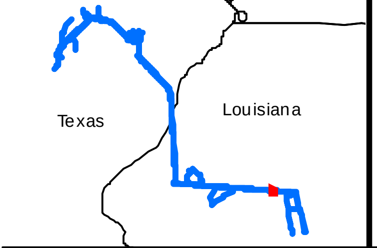
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 124 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

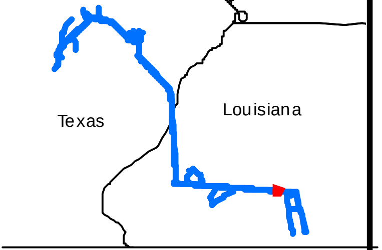
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 125 of 151)

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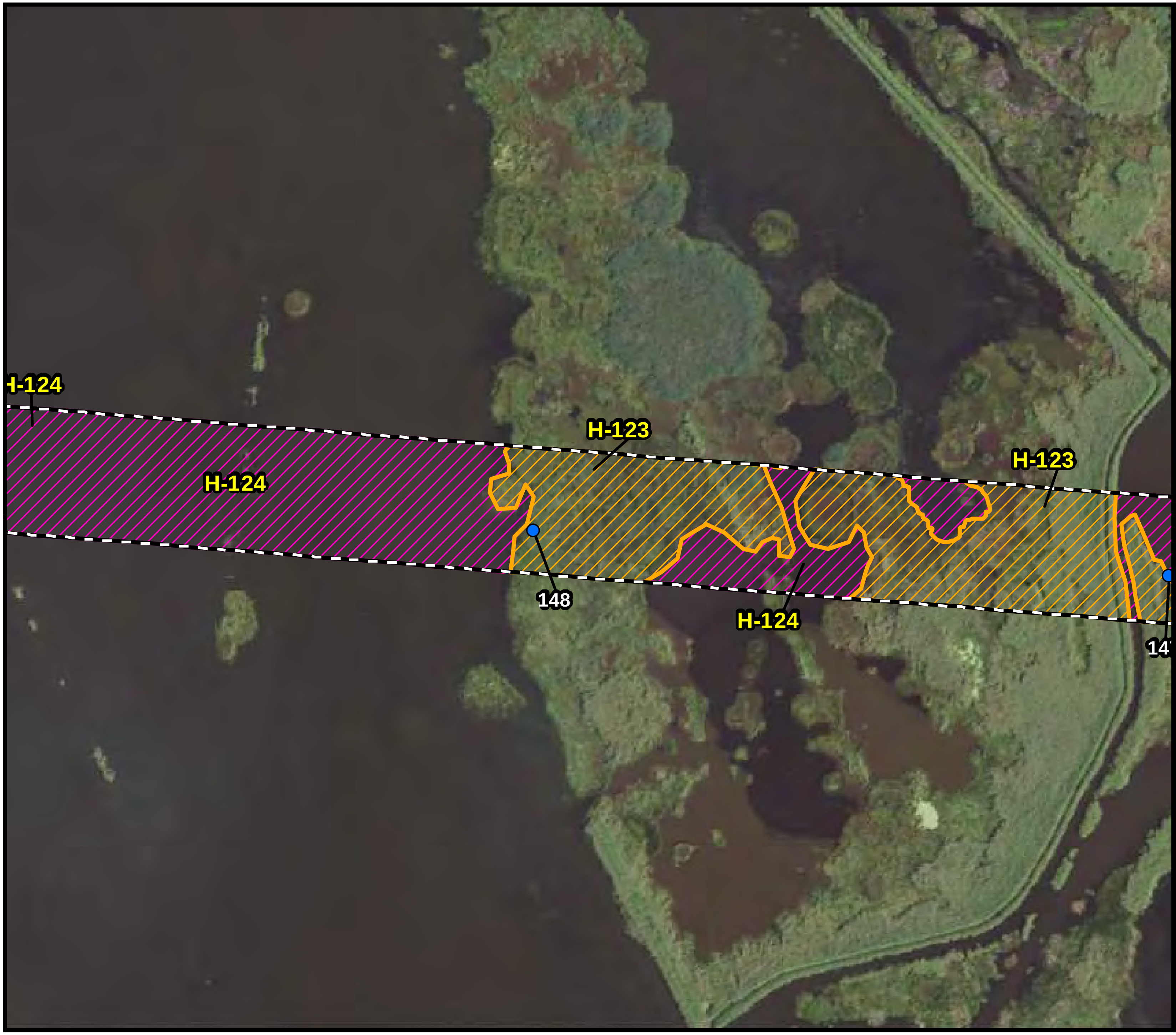


N

0 125 250 500
Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

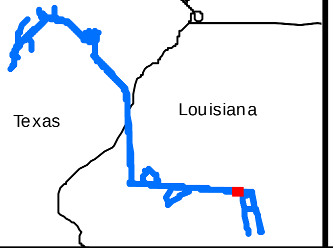
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 126 of 151)

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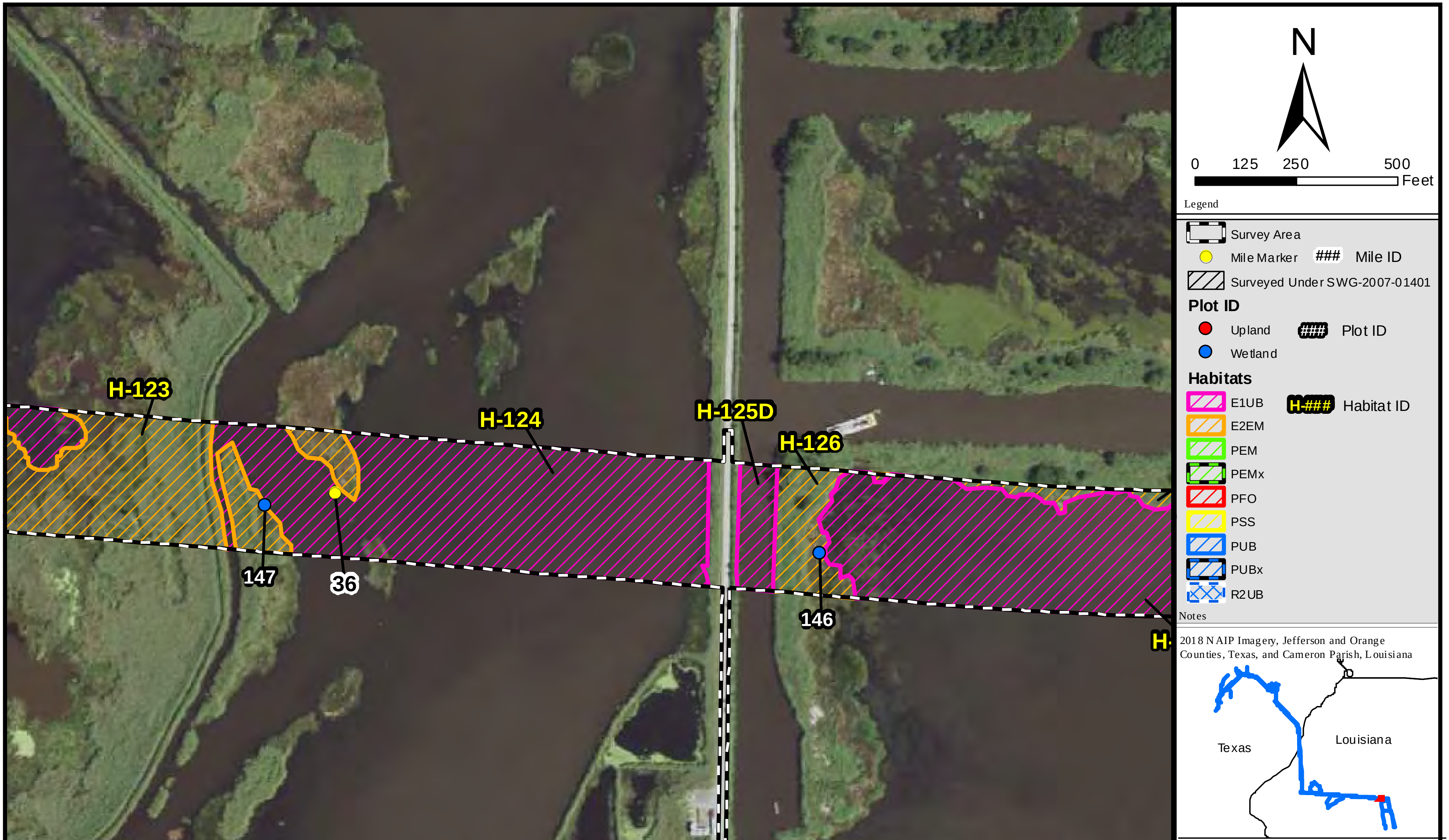

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 127 of 151)

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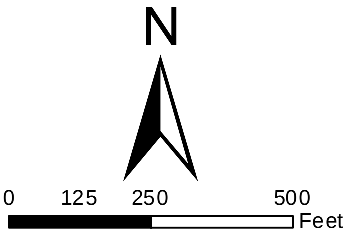


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

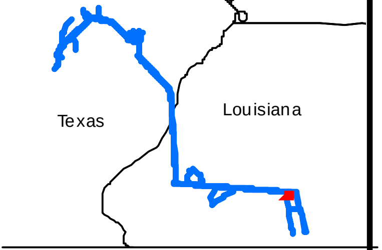
- 🔴 Upland ### Plot ID
- 🔵 Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 128 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

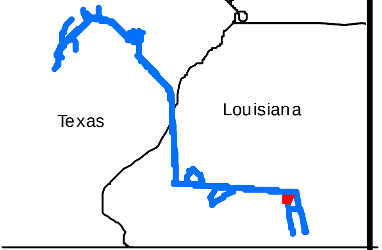
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 129 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

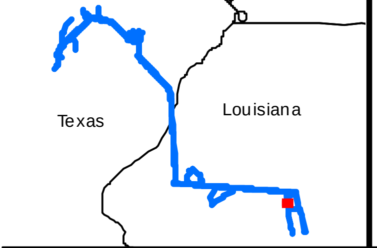
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI
Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 130 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

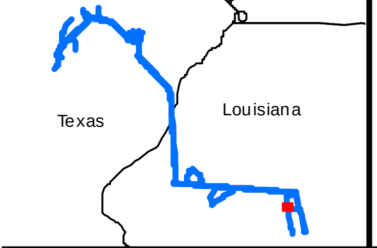
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 131 of 151)

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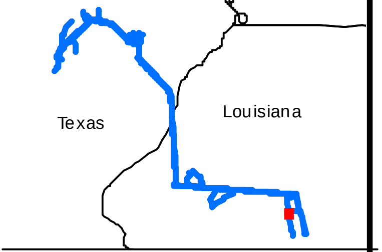


Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

- 🔴 Upland
- 🔵 Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 132 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

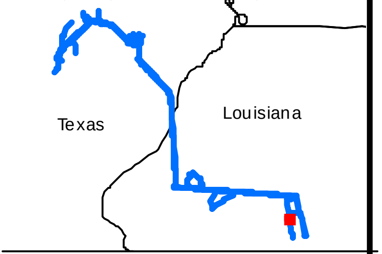
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 133 of 151)

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Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

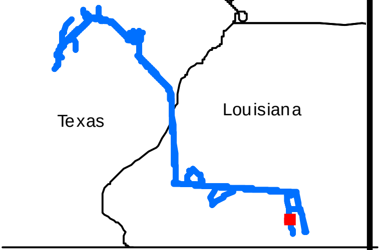
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 134 of 151)

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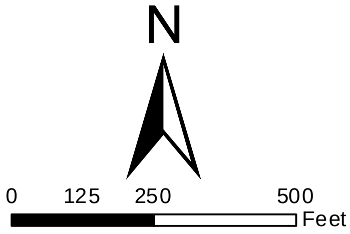


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

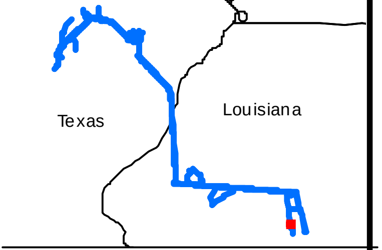
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 135 of 151)

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N

0 125 250 500 Feet

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

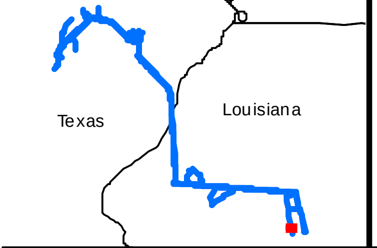
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 136 of 151)

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Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

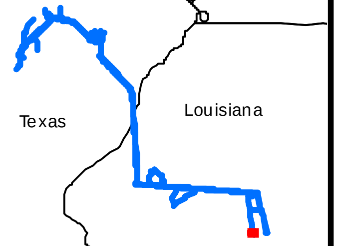
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 137 of 151)

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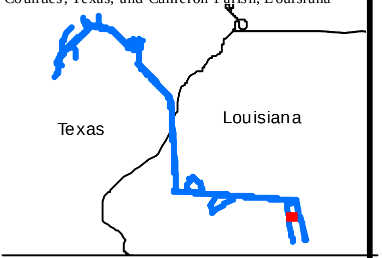

Legend

▭ Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana

Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 138 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

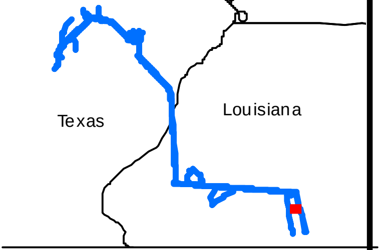
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 139 of 151)

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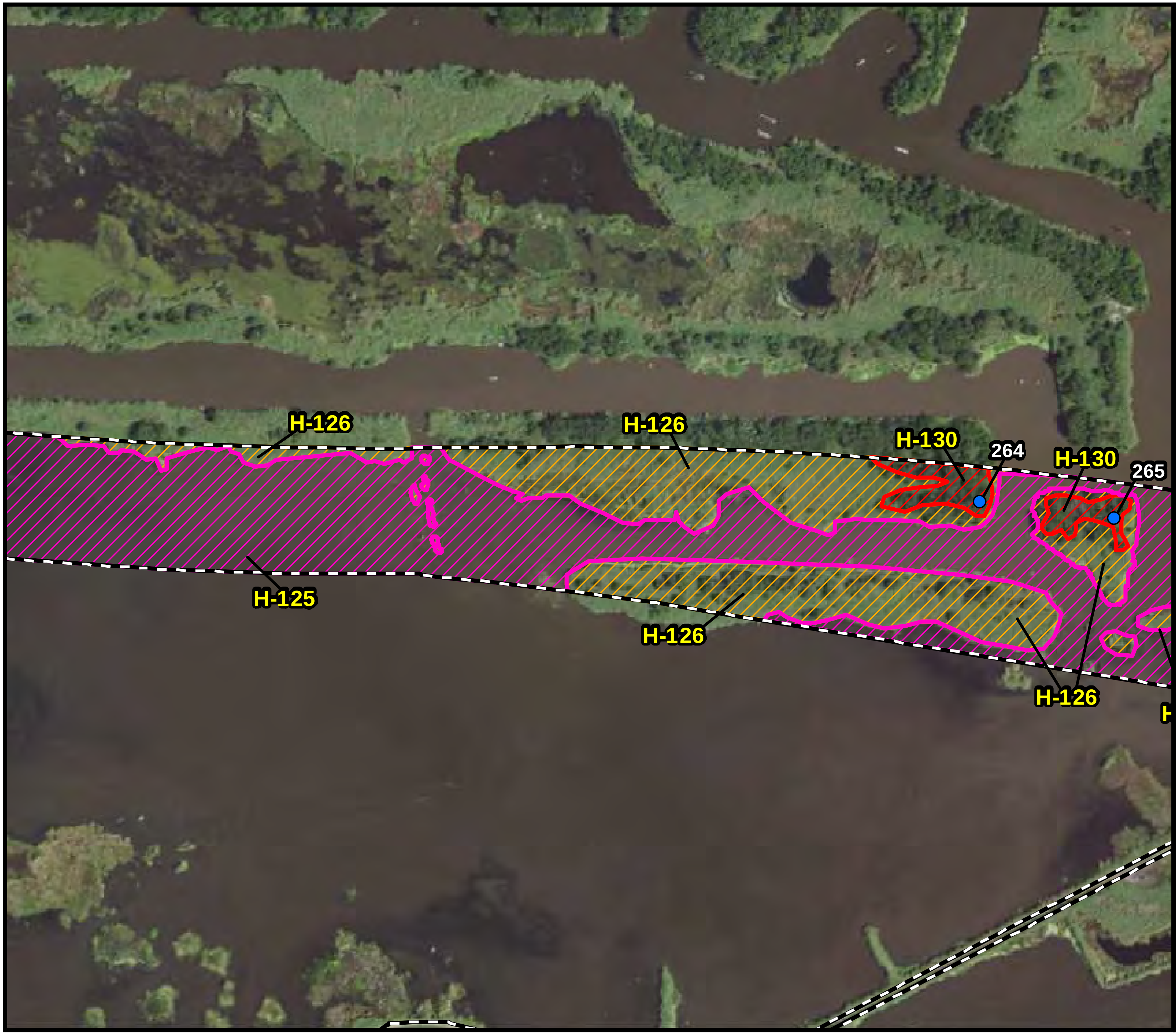


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

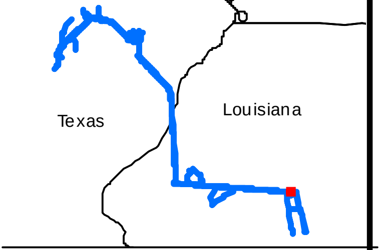
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 140 of 151)

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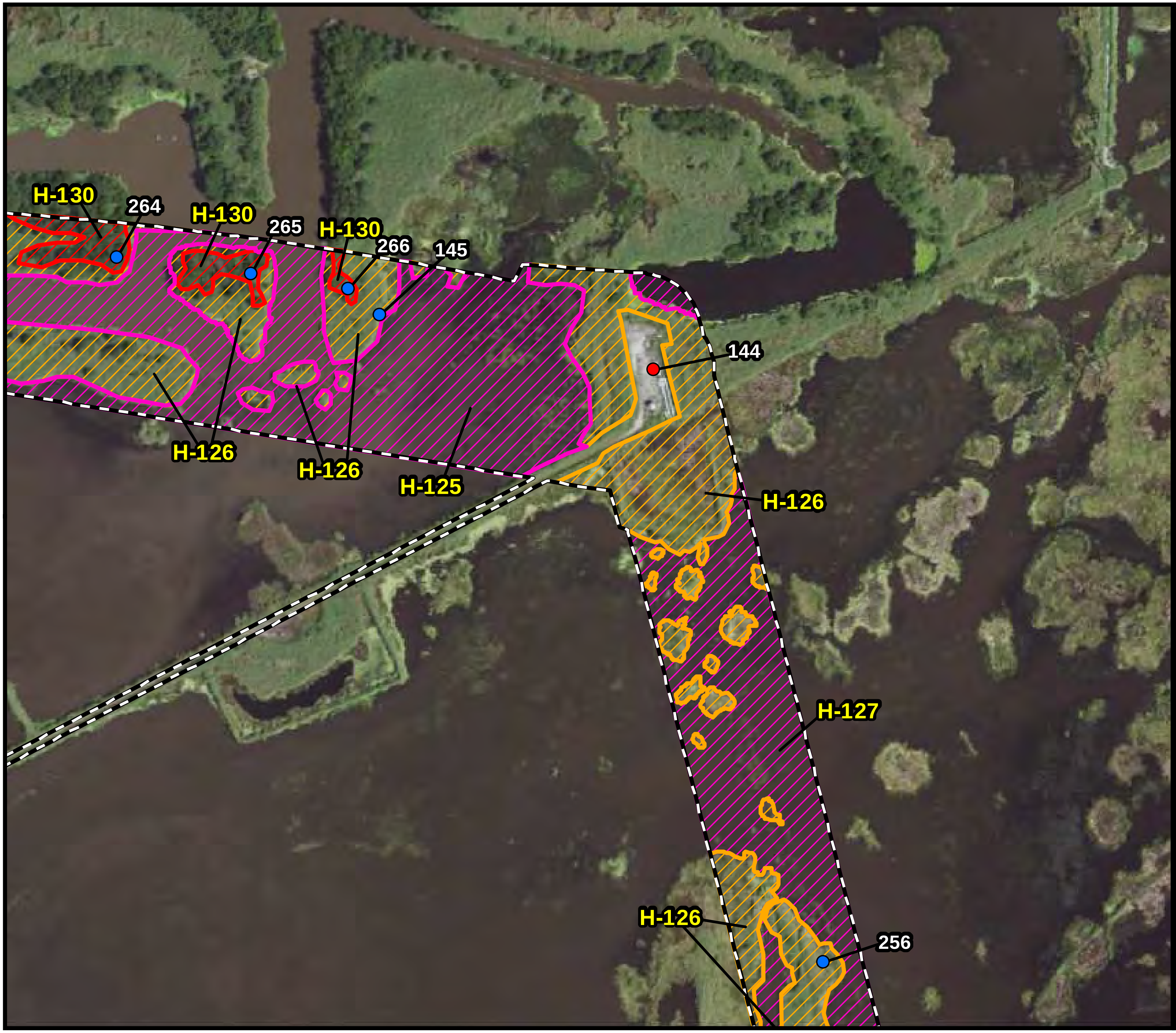


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

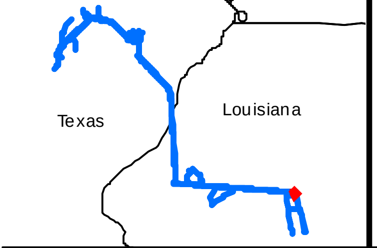
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 141 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

Survey Area

● Mile Marker ### Mile ID

▨ Surveyed Under SWG-2007-01401

Plot ID

● Upland ### Plot ID

● Wetland

Habitats

▨ E1UB H-### Habitat ID

▨ E2EM

▨ PEM

▨ PEMx

▨ PFO

▨ PSS

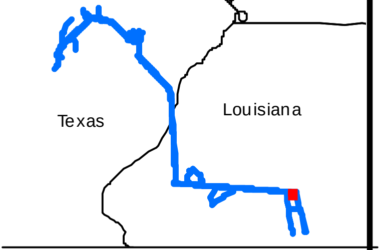
▨ PUB

▨ PUBx

▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 142 of 151)

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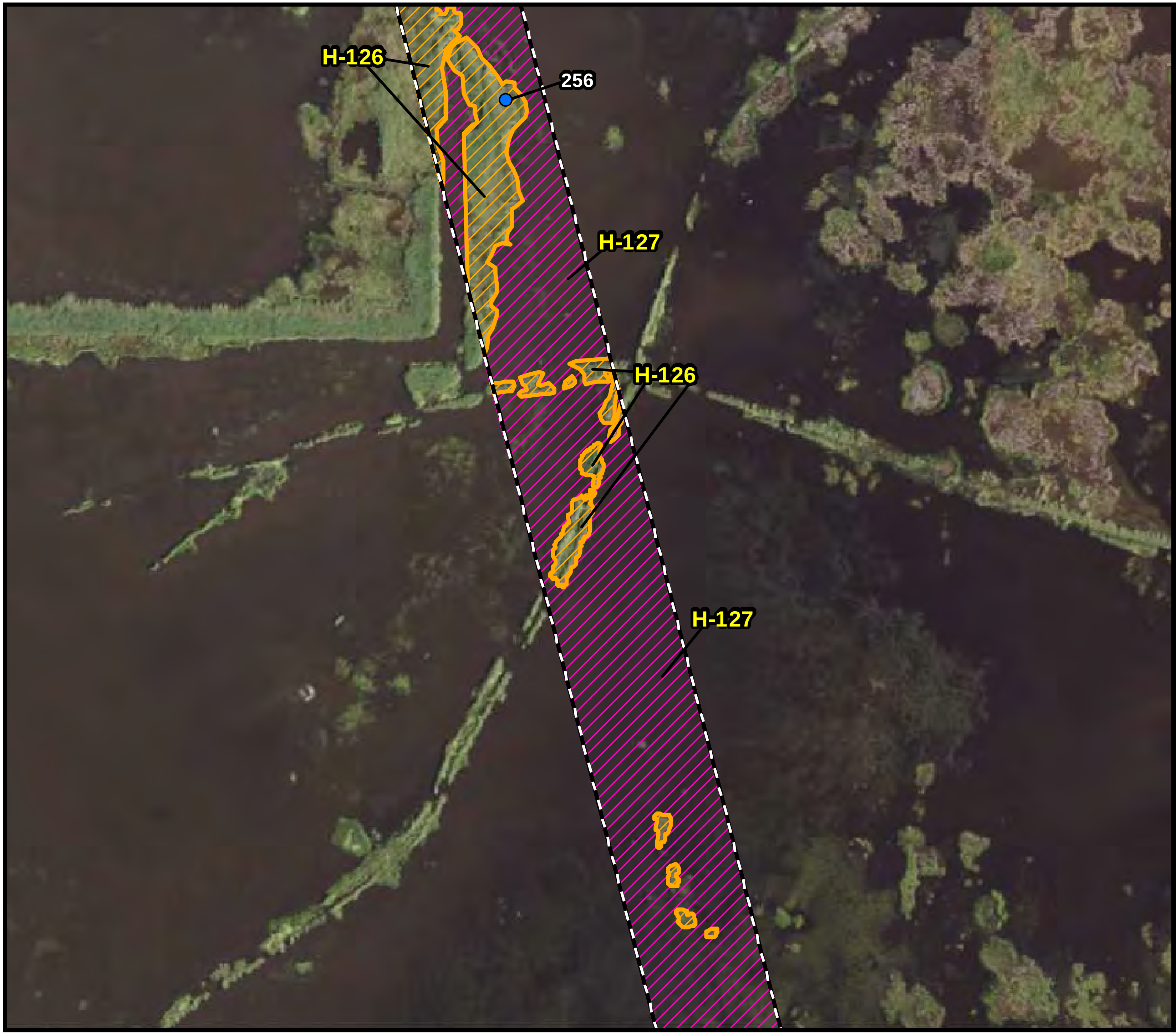


Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

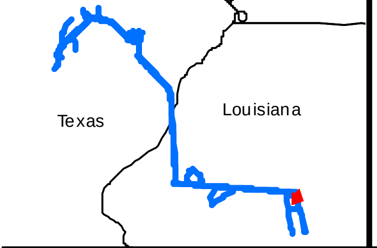
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 143 of 151)

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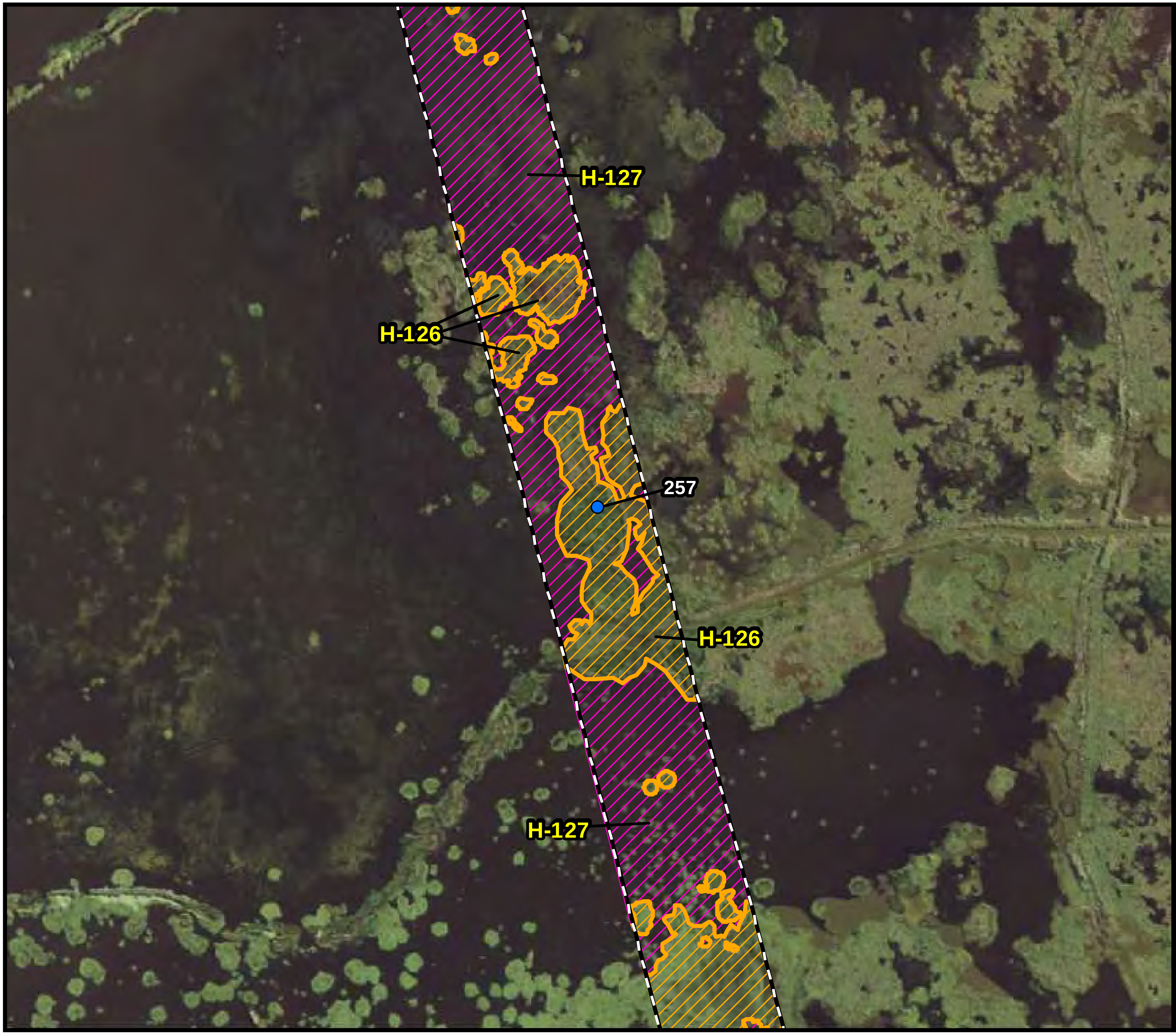


N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

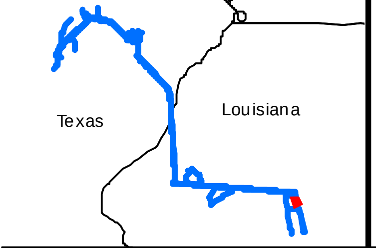
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 144 of 151)

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N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

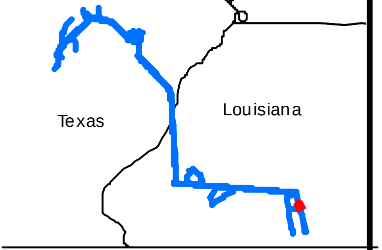
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB H-### Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 145 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

Legend

▭ Survey Area
● Mile Marker
Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

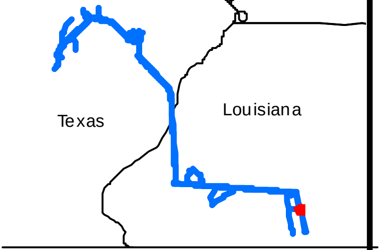
● Upland
● Wetland
Plot ID

Habitats

▨ E1UB
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB
H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 146 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭	Survey Area
●	Mile Marker
###	Mile ID
▨	Surveyed Under SWG-2007-01401

Plot ID

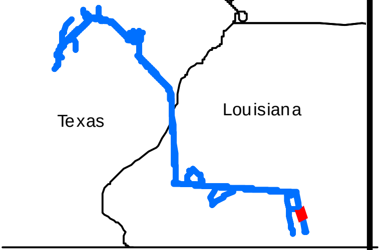
🟥 ●	Upland
🟦 ●	Wetland
###	Plot ID

Habitats

▨	E1UB
▨	E2EM
▨	PEM
▨	PEMx
▨	PFO
▨	PSS
▨	PUB
▨	PUBx
▨	R2UB
H-###	Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 147 of 151)

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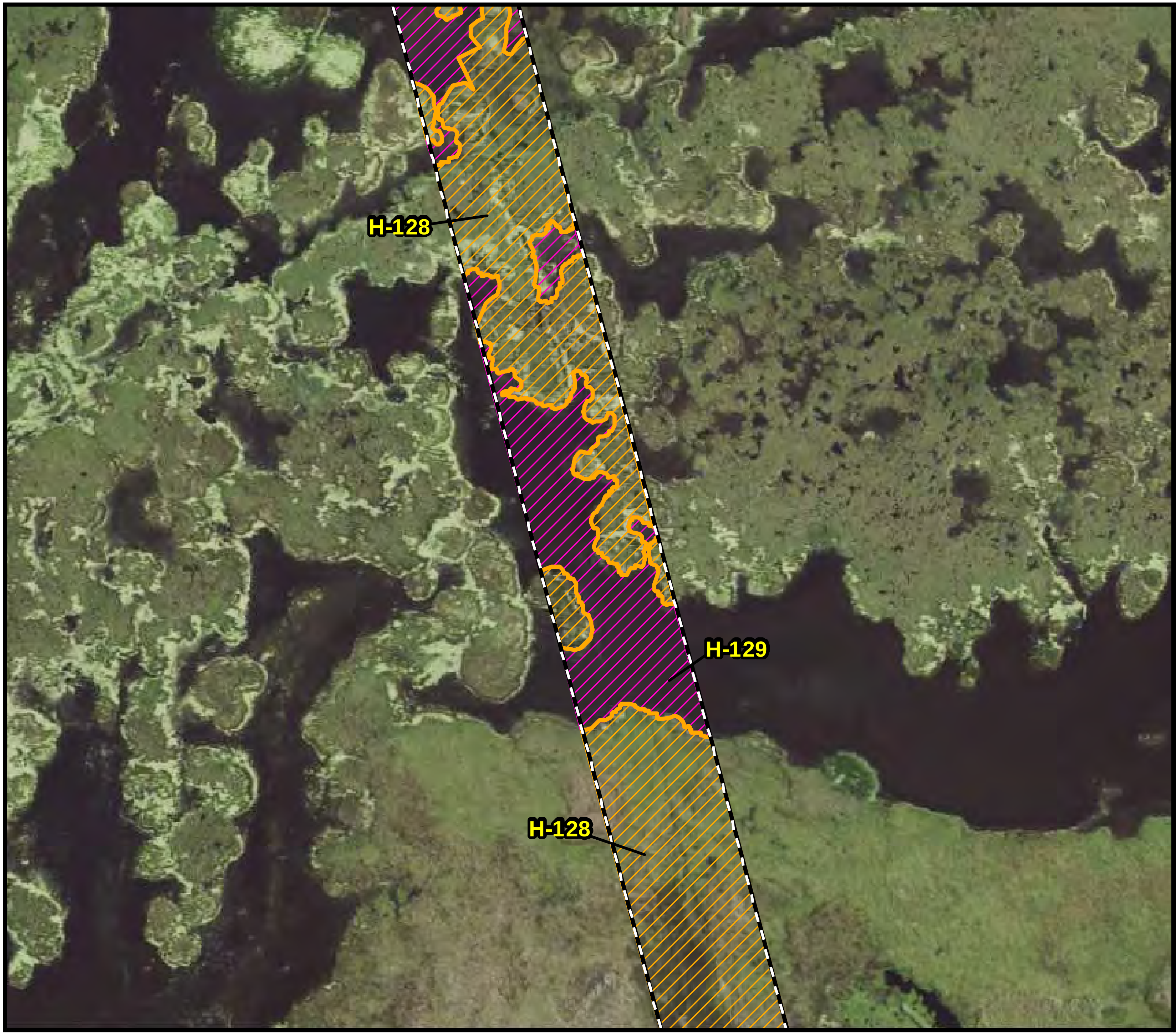
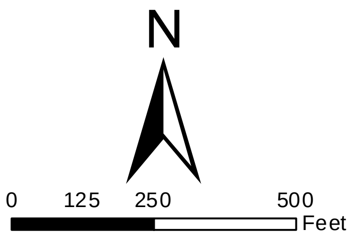




Legend

- ▭ Survey Area
- ● Mile Marker
- ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

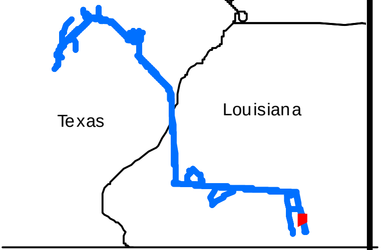
- ● Upland
- ● Wetland
- ### Plot ID

Habitats

- ▨ E1UB
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB
- H-### Habitat ID

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 148 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500 Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

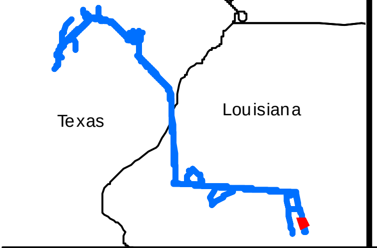
🔴 Upland ### Plot ID
🔵 Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 149 of 151)

M:\13004\014\Arc\Figure5_Wetlands.mxd

N

0 125 250 500
Feet

Legend

▭ Survey Area
● Mile Marker ### Mile ID
▨ Surveyed Under SWG-2007-01401

Plot ID

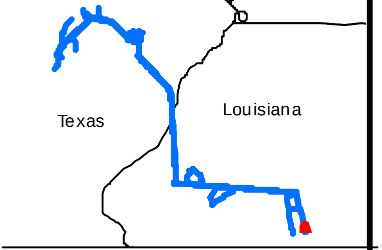
● Upland ### Plot ID
● Wetland

Habitats

▨ E1UB **H-###** Habitat ID
▨ E2EM
▨ PEM
▨ PEMx
▨ PFO
▨ PSS
▨ PUB
▨ PUBx
▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services Inc.

Project: 13004-014
Date: 06/17/2020

Figure 5
(Map 150 of 151)

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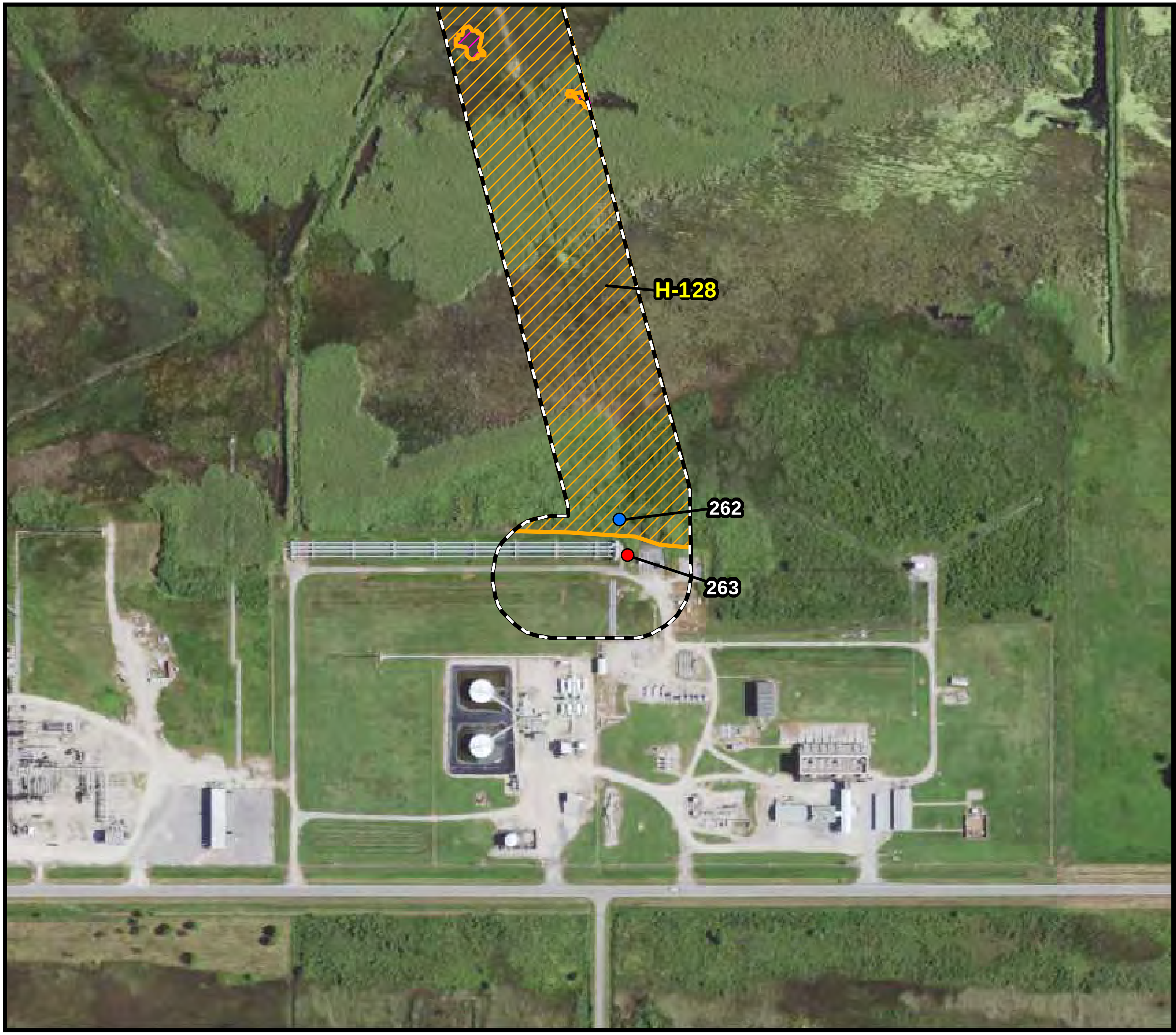


N

0 125 250 500 Feet

Legend

- ▭ Survey Area
- ● Mile Marker ### Mile ID
- ▨ Surveyed Under SWG-2007-01401

Plot ID

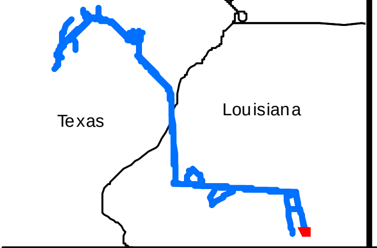
- ● Upland ### Plot ID
- ● Wetland

Habitats

- ▨ E1UB H-### Habitat ID
- ▨ E2EM
- ▨ PEM
- ▨ PEMx
- ▨ PFO
- ▨ PSS
- ▨ PUB
- ▨ PUBx
- ▨ R2UB

Notes

2018 NAIP Imagery, Jefferson and Orange Counties, Texas, and Cameron Parish, Louisiana



Wetland Determination Map

Blue Marlin Offshore Port LLC

Blue Marlin Offshore Port Project

BESI Benchmark Ecological Services, Inc.

Project: 13004-014

Date: 06/17/2020

Figure 5
(Map 151 of 151)

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APPENDIX B

SOIL INFORMATION SURVEY

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Cameron Parish, Louisiana, and Jefferson and Orange Counties, Texas

June 15, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:292,000 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cameron Parish, Louisiana
Survey Area Data: Version 17, Sep 11, 2019

Soil Survey Area: Jefferson and Orange Counties, Texas
Survey Area Data: Version 20, Sep 12, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BA	Bancker muck, 0 to 0.2 percent slopes, very frequently flooded	455.7	28.1%
CR	Creole mucky clay	75.8	4.7%
Hb	Hackberry loamy fine sand	0.3	0.0%
Hm	Hackberry-Mermentau complex, gently undulating	6.0	0.4%
ME	Mermentau clay	23.8	1.5%
W	Water	277.4	17.1%
Subtotals for Soil Survey Area		**838.9**	**51.7%**
Totals for Area of Interest		**1,622.5**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	47.5	2.9%
BbA	Barbary mucky clay, 0 to 1 percent slopes, frequently flooded	92.1	5.7%
CamA	Camptown silt loam, 0 to 1 percent slopes, frequently ponded	0.3	0.0%
CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	34.4	2.1%
HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	0.7	0.0%
IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	88.8	5.5%
NuC	Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	1.8	0.1%
OrdB	Orcadia silt loam, 0 to 2 percent slopes, rarely flooded	13.6	0.8%
OriA	Orcadia-Anahuac complex, 0 to 1 percent slopes	54.1	3.3%
OrnA	Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded	37.4	2.3%
OsdA	Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded	65.9	4.1%
OsuB	Orcadia-Urban land complex, 0 to 2 percent slopes	11.7	0.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OsvB	Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded	61.9	3.8%
URLX	Urban land	1.0	0.1%
W	Water	246.0	15.2%
ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	26.3	1.6%
Subtotals for Soil Survey Area		**783.6**	**48.3%**
Totals for Area of Interest		**1,622.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Cameron Parish, Louisiana

BA—Bancker muck, 0 to 0.2 percent slopes, very frequently flooded

Map Unit Setting

National map unit symbol: 2tpnf
Elevation: 0 feet
Mean annual precipitation: 43 to 68 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 219 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Bancker, very frequently flooded, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bancker, Very Frequently Flooded

Setting

Landform: Marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fluid clayey backswamp deposits

Typical profile

Oa - 0 to 10 inches: muck
Cg - 10 to 79 inches: clay

Properties and qualities

Slope: 0 to 0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: Brackish Fluid Marsh 60-64 PZ (R151XY004LA)
Hydric soil rating: Yes

Minor Components

Clovelly, very frequently flooded

Percent of map unit: 10 percent

Landform: Marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Brackish Fluid Marsh 60-64 PZ (R151XY004LA)
Hydric soil rating: Yes

Creole, very frequently flooded
Percent of map unit: 8 percent
Landform: Marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Brackish Firm Mineral Marsh 55-64 PZ (R151XY005LA)
Hydric soil rating: Yes

CR—Creole mucky clay

Map Unit Setting

National map unit symbol: 1vvg8
Elevation: 0 feet
Mean annual precipitation: 43 to 61 inches
Mean annual air temperature: 59 to 77 degrees F
Frost-free period: 259 to 313 days
Farmland classification: Not prime farmland

Map Unit Composition

Creole and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Creole

Setting

Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fluid clayey alluvium

Typical profile

H1 - 0 to 17 inches: mucky clay
H2 - 17 to 48 inches: clay
H3 - 48 to 52 inches: sandy loam
H4 - 52 to 96 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 15.0
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Brackish Firm Mineral Marsh 55-64 PZ (R151XY005LA)
Hydric soil rating: Yes

Minor Components

Minor components

Percent of map unit: 15 percent
Hydric soil rating: No

Hb—Hackberry loamy fine sand

Map Unit Setting

National map unit symbol: 1vvgd
Elevation: 0 to 10 feet
Mean annual precipitation: 43 to 61 inches
Mean annual air temperature: 59 to 77 degrees F
Frost-free period: 259 to 313 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hackberry and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hackberry

Setting

Landform: Beach ridges
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy beach sand and/or loamy beach sand

Typical profile

H1 - 0 to 6 inches: loamy fine sand
H2 - 6 to 28 inches: very fine sandy loam

H3 - 28 to 61 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 12 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Sandy Chenier 55-64 PZ (R151XY010LA)
Hydric soil rating: No

Minor Components

Creole

Percent of map unit: 3 percent
Landform: Depressions
Ecological site: Brackish Firm Mineral Marsh 55-64 PZ (R151XY005LA)
Hydric soil rating: Yes

Bancker

Percent of map unit: 3 percent
Landform: Depressions
Ecological site: Brackish Fluid Marsh 60-64 PZ (R151XY004LA)
Hydric soil rating: Yes

Peveto

Percent of map unit: 2 percent
Ecological site: Sandy Chenier 55-64 PZ (R151XY010LA)
Hydric soil rating: No

Mermentau

Percent of map unit: 2 percent
Landform: Depressions
Ecological site: Clayey Chenier Brackish Marsh 55-64 PZ (R151XY006LA)
Hydric soil rating: Yes

Hm—Hackberry-Mermentau complex, gently undulating

Map Unit Setting

National map unit symbol: 1vvgf
Elevation: 0 to 20 feet
Mean annual precipitation: 43 to 61 inches
Mean annual air temperature: 59 to 77 degrees F
Frost-free period: 259 to 313 days
Farmland classification: Not prime farmland

Map Unit Composition

Hackberry and similar soils: 60 percent
Mermentau and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hackberry

Setting

Landform: Beach ridges
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy beach sand and/or loamy beach sand

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 27 inches: very fine sandy loam
H3 - 27 to 60 inches: loamy fine sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 12 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A

Ecological site: Sandy Chenier 55-64 PZ (R151XY010LA)
Hydric soil rating: No

Description of Mermentau

Setting

Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over clayey backswamp deposits

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 29 inches: silty clay
H3 - 29 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 42 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 35.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Clayey Chenier Brackish Marsh 55-64 PZ (R151XY006LA)
Hydric soil rating: Yes

Minor Components

Minor components

Percent of map unit: 10 percent
Hydric soil rating: No

ME—Mermentau clay

Map Unit Setting

National map unit symbol: 1vvgl
Elevation: 0 to 20 feet
Mean annual precipitation: 43 to 61 inches
Mean annual air temperature: 59 to 77 degrees F

Frost-free period: 259 to 313 days
Farmland classification: Not prime farmland

Map Unit Composition

Mermentau and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mermentau

Setting

Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coastal clayey and/or loamy alluvium

Typical profile

H1 - 0 to 19 inches: clay
H2 - 19 to 59 inches: very fine sandy loam
H3 - 59 to 69 inches: sandy clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 42 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 35.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Clayey Chenier Brackish Marsh 55-64 PZ (R151XY006LA)
Hydric soil rating: Yes

Minor Components

Minor components

Percent of map unit: 14 percent
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 1vvgy
Mean annual precipitation: 43 to 61 inches
Mean annual air temperature: 59 to 77 degrees F
Frost-free period: 259 to 313 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Jefferson and Orange Counties, Texas

BaA—Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal

Map Unit Setting

National map unit symbol: dl2s
Elevation: 0 to 10 feet
Mean annual precipitation: 54 to 60 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 260 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Bancker and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bancker

Setting

Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fluid clayey backswamp deposits

Typical profile

Oa - 0 to 9 inches: mucky peat
H2 - 9 to 41 inches: clay
H3 - 41 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 36.0
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: FLUID BRACKISH MARSH (R151XY674TX)
Hydric soil rating: Yes

Minor Components

Unnamed, minor components

Percent of map unit: 14 percent
Hydric soil rating: No

BbA—Barbary mucky clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2qr6p
Elevation: 0 to 50 feet
Mean annual precipitation: 43 to 73 inches
Mean annual air temperature: 55 to 79 degrees F
Frost-free period: 245 to 321 days
Farmland classification: Not prime farmland

Map Unit Composition

Barbary, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barbary, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Fluid clayey alluvium

Typical profile

A - 0 to 14 inches: mucky clay
Cg - 14 to 65 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: Delta Plain - Frequently Flooded Ponded Very Poorly Drained Oxbows And Swales - PROVISIONAL (F131AY501LA)
Hydric soil rating: Yes

Minor Components

Fausse, frequently flooded
Percent of map unit: 8 percent
Landform: Backswamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Schriever, frequently flooded
Percent of map unit: 2 percent
Landform: Backswamps
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

CamA—Camptown silt loam, 0 to 1 percent slopes, frequently ponded

Map Unit Setting
National map unit symbol: f73z
Elevation: 10 to 100 feet
Mean annual precipitation: 48 to 60 inches
Mean annual air temperature: 67 to 69 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition
Camptown and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Camptown

Setting
Landform: Meanders
Landform position (three-dimensional): Dip
Microfeatures of landform position: Channels
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 4 inches: silt loam
Bg - 4 to 24 inches: silt loam
Btg/E - 24 to 46 inches: silt loam
Btg - 46 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 6w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: Poorly Drained Loamy Upland (F152BY007TX)
Hydric soil rating: Yes

Minor Components

Evadale

Percent of map unit: 3 percent
Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Poorly Drained Loamy Upland (F152BY007TX)
Hydric soil rating: Yes

Bevil

Percent of map unit: 2 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Microfeatures of landform position: Gilgai
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey Flat (F152BY004TX)
Hydric soil rating: Yes

CsA—Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal

Map Unit Setting

National map unit symbol: dl36
Elevation: 0 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 260 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Creole and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Creole

Setting

Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fluid clayey backswamp deposits

Typical profile

H1 - 0 to 7 inches: mucky peat
H2 - 7 to 13 inches: clay
H3 - 13 to 34 inches: clay
H4 - 34 to 58 inches: clay
H5 - 58 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D

Ecological site: FIRM BRACKISH MARSH (R151XY671TX)
Hydric soil rating: Yes

Minor Components

Unnamed, hydric minor components

Percent of map unit: 14 percent
Landform: Depressions
Hydric soil rating: Yes

HatA—Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 1vykn
Elevation: 20 to 150 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 67 to 68 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Hatliff and similar soils: 38 percent
Pluck and similar soils: 35 percent
Kian and similar soils: 24 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hatliff

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Holocene age clayey alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 12 inches: loam
Bw1 - 12 to 38 inches: fine sandy loam
Bw2 - 38 to 62 inches: fine sandy loam
Bg - 62 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 44 to 64 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: Well Drained Bottomland (F152BY012TX)
Hydric soil rating: No

Description of Pluck

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Microfeatures of landform position: Channels
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: fine sandy loam
Bg1 - 6 to 34 inches: loam
Bg2 - 34 to 60 inches: loam
Bg3 - 60 to 80 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 3 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: Poorly Drained Loamy Bottomland (F152BY013TX)
Hydric soil rating: Yes

Description of Kian

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Microfeatures of landform position: Channels
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Loamy alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw - 5 to 26 inches: fine sandy loam
Bg1 - 26 to 55 inches: fine sandy loam
Bg2 - 55 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 3 to 10 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 8e
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Poorly Drained Loamy Bottomland (F152BY013TX)
Hydric soil rating: Yes

Minor Components

Simelake

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Poorly Drained Clayey Bottomland (F152BY014TX)
Hydric soil rating: Yes

Cowmarsh

Percent of map unit: 1 percent
Landform: Oxbows
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Swamp (F152BY011TX)

Hydric soil rating: Yes

IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal

Map Unit Setting

National map unit symbol: 2thnj
Elevation: 0 to 10 feet
Mean annual precipitation: 50 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Ijam and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ijam

Setting

Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey dredge spoils derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: clay
Cg1 - 6 to 23 inches: clay
Cg2 - 23 to 65 inches: clay
Cg3 - 65 to 80 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: INTERMEDIATE Firm MARSH (R151XY673TX)
Hydric soil rating: Yes

NuC—Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal

Map Unit Setting

National map unit symbol: dl41
Elevation: 0 to 10 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 260 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Neel and similar soils: 60 percent
Urban land: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Neel

Setting

Microfeatures of landform position: Mounds
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey sediments of the beaumont formation

Typical profile

H1 - 0 to 12 inches: clay
H2 - 12 to 80 inches: clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: SALTY PRAIRIE (R151XY680TX)
Hydric soil rating: No

Description of Urban Land

Typical profile

H1 - 0 to 40 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Unnamed, minor components

Percent of map unit: 12 percent
Hydric soil rating: No

Unnamed, hydric minor components

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

OrdB—Orcadia silt loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2thp9
Elevation: 10 to 20 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Orcadia and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear

Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: silt loam
E - 6 to 10 inches: silt loam
Bt/E - 10 to 15 inches: silt loam
Bt - 15 to 43 inches: clay
Btg - 43 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Minor Components

Aris

Percent of map unit: 8 percent
Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Lowland (R150AY537TX)
Hydric soil rating: Yes

Labelle

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

OriA—Orcadia-Anahuac complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2thpb
Elevation: 10 to 100 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Orcadia and similar soils: 60 percent
Anahuac and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: loam
E - 6 to 10 inches: loam
Bt/E - 10 to 17 inches: loam
Bt - 17 to 58 inches: clay loam
Btg - 58 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 6.0
Available water storage in profile: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Description of Anahuac

Setting

Landform: Point bars
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 15 inches: very fine sandy loam
E - 15 to 19 inches: very fine sandy loam
Bt/E - 19 to 24 inches: loam
Bt - 24 to 52 inches: clay
Btg - 52 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 41 to 64 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Minor Components

Aris

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: Lowland (R150AY537TX)
Hydric soil rating: Yes

Morey

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Labelle

Percent of map unit: 1 percent
Landform: Flats
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

OrnA—Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2thpc
Elevation: 0 to 20 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Orcadia and similar soils: 60 percent
Anahuac and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 4 inches: loam

E - 4 to 9 inches: loam
Bt/E - 9 to 12 inches: loam
Bt - 12 to 40 inches: clay
Btg - 40 to 80 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Description of Anahuac

Setting

Landform: Point bars
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 15 inches: loam
E - 15 to 28 inches: loam
Bt/E - 28 to 34 inches: loam
Bt - 34 to 53 inches: clay
Btg - 53 to 80 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 41 to 64 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0

Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Minor Components

Aris

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Lowland (R150AY537TX)
Hydric soil rating: Yes

Labelle

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Meaton

Percent of map unit: 1 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: Yes

OsdA—Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2thpf
Elevation: 0 to 20 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Aris and similar soils: 60 percent

Orcadia and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aris

Setting

Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 5 inches: silt loam
AE - 5 to 10 inches: silt loam
Bt1 - 10 to 31 inches: clay loam
Bt2 - 31 to 65 inches: clay
Btg - 65 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 8.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: Lowland (R150AY537TX)
Hydric soil rating: Yes

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: loam
E - 6 to 10 inches: loam
Bt/E - 10 to 21 inches: loam
Bt - 21 to 49 inches: clay
Btg - 49 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Minor Components

Meaton

Percent of map unit: 3 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: Yes

Labelle

Percent of map unit: 2 percent
Landform: Flats
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

OsuB—Orcadia-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2thpg
Elevation: 20 to 100 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Orcadia and similar soils: 65 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: silt loam
E - 6 to 9 inches: loam
Bt/E - 9 to 17 inches: loam
Bt - 17 to 57 inches: clay loam
Btg - 57 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 6.0
Available water storage in profile: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

M - 0 to 40 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

OsvB—Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2thph
Elevation: 10 to 20 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Orcadia and similar soils: 65 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orcadia

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: silt loam
E - 6 to 10 inches: silt loam
Bt/E - 10 to 15 inches: silt loam
Bt - 15 to 43 inches: clay
Btg - 43 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 25 to 66 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: Northern Loamy Prairie (R150AY741TX)
Hydric soil rating: No

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

M - 0 to 40 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

URLX—Urban land

Map Unit Setting

National map unit symbol: 2sych
Elevation: 10 to 200 feet
Mean annual precipitation: 48 to 62 inches

Mean annual air temperature: 67 to 72 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

M - 0 to 40 inches: variable

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

W—Water

Map Unit Setting

National map unit symbol: dl4t
Elevation: 0 to 50 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

ZumA—Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded

Map Unit Setting

National map unit symbol: 2th6m
Elevation: 0 to 10 feet
Mean annual precipitation: 48 to 62 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 270 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Zummo and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zummo

Setting

Landform: Marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Firm clayey fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 24 inches: clay
Bg1 - 24 to 46 inches: clay
Bg2 - 46 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 6w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: D
Ecological site: FIRM FRESH MARSH (R151XY672TX)
Hydric soil rating: Yes

Minor Components

Harris

Percent of map unit: 3 percent
Landform: Marshes
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: INTERMEDIATE Firm MARSH (R151XY673TX)
Hydric soil rating: Yes

Franeau

Percent of map unit: 1 percent
Landform: Flats

Landform position (three-dimensional): Dip
Microfeatures of landform position: Gilgai
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: SALTY PRAIRIE (R151XY680TX)
Hydric soil rating: Yes

Ijam

Percent of map unit: 1 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: INTERMEDIATE Firm MARSH (R151XY673TX)
Hydric soil rating: Yes

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Map Unit Description (Brief)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the selected area. The component descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit. A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the associated soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas (components) for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The "Map Unit Description (Brief)" report gives a brief, general description of the soil components that occur in a map unit. Descriptions of nonsoil (miscellaneous areas) and minor map unit components may or may not be included. This description is written by the local soil scientists responsible for the respective soil survey area data. A more detailed description can be generated by the "Map Unit Description" report.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief)

Cameron Parish, Louisiana

Map Unit: CR—Creole mucky clay

Description Category: AGR

This soil is unsuited for cropland or pastureland.

Description Category: SOI

This very poorly drained, fluid, mineral soil is in brackish marshes. It is flooded or ponded most of the time. The soil has a fluid mucky surface layer and a fluid clayey underlying material. It has low strength and poor trafficability. The total subsidence potential is medium.

Map Unit: Hb—Hackberry loamy fine sand

Description Category: AGR

The potential for cropland and pastureland is excellent. Suitable crops are cotton, soybeans, corn, and grain sorghum. Pasture plants are bermudagrasses, bahiagrass, ryegrass tall fescue, and white clover. Traffic pans develop easily, but can be broken by chiseling or deep plowing. A drainage system is generally needed to remove excess surface water. Crop residue management will reduce erosion. Most crops respond well to nitrogen fertilizers. Lime and other fertilizers generally are not needed.

Description Category: RNG

RANGE SITE 10

Description Category: SOI

This level, somewhat poorly drained, sandy soil is on the toe slopes of low ridges along the Gulf of Mexico. The soil is subject to rare flooding. The surface layer is sandy and the subsoil is loamy and sandy. The soil is very slightly saline. Permeability is moderate. A seasonal high water table limits rooting depth of plants.

Map Unit: Hm—Hackberry-Mermentau complex, gently undulating

Description Category: AGR

The potential for cropland and pastureland is excellent. Suitable crops are cotton, soybeans, corn, and grain sorghum. Pasture plants are bermudagrasses, bahiagrass, ryegrass tall fescue, and white clover. Traffic pans develop easily, but can be broken by chiseling or deep plowing. A drainage system is generally needed to remove excess surface water. Crop residue management will reduce erosion. Most crops respond well to nitrogen fertilizers. Lime and other fertilizers generally are not needed.

Description Category: RNG

RANGE SITE 6

Description Category: RNG

RANGE SITE 10

Description Category: SOI

These soils are level and gently undulating, somewhat poorly drained and poorly drained. They are in a ridge and swale landscape near the coast of the Gulf of Mexico. The Hackberry soil is on low ridges. The Mermentau soil is in low areas between the ridges. Low areas are subject to frequent flooding. The Hackberry soil has a loamy surface layer and subsoil. The underlying material is sandy. The Mermentau soil has a firm, clayey surface layer and subsoil.

Map Unit: ME—Mermentau clay

Description Category: RNG

RANGE SITE 6

Description Category: SOI

This level, poorly drained soil is on low ridges within areas of brackish marsh near the Gulf of Mexico. It is subject to frequent, shallow flooding by high tides. The soil has a firm, clayey surface layer and subsoil. The underlying material is loamy and fliud. Natural fertility is high. The soil is moderately saline or strongly saline. Permeability is very slow. A seasonal high water table is within 3.5 feet of the surface throughout the year.

Jefferson and Orange Counties, Texas

Map Unit: BaA—Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal

Description Category: RNG

Fluid Brackish Marsh - Soils high in organic matter occurring along relic or present major rivers and bayous in the marsh. These very deep saline soils are saturated throughout the year and are too soft for livestock grazing. Climax vegetation includes marshhay cordgrass, seashore saltgrass, saltmarsh bulrush, marsh hemp, aster, and widgeongrass.

Map Unit: CamA—Camptown silt loam, 0 to 1 percent slopes, frequently ponded

Description Category: PHG

7E - DEPRESSED UPLAND - Deep and very deep, clayey and tight loamy uplands occurring in depressions; very poorly drained, tight subsoils; high natural fertility; Very high to high water holding capacity but poor to fair plant-soil-moisture relationship; low to high production potential depending on wetness and inundation.

Description Category: WSG

0w0 - These soils do not have potential production for woodland management. They are ponded for long periods of time. Although bald cypress maybe found around the edges, these soils will not support a commercial stand of trees. Only water loving species such as sedges and buttonbush will grow. They have a low potential for wildlife and livestock use.

Map Unit: CsA—Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal

Description Category: RNG

Firm Brackish Marsh - Soils high in organic matter occurring as level coastal marshes from 0 to 4 feet above sea level. These very deep saline soils are saturated most of the year and can be grazed by livestock. Climax vegetation includes marshhay cordgrass, seashore saltgrass, saltmarsh bulrush and needlegrass.

Map Unit: HatA—Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded

Description Category: PHG

2B - LOAMY ACIDIC BOTTOMLAND - Deep and very deep, strongly to very strongly acid bottomlands with loamy surfaces; may overflow; medium natural fertility; moderate to very high water holding capacity with good plant-soil-moisture relationship; high production potential.

Description Category: PHG

2C - WET LOAMY BOTTOMLAND - Deep and very deep, wet, somewhat poorly to very poorly drained, loamy bottomlands with seasonal high water tables; may overflow; medium natural fertility; high to very high water holding capacity but poor plant-soil-moisture relationship; medium production potential.

Description Category: WSG

2w8 - Seasonal wetness may cause moderate equipment limitations and plant competition. Important commercial tree species include loblolly pine, shortleaf pine, sweetgum, and red oak. These soils are suited for pine and hardwoods, and the site index for loblolly pine and sweetgum is 90. The yield from an unmanaged stand over a 50-year period is approximately 330 board feet (Doyle rule) for loblolly pine, or 210 for sweetgum per acre per year. Native species important to wildlife include water oak, red oak, yaupon, American beautyberry, and Alabama supplejack. High value grasses and forbs used by livestock include pinehill bluestem, longleaf uniola, virginia wildrye, switchgrass, and beaked panicum. Stocking rates depend on canopy density and range from 6-60 acres per animal unit.

Description Category: WSG

2w6 - Clayey texture and seasonal wetness will cause severe equipment limitations and seedling mortality. Important commercial trees include willow oak, water oak, green ash, and sweetgum. These soils are suited for hardwoods, and the site index for water oak and sweetgum is 90. The yield from unmanaged stand of water oak over a 50-year period is approximately 236 board feet (Doyle rule) per acre per year. Native species important to wildlife include water oak, willow oak, green ash, and blackgum. Grasses and forbs important for livestock include switchgrass, beaked panicum, switch cane, wildrye and sedges. Stocking rates depend on canopy density and range from 6-50 acres per animal unit.

Map Unit: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal

Description Category: PHG

1B - WET CLAYEY BOTTOMLAND - Deep and very deep, wet, very poorly to poorly drained, clayey bottomlands; some areas may be ponded; may overflow; high natural fertility; very high to high water holding capacity but poor plant-soil-moisture relationship; medium production potential.

Description Category: RNG

Firm Intermediate Marsh - Soils high in organic matter occurring along level coastal marshland from 1 to 4 feet above sea level. These very deep saline soils are saturated most of the year and can be grazed by livestock. Climax vegetation includes marshhay cordgrass with lesser amounts of California bulrush, olney bulrush, softstem bulrush and seashore paspalum. Spikesedges, seedbox, Colorado river hemp, and cattails are also found in smaller amounts.

Map Unit: NuC—Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal

Description Category: PHG

1A - HEAVY CLAYEY BOTTOMLAND - Deep and very deep, somewhat poorly to well drained, heavy bottomlands; may overflow; high natural fertility; seasonally wet or droughty; very high to high water holding capacity but fair plant-soil-moisture relationship; high production potential.

Description Category: RNG

Salty Prairie - These very deep gray to dark gray clayey and loamy soils occur as broad, nearly level, coastal flats and are frequently inundated by sea water from high tides and gulf storms. Climax vegetation includes by gulf cordgrass, switchgrass, indiangrass, little bluestem, knotroot bristlegrass, and shoregrass.

Map Unit: OrdB—Orcadia silt loam, 0 to 2 percent slopes, rarely flooded

Description Category: PHG

8E1 - SLIGHTLY WET UPLAND - Deep and very deep, loamy uplands; wet during cool seasons; somewhat poorly drained; mainly tight subsoils; medium natural fertility; Very high to high water holding capacity with fair to good plant-soil-moisture relationship; medium to high production potential.

Description Category: RNG

Loamy Prairie 44-56" PZ - Deep, loamy soils on nearly level coastal plains; occasionally moundy. Climax vegetation is a treeless, tall grass prairie including native bluestem, indiangrass, switchgrass, eastern gamagrass, paspalum, low panicums, crinkleawn, bundleflower, mimosa, sensitivebrier, neptunia, gayfeather, indianplantain, and coneflower.

Description Category: WSG

2w8 - Seasonal wetness may cause moderate equipment limitations and plant competition. Important commercial tree species include loblolly pine, shortleaf pine, sweetgum, and red oak. These soils are suited for pine and hardwoods, and the site index for loblolly pine and sweetgum is 90. The yield from an unmanaged stand over a 50-year period is approximately 330 board feet (Doyle rule) for loblolly pine, or 210 for sweetgum per acre per year. Native species important to wildlife include water oak, red oak, yaupon, American beautyberry, and Alabama supplejack. High value grasses and forbs used by livestock include pinehill bluestem, longleaf uniola, virginia wildrye, switchgrass, and beaked panicum. Stocking rates depend on canopy density and range from 6-60 acres per animal unit.

Map Unit: OriA—Orcadia-Anahuac complex, 0 to 1 percent slopes

Description Category: PHG

8C - LOAMY UPLAND - Moderately deep to very deep uplands with loamy surfaces and friable loamy subsoils; slopes 0 to 8 percent; medium natural fertility; medium to high water holding capacity with good plant-soil-moisture relationship; medium to high production potential.

Description Category: PHG

8E1 - SLIGHTLY WET UPLAND - Deep and very deep, loamy uplands; wet during cool seasons; somewhat poorly drained; mainly tight subsoils; medium natural fertility; Very high to high water holding capacity with fair to good plant-soil-moisture relationship; medium to high production potential.

Description Category: RNG

Loamy Prairie 44-56" PZ - Deep, loamy soils on nearly level coastal plains; occasionally moundy. Climax vegetation is a treeless, tall grass prairie including native bluestem, indiangrass, switchgrass, eastern gamagrass, paspalum, low panicums, crinkleawn, bundleflower, mimosa, sensitivebrier, neptunia, gayfeather, indianplantain, and coneflower.

Description Category: WSG

2w8 - Seasonal wetness may cause moderate equipment limitations and plant competition. Important commercial tree species include loblolly pine, shortleaf pine, sweetgum, and red oak. These soils are suited for pine and hardwoods, and the site index for loblolly pine and sweetgum is 90. The yield from an unmanaged stand over a 50-year period is approximately 330 board feet (Doyle rule) for loblolly pine, or 210 for sweetgum per acre per year. Native species important to wildlife include water oak, red oak, yaupon, American beautyberry, and Alabama supplejack. High value grasses and forbs used by livestock include pinehill bluestem, longleaf uniola, virginia wildrye, switchgrass, and beaked panicum. Stocking rates depend on canopy density and range from 6-60 acres per animal unit.

Map Unit: OrnA—Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded

Description Category: PHG

8C - LOAMY UPLAND - Moderately deep to very deep uplands with loamy surfaces and friable loamy subsoils; slopes 0 to 8 percent; medium natural fertility; medium to high water holding capacity with good plant-soil-moisture relationship; medium to high production potential.

Description Category: PHG

8E1 - SLIGHTLY WET UPLAND - Deep and very deep, loamy uplands; wet during cool seasons; somewhat poorly drained; mainly tight subsoils; medium natural fertility; Very high to high water holding capacity with fair to good plant-soil-moisture relationship; medium to high production potential.

Description Category: RNG

Loamy Prairie 44-56" PZ - Deep, loamy soils on nearly level coastal plains; occasionally moundy. Climax vegetation is a treeless, tall grass prairie including native bluestem, indiangrass, switchgrass, eastern gamagrass, paspalum, low panicums, crinkleawn, bundleflower, mimosa, sensitivebrier, neptunia, gayfeather, indianplantain, and coneflower.

Description Category: WSG

2w8 - Seasonal wetness may cause moderate equipment limitations and plant competition. Important commercial tree species include loblolly pine, shortleaf pine, sweetgum, and red oak. These soils are suited for pine and hardwoods, and the site index for loblolly pine and sweetgum is 90. The yield from an unmanaged stand over a 50-year period is approximately 330 board feet (Doyle rule) for loblolly pine, or 210 for sweetgum per acre per year. Native species important to wildlife include water oak, red oak, yaupon, American beautyberry, and Alabama supplejack. High value grasses and forbs used by livestock include pinehill bluestem, longleaf uniola, virginia wildrye, switchgrass, and beaked panicum. Stocking rates depend on canopy density and range from 6-60 acres per animal unit.

Map Unit: OsdA—Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded

Description Category: PHG

8E1 - SLIGHTLY WET UPLAND - Deep and very deep, loamy uplands; wet during cool seasons; somewhat poorly drained; mainly tight subsoils; medium natural fertility; Very high to high water holding capacity with fair to good plant-soil-moisture relationship; medium to high production potential.

Description Category: RNG

Lowland 35-56" PZ - Deep, acid soils in low flats, poorly drained. Indigenously, a wet prairie including eastern gamagrass, maidencane, switchgrass, longtom, sedges and rushes, snakeroot, smartweed, camphorweed, coneflower, and sunflower. Sesbania, waxmyrtle, baccharis, chinese tallow, vaseygrass, smutgrass, and carpetgrass are invaders.

Description Category: RNG

Loamy Prairie 44-56" PZ - Deep, loamy soils on nearly level coastal plains; occasionally moundy. Climax vegetation is a treeless, tall grass prairie including native bluestem, indiangrass, switchgrass, eastern gamagrass, paspalum, low panicums, crinkleawn, bundleflower, mimosa, sensitivebrier, neptunia, gayfeather, indianplantain, and coneflower.

Map Unit: OsuB—Orcadia-Urban land complex, 0 to 2 percent slopes

Description Category: PHG

8E1 - SLIGHTLY WET UPLAND - Deep and very deep, loamy uplands; wet during cool seasons; somewhat poorly drained; mainly tight subsoils; medium natural fertility; Very high to high water holding capacity with fair to good plant-soil-moisture relationship; medium to high production potential.

Description Category: RNG

Loamy Prairie 44-56" PZ - Deep, loamy soils on nearly level coastal plains; occasionally moundy. Climax vegetation is a treeless, tall grass prairie including native bluestem, indiangrass, switchgrass, eastern gamagrass, paspalum, low panicums, crinkleawn, bundleflower, mimosa, sensitivebrier, neptunia, gayfeather, indianplantain, and coneflower.

Description Category: WSG

2w8 - Seasonal wetness may cause moderate equipment limitations and plant competition. Important commercial tree species include loblolly pine, shortleaf pine, sweetgum, and red oak. These soils are suited for pine and hardwoods, and the site index for loblolly pine and sweetgum is 90. The yield from an unmanaged stand over a 50-year period is approximately 330 board feet (Doyle rule) for loblolly pine, or 210 for sweetgum per acre per year. Native species important to wildlife include water oak, red oak, yaupon, American beautyberry, and Alabama supplejack. High value grasses and forbs used by livestock include pinehill bluestem, longleaf uniola, virginia wildrye, switchgrass, and beaked panicum. Stocking rates depend on canopy density and range from 6-60 acres per animal unit.

Map Unit: ZumA—Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded

Description Category: RNG

Firm Fresh Marsh - Soils high in organic matter occurring as potholes, swales, and other areas with little or no surface drainage. These very deep soils are saturated most of the year and can be grazed by livestock. Climax vegetation includes Jamaica sawgrass, giant cutgrass, American lotus, maidencane, cattails, California bulrush, swithchgrass and common reed.

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

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Report—Hydric Soil List - All Components

Hydric Soil List - All Components–LA023-Cameron Parish, Louisiana					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
BA: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded	Bancker-Very frequently flooded	82	Marshes	Yes	2,3,4
	Clovelly-Very frequently flooded	10	Marshes	Yes	1,3,4
	Creole-Very frequently flooded	8	Marshes	Yes	2,3,4
CR: Creole mucky clay	Creole	85	Marshes	Yes	2,3,4
	Minor components	15	—	No	—
Hb: Hackberry loamy fine sand	Hackberry	90	Beach ridges	No	—
	Creole	3	Depressions	Yes	2,3,4
	Bancker	3	Depressions	Yes	2,3,4
	Peveto	2	—	No	—
	Mermentau	2	Depressions	Yes	2,3,4
Hm: Hackberry-Mermentau complex, gently undulating	Hackberry	60	Beach ridges	No	—
	Mermentau	30	Marshes	Yes	2
	Minor components	10	—	No	—
ME: Mermentau clay	Mermentau	86	Marshes	Yes	2
	Minor components	14	—	No	—
W: Water	Water	100	—	No	—

Hydric Soil List - All Components–TX623-Jefferson and Orange Counties, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
BaA: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Bancker	80-90	Marshes	Yes	2,3,4
	Unnamed-Minor components	10-20	—	No	—
BbA: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded	Barbary-Frequently flooded	75-91	Flood plains	Yes	2,3,4
	Fausse-Frequently flooded	5-25	Backswamps	Yes	2,3,4
	Schriever-Frequently flooded	1-4	Backswamps	Yes	2
CamA: Camptown silt loam, 0 to 1 percent slopes, frequently ponded	Camptown	90-100	Meanders	Yes	2,3
	Evadale	0-5	Flats	Yes	2
	Bevil	0-5	Depressions	Yes	2
CsA: Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Creole	80-90	Marshes	Yes	2,3,4
	Unnamed-Hydric minor components	10-20	Depressions	Yes	3
HatA: Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	Hatliff	20-60	Flood plains	No	—
	Pluck	20-45	Flood plains	Yes	2
	Kian	15-45	Flood plains	Yes	2
	Simelake	0-5	Flats	Yes	4
	Cowmarsh	0-1	Oxbows	Yes	2,3,4
IjmB: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	Ijam	100-100	Flats	Yes	2
NuC: Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	Neel	55-65	—	No	—
	Urban land	20-30	—	No	—
	Unnamed-Minor components	5-15	—	No	—
	Unnamed-Hydric minor components	0-5	Depressions	Yes	2,3
OrdB: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded	Orcadia	85-100	Flats	No	—
	Aris	0-10	Flats	Yes	2
	Labelle	0-5	Flats	No	—
OriA: Orcadia-Anahuac complex, 0 to 1 percent slopes	Orcadia	50-70	Flats	No	—
	Anahuac	30-50	Point bars	No	—

Hydric Soil List - All Components–TX623-Jefferson and Orange Counties, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Aris	0-15	Flats	Yes	2
	Morey	0-5	Flats	No	—
	Labelle	0-5	Flats	No	—
OrnA: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded	Orcadia	50-70	Flats	No	—
	Anahuac	30-50	Point bars	No	—
	Aris	0-5	Flats	Yes	2
	Labelle	0-5	Flats	No	—
	Meaton	0-5	Flats	Yes	2
OsdA: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded	Aris	50-70	Flats	Yes	2
	Orcadia	30-50	Flats	No	—
	Meaton	0-10	Flats	Yes	2
	Labelle	0-10	Flats	No	—
OsuB: Orcadia-Urban land complex, 0 to 2 percent slopes	Orcadia	50-70	Flats	No	—
	Urban land	30-50	—	No	—
OsvB: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded	Orcadia	50-70	Flats	No	—
	Urban land	30-50	—	No	—
URLX: Urban land	Urban land	100-100	—	No	—
W: Water	Water	100	—	No	—
ZumA: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	Zummo	95-100	Marshes	Yes	2,3,4
	Harris	0-5	Marshes	Yes	2,4
	Franeau	0-5	Flats	Yes	2
	Ijam	0-5	Flats	Yes	2

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

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If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

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    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;

4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    - B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

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Report—Hydric Soils

Hydric Soils–Cameron Parish, Louisiana

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric criteria
BA—Bancker muck, 0 to 0.2 percent slopes, very frequently flooded				
	Bancker, very frequently flooded	82	Marshes	2, 3, 4
	Clovelly, very frequently flooded	10	Marshes	1, 3, 4
	Creole, very frequently flooded	8	Marshes	2, 3, 4
CR—Creole mucky clay				
	Creole	85	Marshes	2, 3, 4

Hydric Soils–Cameron Parish, Louisiana				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
Hb—Hackberry loamy fine sand				
	Creole	3	Depressions	2, 3, 4
	Bancker	3	Depressions	2, 3, 4
	Mermentau	2	Depressions	2, 3, 4
Hm—Hackberry-Mermentau complex, gently undulating				
	Mermentau	30	Marshes	2
ME—Mermentau clay				
	Mermentau	86	Marshes	2

Hydric Soils–Jefferson and Orange Counties, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
BaA—Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal				
	Bancker	86	Marshes	2, 3, 4
BbA—Barbary mucky clay, 0 to 1 percent slopes, frequently flooded				
	Barbary, frequently flooded	90	Flood plains	2, 3, 4
	Fausse, frequently flooded	8	Backswamps	2, 3, 4
	Schriever, frequently flooded	2	Backswamps	2
CamA—Camptown silt loam, 0 to 1 percent slopes, frequently ponded				
	Camptown	95	Meanders	2, 3
	Evadale	3	Flats	2
	Bevil	2	Depressions	2
CsA—Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal				
	Creole	86	Marshes	2, 3, 4
	Unnamed, hydric minor components	14	Depressions	3
HatA—Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded				
	Pluck	35	Flood plains	2
	Kian	24	Flood plains	2
	Simelake	2	Flats	4
	Cowmarsh	1	Oxbows	2, 3, 4
IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal				
	Ijam	100	Flats	2

Hydric Soils–Jefferson and Orange Counties, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
NuC—Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal				
	Unnamed, hydric minor components	3	Depressions	2, 3
OrdB—Orcadia silt loam, 0 to 2 percent slopes, rarely flooded				
	Aris	8	Flats	2
OriA—Orcadia-Anahuac complex, 0 to 1 percent slopes				
	Aris	2	Flats	2
OrnA—Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded				
	Aris	2	Flats	2
	Meaton	1	Flats	2
OsdA—Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded				
	Aris	60	Flats	2
	Meaton	3	Flats	2
ZumA—Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded				
	Zummo	95	Marshes	2, 3, 4
	Harris	3	Marshes	2, 4
	Franeau	1	Flats	2
	Ijam	1	Flats	2

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APPENDIX C

ROUTINE WETLAND DETERMINATION FORMS

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 001
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.014591
Long: -93.996249
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: R1UBV

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑
Hydric Soils Present?	☑ Yes ☐ No		No: ☐
Wetland Hydrology Present?	☑ Yes ☐ No		

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located on beach adjacent to river. High water table through sand.

Habitat ID: H-002
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 8
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 001

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	100					Coarse sand	
3-16	10 YR 4/1	90	7.5 YR 4/6	10	C	M	Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 002
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.014617
Long: -93.996257
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: R1UBV

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydrology were observed; however, hydric soils were not. The sample plot is not within a wetland. Plot located on well-drained upland shelf. Wrack line present.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes	☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes	☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 002

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	20	x 3 =	60
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	460 (B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 6/3	80	7.5YR 8/6	20	C	M/PL	Sand	
6-16	10 YR 4/2	100					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 003
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.014993
Long: -93.996461
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Poorly drained forested depression

Habitat ID: H-003
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 003

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Triadica sebifera*	40	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Alternanthera philoxeroides*	60	Yes	OBL
2.	*Ludwigia peploides*	40	Yes	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	220 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5YR 4/6	30	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 004
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.014960
Long: -93.996467
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 004

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	70	x 3 =	210
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	250 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 2/1	70	7.5YR 4/6	30	C	M	Loamy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 005
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.015417
Long: -93.996466
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 005

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	60	Yes	FACU
2. *Cyperus virens*	40	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	0	x 3 =	0
FACU Species	60	x 4 =	240
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	320 (B)

Prevalence Index = B/A = 3.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 005

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	60	10 YR 2/1	20	C	M	Loamy Clay	
			10YR 4/6	20	C	M	Loamy Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 006
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.015418
Long: -93.996402
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-004
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 006

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	80	Yes	FACW
2. *Juncus effusus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	80	x 2 =	160
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 006

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 4/6	20	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 007
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.015845
Long: -93.996057
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 007

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	60	Yes	FACU
2. *Cyperus virens*	40	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	0	x 3 =	0
FACU Species	60	x 4 =	240
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	320 (B)

Prevalence Index = B/A = 3.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	80	7.5 YR 4/6	10	C	M	Clay	
			10 YR 6/1	10	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 008
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.015844
Long: -93.996010
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-005
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 008

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Triadica sebifera*	40	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Alternanthera philoxeroides*	40	Yes	OBL
2.	*Cyperus virens*	30	Yes	FACW
3.	*Juncus effusus*	30	Yes	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	70	x 1 =	70	
FACW Species	30	x 2 =	60	
FAC Species	40	x 3 =	120	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	140	(A)	250	(B)

Prevalence Index = B/A = 1.79

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 008

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5YR 4/6	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 009
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.016958
Long: -93.995903
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☑ Yes ☐ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 009

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Rosa bracteata*	30	Yes	UPL
2. *Ilex vomitoria*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	30	x 4 =	120
UPL Species	30	x 5 =	150
Column Totals:	100	(A)	390 (B)

Prevalence Index = B/A = 3.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 009

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	80	7.5 YR 4/6	10	C	M	Clay	
			10 YR 6/1	10	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☑ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 010
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.016999
Long: -93.995923
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-006
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 010

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	60	Yes	OBL
2. *Eleocharis montevidensis*	40	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	40	x 2 =	80
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	140 (B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 010

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 4/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 011
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.017298
Long: -93.995417
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-007
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 011

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Morella cerifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Alternanthera philoxeroides*	60	Yes	OBL
2. *Juncus effusus*	40	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	220 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 011

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5YR 4/6	30	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 012
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.017242
Long: -93.995417
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☑ Yes ☐ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 012

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Rosa bracteata*	30	Yes	UPL
2. *Ilex vomitoria*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	30	x 4 =	120
UPL Species	30	x 5 =	150
Column Totals:	100	(A)	390 (B)

Prevalence Index = B/A = 3.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 012

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	80	7.5 YR 4/6	10	C	M	Clay	
			10 YR 6/1	10	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☑ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 013
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.018423
Long: -93.994700
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot is located on an upland island.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 013

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	60	Yes	FAC
2. *Triadica sebifera*	10	No	FAC
3.			
4.			
5.			
6.			
7.			
	70	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Chasmanthium laxum*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	70	x 3 =	210
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	250 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 013

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 2/1	100					Loamy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)
  (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 014
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.018479
Long: -93.994631
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-007
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 014

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2. *Liquidambar styraciflua*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Alternanthera philoxeroides*	60	Yes	OBL
2. *Juncus effusus*	40	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	220 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 014

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5YR 4/6	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 015
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.018255
Long: -93.994393
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-079
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 015

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Spartina patens*	60	Yes	FACW
2. *Alternanthera philoxeroides*	30	Yes	OBL
3. *Eleocharis montevidensis*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	70	x 2 =	140
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	170 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 015

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 4/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 016
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.018855
Long: -93.994406
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 016

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Liquidambar styraciflua*	30	Yes	FAC
2.	*Triadica sebifera*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	60	Yes	FAC
2.	*Triadica sebifera*	10	No	FAC
3.				
4.				
5.				
6.				
7.				
		70	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Chasmanthium laxum*	20	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		20	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	370 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 016

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10 YR 2/1	100					Silty Clay	
10-16	10 YR 4/1	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 017
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.018754
Long: -93.994478
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-007
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 017

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	30	Yes	FAC
2. *Triadica sebifera*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Chasmanthium laxum*	30	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	30	x 2 =	60
FAC Species	70	x 3 =	210
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	270 (B)

Prevalence Index = B/A = 2.70

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 017

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	70	7.5YR 4/6	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)
  (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 018
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.020172
Long: -93.993632
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 018

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	70	x 3 =	210
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	290 (B)

Prevalence Index = B/A = 3.22

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 018

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10 YR 3/1	100					Loamy Clay	
7-16	10 YR 5/2	75	7.5 YR 6/8	25	C	M	Loamy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 019
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.021643
Long: -93.992417
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑
Hydric Soils Present?	☑ Yes ☐ No		No: ☐
Wetland Hydrology Present?	☑ Yes ☐ No		

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-008
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 019

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	80	Yes	OBL
2. *Cyperus virens*	20	No	FACW
3. *Eleocharis montevidensis*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	30	x 2 =	60
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110 (A)		140 (B)

Prevalence Index = B/A = 1.27

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 019

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	60	7.5 YR 4/6	40	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☑ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 020
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.021672
Long: -93.992377
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydrology were not observed. Hydric soils were observed. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 020

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Juncus effusus*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	x 1 =	10	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	80	x 4 =	320	
UPL Species	0	x 5 =	0	
Column Totals:	90	(A)	330	(B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%
No Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 020

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	90	7.5YR 4/6	10			Loamy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☑ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 021
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.022002
Long: -93.992053
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS3A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Roadway, unvegetated

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 021

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant
Species Across All Strata: ______ (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%
______ Prevalence Index is ≤3.0[1]
______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 021

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.Unvegetated road.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 022
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.022021
Long: -93.992023
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: PSS3A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-009
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 022

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Leersia hexandra*	60	Yes	OBL
2.	*Cyperus virens*	20	Yes	FACW
3.	*Juncus effusus*	20	Yes	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 022

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 5/1	70	7.5 YR 4/6	30	C	M	Sandy Clay	
6-16	10 YR 3/1	60	7.5 YR 4/6	40	C	M	Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 023
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052058
Long: -93.954245
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-024
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 023

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	80	Yes	OBL
2. *Juncus effusus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 023

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/1	95	7.5YR 6/8	5	C	M	Clay	Organic
2-16	10 YR 6/1	85	7.5 YR 4/6	15	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 024
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052067
Long: -93.954200
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 024

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	85	Yes	FACU
2. *Nothoscordum bivalve*	5	No	FACU
3. *Mimosa strigillosa*	5	No	FAC
4. *Vicia sativa*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	5	x 3 =	15
FACU Species	95	x 4 =	380
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	395 (B)

Prevalence Index = B/A = 3.95

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 024

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/3	100					Clay	Oyster hash and fill material

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 025
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052159
Long: -93.953905
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 025

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	85	Yes	FACU
2. *Nothoscordum bivalve*	5	No	FACU
3. *Mimosa strigillosa*	5	No	FAC
4. *Vicia sativa*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Smilax bona-nox*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	35	x 3 =	105
FACU Species	95	x 4 =	380
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	485 (B)

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 025

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/3	100					Clay	Oyster hash and fill material

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 026
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052172
Long: -93.953876
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-025	Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 026

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Typha latifolia*	50	Yes	OBL
2. *Leersia hexandra*	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 026

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/1	60	7.5YR 5/6	40	C	M	Silt	Organic
3-6	10 YR 3/1	100					Silt	Organic
6-16	10 YR 6/2	85	7.5YR 6/6	15	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 027
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.054430
Long: -93.951676
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Plot is located on an upland roadway.
Unvegetated

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 027

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant
Species Across All Strata: ______ (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%
______ Prevalence Index is ≤3.0[1]
______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. Unvegetated roadway.

SOIL

Sampling Point: 027

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.Unvegetated roadway

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 028
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.054406
Long: -93.951683
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-025
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 028

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Spartina patens*	50	Yes	FACW
2.	*Phragmites australis*	40	Yes	FACW
3.	*Iva frutescens*	10	No	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 028

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	70	7.5 YR 4/6	30	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 029
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.054518
Long: -93.951678
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-027	Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 029

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Spartina patens*	50	Yes	FACW
2. *Phragmites australis*	40	Yes	FACW
3. *Iva frutescens*	10	No	FACW
4. *Typha latifolia*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	x 1 =	10	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	110	(A)	210	(B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 029

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	70	7.5 YR 4/6	30	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 030
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.042707
Long: -93.965041
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Fringe wetland, river shoreline.

Habitat ID: H-010
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 030

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	60	Yes	FACW
2. *Schoenoplectus californicus*	40	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	60	x 2 =	120
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	160 (B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 030

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10 YR 3/1	100					Sandy Silt	Organic Material
5-16	10 YR 4/1	80	10 YR 5/8	20	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 031
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.042782
Long: -93.965063
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 031

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Pinus taeda*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2. *Nothoscordum bivalve*	20	Yes	FACU
3. *Cynodon dactylon*	20	Yes	FACU
4. *Schizachyrium scoparium*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 40% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	30	x 3 =	90
FACU Species	70	x 4 =	280
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	370 (B)

Prevalence Index = B/A = 3.70

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 031

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 032
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043898
Long: -93.963727
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-011
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	1
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 032

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	40	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Triadica sebifera*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		10	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Triadica sebifera*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		10	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Juncus effusus*	40	Yes	OBL
2.	*Eleocharis montevidensis*	30	Yes	FACW
3.	*Sagittaria latifolia*	10	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		80	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	30	x 2 =	60
FAC Species	60	x 3 =	180
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	290 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 032

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 033
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043924
Long: -93.963774
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 033

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Pinus taeda*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2. *Nothoscordum bivalve*	20	Yes	FACU
3. *Cynodon dactylon*	20	Yes	FACU
4. *Schizachyrium scoparium*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	70	x 4 =	280
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	430 (B)

Prevalence Index = B/A = 3.58

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
No	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 033

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 034
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043960
Long: -93.963716
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-012
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 034

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Juncus effusus*	40	Yes	OBL
2.	*Eleocharis montevidensis*	30	Yes	FACW
3.	*Sagittaria latifolia*	10	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		80	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	30	x 2 =	60
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	80	(A)	110 (B)

Prevalence Index = B/A = 1.38

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 034

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 035
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044451
Long: -93.962731
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation
☐ Water Marks (B1)
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits (B5)
☐ Inundated Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of two required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines (B16)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0	
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16	
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16	**Wetland Hydrology Present?:** Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 035

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	30	Yes	FAC
2. *Triadica sebifera*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	90	x 3 =	270
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 035

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	100					Loamy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 036
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044430
Long: -93.962655
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-013
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 1
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 036

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Spartina patens*	40	Yes	FACW
2. *Cladium jamaicense*	40	Yes	NI
3. *Phragmites australis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	60	x 2 =	120
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	120 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 036

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 037
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044333
Long: -93.963196
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-011
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 037

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Triadica sebifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Triadica sebifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	40	Yes	OBL
2. *Eleocharis montevidensis*	30	Yes	FACW
3. *Sagittaria latifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	30	x 2 =	60
FAC Species	60	x 3 =	180
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	290 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 037

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 038
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044370
Long: -93.963228
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-012

Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	1
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 038

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	40	Yes	OBL
2. *Eleocharis montevidensis*	30	Yes	FACW
3. *Sagittaria latifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	30	x 2 =	60
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	80	(A)	110 (B)

Prevalence Index = B/A = 1.38

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 038

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 039
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044411
Long: -93.963156
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 039

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Pinus taeda*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2. *Nothoscordum bivalve*	20	Yes	FACU
3. *Cynodon dactylon*	20	Yes	FACU
4. *Schizachyrium scoparium*	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	70	x 4 =	280
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	430 (B)

Prevalence Index = B/A = 3.58

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 039

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 040
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.045092
Long: -93.962267
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 040

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Liquidambar styraciflua*	20	Yes	FAC
2.	*Pinus taeda*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		30	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	20	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		20	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Rubus trivialis*	20	Yes	FACU
2.	*Triadica sebifera*	20	Yes	FAC
3.	*Cynodon dactylon*	20	Yes	FACU
4.	*Schizachyrium scoparium*	10	No	FACU
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		70	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	70	x 3 =	210
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	410 (B)

Prevalence Index = B/A = 3.42

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 040

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 041
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.045091
Long: -93.962230
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-014
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 041

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	40	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Chasmanthium laxum*	30	Yes	FACW
2.	*Carex cherokeensis*	30	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		60	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	60	x 2 =	120
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	240 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 041

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 042
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.046070
Long: -93.961163
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-016
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery

- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	1
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 042

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Eleocharis montevidensis*	50	Yes	FACW
2.	*Juncus effusus*	40	Yes	OBL
3.	*Hydrocotyle umbellata*	10	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	x 1 =	50	
FACW Species	50	x 2 =	100	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	150	(B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 042

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 043
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.046047
Long: -93.961102
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-015
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 043

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2. *Quercus nigra*	5	No	FAC
3.			
4.			
5.			
6.			
7.			
	45	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Chasmanthium laxum*	30	Yes	FACW
2. *Carex cherokeensis*	30	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	60	x 2 =	120
FAC Species	45	x 3 =	135
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	105	(A)	255 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 043

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 044
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.046012
Long: -93.961153
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 044

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Triadica sebifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 044

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 045
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.047596
Long: -93.959224
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 045

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	50	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		50	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	50	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		50	= Total Cover	

Herb Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
			= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	100	x 3 =	300
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 045

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/4	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 046
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.047619
Long: -93.959222
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-018
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 046

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2. *Pinus taeda*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cladium jamaicense*	40	Yes	NI
2. *Eleocharis montevidensis*	30	Yes	FACW
3. *Juncus effusus*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 75% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	30	x 2 =	60
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	220 (B)

Prevalence Index = B/A = 2.44

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 046

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 047
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.047635
Long: -93.959276
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-017
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 1	
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16	
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16	**Wetland Hydrology Present?:** Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Two primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 047

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	50	Yes	FACW
2. *Juncus effusus*	30	Yes	OBL
3. *Hydrocotyle umbellata*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 047

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 048
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.048839
Long: -93.957881
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☑ Yes ☐ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 048

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Sapling Stratum (Plot size : 30)			
1. *Pinus taeda*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Morella cerifera*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	55	x 3 =	165
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	55	(A)	165 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. Herb stratum recently disturbed/grubbed. Inconclusive

SOIL Sampling Point: 048

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 049
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.048805
Long: -93.957952
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-017
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	1
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 049

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Cladium jamaicense*	40	Yes	NI
2.	*Typha domingensis*	40	Yes	OBL
3.	*Juncus effusus*	20	Yes	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	60 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 049

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 5/6	20	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 050
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.049458
Long: -93.957044
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 050

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Sapling Stratum (Plot size : 30)			
1. *Pinus taeda*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	40	Yes	FAC
2. *Morella cerifera*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	55	= Total Cover	

Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	95	x 3 =	285
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	95	(A)	285 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 050

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 051
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.049528
Long: -93.957018
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-019
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 051

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Juncus effusus*	50	Yes	OBL
2.	*Eleocharis montevidensis*	40	Yes	FACW
3.	*Saccharum alopecuroides*	10	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	x 1 =	50	
FACW Species	40	x 2 =	80	
FAC Species	10	x 3 =	30	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	160	(B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 051

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 5/6	20	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 052
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050191
Long: -93.955984
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:

Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation
☐ Water Marks (B1)
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits (B5)
☐ Inundated Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of two required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines (B16)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 052

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Pinus taeda*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	40	Yes	FAC
2. *Morella cerifera*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	55	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	95	x 3 =	285
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	95	(A)	285 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 052

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 053
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050216
Long: -93.955932
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-020
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 053

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cladium jamaicense*	30	Yes	NI
2. *Juncus effusus*	30	Yes	OBL
3. *Sagittaria latifolia*	30	Yes	OBL
4. *Sabal minor*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	10	x 2 =	20	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	70	(A)	80	(B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 053

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 5/6	20	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 054
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050257
Long: -93.956031
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-022
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 054

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Sabal minor*	30	Yes	FACW
2. *Juncus effusus*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	30	x 2 =	60
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	240 (B)

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 054

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	70	7.5 YR 5/8	30	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 055
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050522
Long: -93.955909
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-021
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 055

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	40	Yes	OBL
2. *Distichlis spicata*	40	Yes	OBL
3. *Hydrocotyle umbellata*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 055

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 5/6	20	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 056
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050545
Long: -93.955865
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland. Plot located in recently cleared right-of-way.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 056

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2. *Ampelopsis arborea*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	20	x 3 =	60
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	40 (A)		140 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 056

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	95	7.5 YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 057
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050795
Long: -93.955493
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland. Plot located in recently cleared right-of-way.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 057

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2. *Ampelopsis arborea*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	20	x 3 =	60
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	40	(A)	140 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
No Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 057

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	95	7.5 YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 058
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.050822
Long: -93.955433
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-020
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 058

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	40	Yes	OBL
2. *Distichlis spicata*	40	Yes	OBL
3. *Hydrocotyle umbellata*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 058

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 5/6	20	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 059
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.054774
Long: -93.951538
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID:
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery

- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in shallow, poorly drained depression.

Vegetation - Use scientific names of plants.

Sampling Point: 059

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Triadica sebifera*	30	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		30	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Triadica sebifera*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		10	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Iva frutescens*	20	Yes	FACW
2.	*Sesbania drummondii*	10	Yes	FACW
3.				
4.				
5.				
6.				
7.				
		30	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Juncus effusus*	40	Yes	OBL
2.	*Eleocharis montevidensis*	40	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		80	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	70	x 2 =	140
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	150	(A)	300 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 059

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	80	7.5 YR 8/5	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.   [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 060
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.054800
Long: -93.951569
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 060

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Stenotaphrum secundatum*	90	Yes	FAC
2. *Iva frutescens*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	10	x 2 =	20
FAC Species	90	x 3 =	270
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	290 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 060

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/1	90	7.5 YR 5/8	10	C	M/PL	Clay	
12-16	10 YR 6/2	95	7.5 YR 5/8	5	C	M/PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 061
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055571
Long: -93.950278
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 061

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Iva frutescens*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	80	x 4 =	320
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 061

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	95	7.5 YR 4/6	5	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 062
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055550
Long: -93.950224
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: PFO1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑
Hydric Soils Present?	☑ Yes ☐ No		No: ☐
Wetland Hydrology Present?	☑ Yes ☐ No		

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-029
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 062

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 062

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	7.5 YR 5/8	10	C	M/PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 063
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.056081
Long: -93.950344
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 063

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1. *Triadica sebifera*	20	Yes	FAC
2. *Ulmus crassifolia*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	50	(A)	150 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 063

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/1	90	7.5 YR 5/8	10	C	M/PL	Clay	
12-16	10 YR 6/2	95	7.5 YR 5/8	5	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 064
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.056143
Long: -93.950187
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-030
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 064

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1. *Triadica sebifera*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	40	Yes	FACW
2. *Eleocharis montevidensis*	40	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	80	x 2 =	160
FAC Species	60	x 3 =	180
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	340 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 064

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	7.5 YR 5/8	10	C	M/PL	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 065
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.057193
Long: -93.949429
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No		
Wetland Hydrology Present?	☑ Yes ☐ No		

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-031
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	1
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 065

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis parvula*	80	Yes	OBL
2. *Juncus effusus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 065

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 2/1	100					Loam	
2-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 066
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.057153
Long: -93.949458
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 066

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	100	x 4 =	400	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	400	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 066

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 2/1	100					Loam	
2-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 067
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058820
Long: -93.946656
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-033
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 067

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cladium mariscus*	60	Yes	OBL
2. *Schoenoplectus californicus*	30	Yes	OBL
3. *Eleocharis montevidensis*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 067

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 2/1	100					Loam	
2-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 068
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058885
Long: -93.946613
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 068

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Stenotaphrum secundatum*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	100	x 3 =	300
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 068

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 2/1	100					Loam	
2-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 069
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058699
Long: -93.946110
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-034
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 1	
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0	
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0	**Wetland Hydrology Present?:** Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 069

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Iva frutescens*	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Stenotaphrum secundatum*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	80	x 3 =	240
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	320 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 069

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 2/1	100					Loam	
2-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 070
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058749
Long: -93.946076
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 070

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	30	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		30	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	50	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		50	= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Stenotaphrum secundatum*	20	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		20	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	100	x 3 =	300
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 070

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 4/6	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 071
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059106
Long: -93.943820
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-036
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 071

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	90	Yes	FACW
2. *Cyperus virens*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 071

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 072
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059121
Long: -93.943869
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydrology were not observed. Hydric soils were observed. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 072

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Pinus taeda*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	50	Yes	FACU
2. *Nothoscordum bivalve*	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	20	x 3 =	60
FACU Species	80	x 4 =	320
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	380 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 072

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 073
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059127
Long: -93.941110
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-038
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 073

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	50	Yes	FACW
2. *Alternanthera philoxeroides*	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 073

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 074
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059046
Long: -93.941083
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: PFO1C

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-037
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 074

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	20	Yes	FAC
2. *Liquidambar styraciflua*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Chasmanthium laxum*	30	Yes	FACW
2. *Juncus effusus*	10	Yes	OBL
3. *Alternanthera philoxeroides*	10	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	30	x 2 =	60
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	200 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 074

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/4/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 075
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059130
Long: -93.941227
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydrology were not observed. Hydric soils were observed. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 075

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Schizachyrium scoparium*	30	Yes	FACU
2.	*Rubus trivialis*	30	Yes	FACU
3.	*Nothoscordum bivalve*	10	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		70	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	70	x 4 =	280
UPL Species	0	x 5 =	0
Column Totals:	70	(A)	280 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 075

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 076
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.056023
Long: -93.928064
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 076

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	20	Yes	FAC
2. *Pinus taeda*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	40	Yes	FACU
2. *Ampelopsis arborea*	30	Yes	FAC
3. *Andropogon glomeratus*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Lonicera japonica*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.	10	Yes	
	20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 60% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	10	x 2 =	20
FAC Species	60	x 3 =	180
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	400 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 076

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 077
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055692
Long: -93.927182
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 077

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	30	Yes	FACU
2. *Rubus trivialis*	30	Yes	FACU
3. *Schizachyrium scoparium*	20	Yes	FACU
4. *Nothoscordum bivalve*	20	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 077

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 078
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055706
Long: -93.927250
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-046
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 6
Saturation Present? ☑ Yes ☐ No Depth (Inches): 6
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall.

Vegetation - Use scientific names of plants.

Sampling Point: 078

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	40	Yes	FACW
2. *Eleocharis cellulosa*	40	Yes	OBL
3. *Juncus effusus*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	40	x 2 =	80	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	140	(B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 078

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 079
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055257
Long: -93.925501
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-047
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 6
Saturation Present? ☑ Yes ☐ No Depth (Inches): 6
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Surface water present due to recent rainfall.

Vegetation - Use scientific names of plants.

Sampling Point: 079

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 079

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 080
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055258
Long: -93.925456
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Plot was taken on a gravel roadway. No signs of hydrology were observed.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 080

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%

______ Prevalence Index is ≤3.0[1]

______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is less than 50%. Plot was taken on a roadway. No vegetation was present.

SOIL

Sampling Point: 080

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.Soil pit was not dug due to a layer of gravel roadway.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 081
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.055263
Long: -93.925399
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-048
Habitat Type: PEMx

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 081

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 081

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site:	Blue Marlin Offshore Port Project	City/ County:	Orange	Sampling Date:	3/5/2020
Applicant/Owner:	Blue Marlin Offshore Port LLC	State:	Texas	Sampling Point:	082
Investigator(s):	BS, RC, HK	Section, Township, Range:			
Landform (hillside, terrace, etc.):	Plain	Local relief (concave, convex, none):	Convex	Slope (%):	<1
Subregion (LRRA or MLRA):	LRR-T	Lat:	30.053720	Long:	-93.920604
				Datum:	NAD 83, Decimal Degrees
Soil Map Unit Name:	Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded			NWI Classification:	None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:	Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 082

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	30	Yes	FACU
2. *Rubus trivialis*	30	Yes	FACU
3. *Schizachyrium scoparium*	20	Yes	FACU
4. *Nothoscordum bivalve*	20	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 082

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 083
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.053711
Long: -93.920569
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-049
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 5
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located in water feature with PEM wetland.

Vegetation - Use scientific names of plants.

Sampling Point: 083

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cladium mariscus*	90	Yes	OBL
2. *Ludwigia palustris*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 083

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 5/1	70	7.5 YR 6/8	30	C	M	Silty Clay	
6-16	Gley 1 6/5 GY	70	7.5 YR 5/8	30	C	M	Sandy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☑ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 084
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.053264
Long: -93.919169
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-052
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 5
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One primary indicator and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 084

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cladium mariscus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 084

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 5/1	70	7.5 YR 6/8	30	C	M	Silty Clay	
6-16	Gley 1 6/5 GY	70	7.5 YR 5/8	30	C	M	Sandy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☑ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 085
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.053217
Long: -93.919100
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 085

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	80	Yes	FACU
2. *Andropogon glomeratus*	10	No	FACW
3. *Schizachyrium scoparium*	10	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	90	x 4 =	360
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	380 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 085

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 086
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.053407
Long: -93.919146
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-051
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☑ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 086

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cladium mariscus*	60	Yes	OBL
2. *Rubus trivialis*	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	0	x 2 =	0	
FAC Species	40	x 3 =	120	
FACU Species	10	x 4 =	40	
UPL Species	0	x 5 =	0	
Column Totals:	110	(A)	220	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 086

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	70	7.5 YR 4/6	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 087
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052854
Long: -93.917492
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 087

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	50	Yes	FACU
2. *Nothoscordum bivalve*	30	Yes	FACU
3. *Schizachyrium scoparium*	20	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 087

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/3	90	7.5 YR 4/6	10	C	M	Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 088
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052828
Long: -93.917459
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-055
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 088

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	60	Yes	FACW
2. *Cyperus virens*	30	Yes	FACW
3. *Hydrocotyle umbellata*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	90	x 2 =	180
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	190 (B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 088

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 089
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.052444
Long: -93.915768
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 089

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Pinus taeda*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	90	x 3 =	270
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 089

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	85	7.5 YR 6/8	15	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]**:**

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 090
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.051144
Long: -93.911917
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 090

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Cynodon dactylon*	60	Yes	FACU
2.	*Cyperus virens*	20	Yes	FACW
3.	*Trifolium repens*	20	Yes	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	80	x 4 =	320
UPL Species	0	x 5 =	0
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

No	Dominance Test is >50%
No	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 090

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	98	7.5 YR 5/6	2	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 091
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044773
Long: -93.905300
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-059	Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 091

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	70	Yes	FACW
2. *Hydrocotyle umbellata*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	70	x 2 =	140
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	170 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 091

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	60	7.5 YR 5/8	40	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 092
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044732
Long: -93.905260
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 092

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Cynodon dactylon*	60	Yes	FACU
2.	*Nothoscordum bivalve*	30	Yes	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		90	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	90	x 4 =	360
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	360 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 092

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	80	7.5 YR 5/8	20	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 093
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.044697
Long: -93.905254
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-060
Habitat Type: PUBx

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 093

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis cellulosa*	90	Yes	OBL
2. *Hydrocotyle umbellata*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 093

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	60	7.5 YR 5/8	40	C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 094
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.045901
Long: -93.906325
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 094

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	20	Yes	FAC
2. *Triadica sebifera*	10	Yes	FAC
3. *Myrica cerifera*	10	Yes	FAC
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 80% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	70	x 3 =	210
FACU Species	30	x 4 =	120
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	330 (B)

Prevalence Index = B/A = 3.30

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 094

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/3	100			C	M	Sandy Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 095
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.038161
Long: -93.897211
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-062
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 6
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 6

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Water table 6" below surface. No surface water present.

Vegetation - Use scientific names of plants.

Sampling Point: 095

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	20	Yes	FAC
2.	*Liquidambar styraciflua*	20	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Carex cherokeensis*	30	Yes	FACW
2.	*Hydrocotyle umbellata*	30	Yes	OBL
3.	*Sagittaria latifolia*	30	Yes	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		90	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	30	x 2 =	60
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	240 (B)

Prevalence Index = B/A = 1.85

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 095

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	90	7.5 YR 5/4	10	C	M	Silty Clay	Organic
6-16	10 YR 4/2	70	7.5 YR 5/4	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 096
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.038144
Long: -93.897105
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located in well drained upland mound. Dominated by yaupon.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes	☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes	☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 096

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	20	Yes	FAC
2.	*Quercus nigra*	20	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	60	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		60	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		10	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 096

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 097
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.037362
Long: -93.896379
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-062
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 1
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 097

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	30	Yes	FAC
2. *Quercus nigra*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	5	x 2 =	10
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	55	(A)	160 (B)

Prevalence Index = B/A = 2.91

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 097

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	90	7.5 YR 5/4	10	C	M	Silty Clay	Organic
6-16	10 YR 4/2	70	7.5 YR 5/4	30	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 098
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.037310
Long: -93.896331
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 098

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	20	Yes	FAC
2. *Quercus nigra*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Ilex vomitoria*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 098

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 099
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036270
Long: -93.895452
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☐
Hydric Soils Present?	☐ Yes ☑ No		No: ☑
Wetland Hydrology Present?	☐ Yes ☑ No		

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 099

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	20	Yes	FAC
2.	*Quercus nigra*	20	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	60	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		60	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		10	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 099

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 100
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036280
Long: -93.895424
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-062
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 100

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Liquidambar styraciflua*	30	Yes	FAC
2.	*Quercus nigra*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		10	= Total Cover	

Herb Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
			= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	50	(A)	150 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 100

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	90	7.5 YR 5/4	10	C	M	Silty Clay	Organic
6-16	10 YR 4/2	70	7.5 YR 5/4	30	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)
  (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 101
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036277
Long: -93.895088
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑
Hydric Soils Present?	☑ Yes ☐ No		No: ☐
Wetland Hydrology Present?	☑ Yes ☐ No		

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-064
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 101

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Ludwigia peploides*	80	Yes	OBL
2. *Cyperus virens*	10	No	FACW
3. *Sagittaria lancifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 101

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	80	7.5 YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

  (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 102
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036285
Long: -93.894967
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 102

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	20	Yes	FAC
2.	*Quercus nigra*	20	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	60	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		60	= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	10	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		10	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	110	x 3 =	330
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 102

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 103
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036302
Long: -93.894838
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-063
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 103

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	20	Yes	FAC
2.	*Liquidambar styraciflua*	10	Yes	FAC
3.	*Quercus nigra*	10	Yes	FAC
4.				
5.				
6.				
7.				
		40	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Carex cherokeensis*	30	Yes	FACW
2.	*Juncus effusus*	30	Yes	OBL
3.	*Hydrocotyle umbellata*	30	Yes	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		90	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	30	x 2 =	60
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	240 (B)

Prevalence Index = B/A = 1.85

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 103

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	90	7.5 YR 5/4	10	C	M	Silty Clay	Organic
6-16	10 YR 4/2	70	7.5 YR 5/4	30	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 104
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.033361
Long: -93.892551
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-064
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 104

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Spartina patens*	40	Yes	FACW
2.	*Cyperus virens*	30	Yes	FACW
3.	*Nothoscordum bivalve*	15	No	FACU
4.	*Hydrocotyle umbellata*	15	No	OBL
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	15	x 1 =	15
FACW Species	70	x 2 =	140
FAC Species	0	x 3 =	0
FACU Species	15	x 4 =	60
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	215 (B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 104

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	80	7.5 YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 105
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.033387
Long: -93.892497
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 105

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	30	Yes	FAC
2.	*Liquidambar styraciflua*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	5	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		5	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Carex cherokeensis*	5	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		5	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	5	x 2 =	10
FAC Species	45	x 3 =	135
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	50	(A)	145 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 105

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 106
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.033471
Long: -93.892471
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-066
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 106

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Quercus nigra*	10	Yes	FAC
3. *Triadica sebifera*	10	Yes	FAC
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	160 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 106

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	80	7.5 YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 107
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.032543
Long: -93.891030
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-066
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 107

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Quercus nigra*	10	Yes	FAC
3. *Triadica sebifera*	10	Yes	FAC
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	160 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 107

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/1	100			C	M	Silty Clay	
4-16	10 yR 4/1	95	7.5 YR 4/6	5	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 108
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.032440
Long: -93.891009
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 108

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus taeda*	30	Yes	FAC
2. *Liquidambar styraciflua*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	50	Yes	FAC
2. *Carex cherokeensis*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
	55	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	5	x 2 =	10
FAC Species	90	x 3 =	270
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	95	(A)	280 (B)

Prevalence Index = B/A = 2.95

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 108

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 109
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.031088
Long: -93.890004
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 109

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	30	Yes	FAC
2.	*Triadica sebifera*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	40	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Rubus trivialis*	20	Yes	FACU
2.	*Pinus taeda*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		30	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 80% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	90	x 3 =	270
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	350 (B)

Prevalence Index = B/A = 3.18

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 109

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 110
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.031005
Long: -93.889966
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-067
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 110

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Eleocharis montevidensis*	100	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 110

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	80	7.5 YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 111
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.031023
Long: -93.889880
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia silt loam, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-068
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 111

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1. *Morella cerifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis cellulosa*	40	Yes	OBL
2. *Eleocharis parvula*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	210 (B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 111

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/1	100			C	M	Silty Clay	
4-16	10 yR 4/1	95	7.5 YR 4/6	5	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 112
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.029939
Long: -93.888833
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PEM1Ch

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 112

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Rubus trivialis*	30	Yes	FACU
2. *Nothoscordum bivalve*	20	Yes	FACU
3. *Ilex vomitoria*	20	Yes	FAC
4. *Andropogon glomeratus*	20	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	20	x 3 =	60
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	300 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 112

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 113
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.029899
Long: -93.888782
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PEM1Ch
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-069
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 113

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Saccharum alopecuroides*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	100	x 3 =	300
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 113

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	80	7.5 YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 114
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058662
Long: -93.935768
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-042
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 1
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 114

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Eleocharis montevidensis*	95	Yes	FACW
2.	*Nothoscordum bivalve*	5	No	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	95	x 2 =	190
FAC Species	0	x 3 =	0
FACU Species	5	x 4 =	20
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	210 (B)

Prevalence Index = B/A = 2.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 114

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 115
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058662
Long: -93.935720
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Plot was taken on roadway surface. No hydrology indicators were observed.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 115

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant
Species Across All Strata: ______ (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%

______ Prevalence Index is ≤3.0[1]

______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is less than 50%. No vegetation observed on roadway surface.

SOIL

Sampling Point: 115

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.No soil pit was dug due to roadway surface.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 116
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058673
Long: -93.935671
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-043
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 116

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Eleocharis montevidensis*	95	Yes	FACW
2. *Potamogeton diversifolius*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	95	x 2 =	190
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	195 (B)

Prevalence Index = B/A = 1.95

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 116

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	95	7.5 YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 117
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058389
Long: -93.935509
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-044
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 117

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Triadica sebifera*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Morella cerifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	60	x 3 =	180
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	180 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 117

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	95	7.5 YR 4/6	5	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 118
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058384
Long: -93.935558
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Plot taken on gravel road.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 118

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	60	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL Species	0	x 1 = 0
FACW Species	0	x 2 = 0
FAC Species	0	x 3 = 0
FACU Species	60	x 4 = 240
UPL Species	0	x 5 = 0
Column Totals:	60 (A)	240 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 118

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.No soil pit dug due to gravel layer.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 119
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.056946
Long: -93.931592
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-045
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 119

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis parvula*	80	Yes	OBL
2. *Cyperus virens*	10	No	FACW
3. *Andropogon glomeratus*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 119

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	95	7.5 YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/5/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 120
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.056981
Long: -93.931580
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 120

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	30	Yes	FAC
2.	*Triadica sebifera*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	10	Yes	FAC
2.	*Morella cerifera*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		20	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Rubus trivialis*	10	Yes	FACU
2.	*Smilax bona-nox*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		20	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 83% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	70	x 3 =	210
FACU Species	10	x 4 =	40
UPL Species	0	x 5 =	0
Column Totals:	80	(A)	250 (B)

Prevalence Index = B/A = 3.13

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 120

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/1	98	7.5 YR 4/6	2	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T, U)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/6/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 121
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059004
Long: -93.938660
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation and hydrology were not observed. Hydric soils were observed. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 121

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Schizachyrium scoparium*	10	No	FACU
3. *Solidago sempervirens*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	90	x 4 =	360
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	380 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 121

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	90	7.5 YR 5/6	10	C	M	Fine Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/6/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 122
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.059053
Long: -93.938769
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Saturated and water table to surface

Habitat ID: H-041
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 122

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cladium jamaicense*	40	Yes	NI
2. *Saccharum alopecuroides*	40	Yes	FAC
3. *Eleocharis cellulosa*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	0	x 2 =	0
FAC Species	40	x 3 =	120
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	60	(A)	140 (B)

Prevalence Index = B/A = 2.33

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 122

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	80	7.5 YR 6/8	20	C	M/PL	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/6/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 123
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058755
Long: -93.939239
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits (B5)
- ☐ Inundated Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 123

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Pinus taeda*	20	Yes	FAC
2.	*Quercus nigra*	20	Yes	FAC
3.	*Triadica sebifera*	5	No	FAC
4.				
5.				
6.				
7.				
		45	= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.	*Ilex vomitoria*	20	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		20	= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Carex cherokeensis*	5	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		5	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	5	x 2 =	10
FAC Species	65	x 3 =	195
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	70	(A)	205 (B)

Prevalence Index = B/A = 2.93

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 123

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	100			C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)
  (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T, U)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 3/6/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 124
Investigator(s): BS, RC, HK
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.058793
Long: -93.939351
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Anahuac complex, 0 to 1 percent slopes
NWI Classification: PFO1C

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Positive result for alpha-alpha dipyridyl test. Plot located in shallow, poorly drained depression.

Habitat ID: H-040
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 124

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	30	Yes	FAC
2. *Triadica sebifera*	10	Yes	FAC
3. *Liquidambar styraciflua*	10	Yes	FAC
4.			
5.			
6.			
7.			
	50	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	50	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	50	x 2 =	100
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	250 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 124

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/2	100			C	M/PL	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☑ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.Positive result for alpha-alpha dipyridyl test. Redox features difficult to see

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 125
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.029350
Long: -93.888166
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PEM1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland adjacent to canal.

Habitat ID: H-071
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 125

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	

Herb Stratum (Plot size : 30)				
1.	*Juncus effusus*	5	No	OBL
2.	*Typha latifolia*	40	Yes	OBL
3.	*Persicaria hydropiperoides*	5	No	OBL
4.	*Spartina patens*	50	Yes	FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	

Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 125

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	80	7.5YR 5/6	20	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 126
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.029316
Long: -93.888120
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PEM1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland pipeline right of way.

Vegetation - Use scientific names of plants.

Sampling Point: 126

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Paspalum urvillei*	20	Yes	FAC
2. *Iva annua*	10	No	FAC
3. *Baptisia bracteata*	15	No	NI
4. *Mimosa strigillosa*	20	Yes	FAC
5. *Sorghum halepense*	15	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	35	x 4 =	140
UPL Species	0	x 5 =	0
Column Totals:	85	(A)	290 (B)

Prevalence Index = B/A = 3.41

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 126

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	95	10YR 5/6	5	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 127
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.028222
Long: -93.887214
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland swale.

Habitat ID: H-082
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 127

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	30	Yes	FACW
2. *Typha latifolia*	50	Yes	OBL
3. *Spartina spartinae*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	70	x 1 =	70
FACW Species	30	x 2 =	60
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	130 (B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 127

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	80	7.5YR 5/6	20	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 128
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 2
Subregion (LRRA or MLRA): LRR-T
Lat: 30.028257
Long: -93.887168
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PEM1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 128

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Paspalum urvillei*	40	Yes	FAC
2. *Iva annua*	20	Yes	FAC
3. *Baccharis halimifolia*	20	Yes	FAC
4. *Tamarix ramosissima*	10	No	NI
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Smilax bona-nox*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	90	x 3 =	270
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 128

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 129
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027137
Long: -93.884312
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded
NWI Classification: PFO1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 129

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2. *Quercus nigra*	30	Yes	FAC
3. *Fraxinus pennsylvanica*	40	Yes	FACW
4.			
5.			
6.			
7.			
	100	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Ligustrum sinense*	2	No	FAC
2. *Iva annua*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	12	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1. *Smilax bona-nox*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	82	x 3 =	246
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	122	(A)	326 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 129

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 130
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027345
Long: -93.881289
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: PFO1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 130

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	30	Yes	FAC
2. *Quercus nigra*	20	Yes	FAC
3. *Fraxinus pennsylvanica*	40	Yes	FACW
4. Ilex opaca	10	No	FAC
5.			
6.			
7.			
	100	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Ligustrum sinense*	2	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	2	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Smilax bona-nox*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	72	x 3 =	216
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	112	(A)	296 (B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 130

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 131
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027479
Long: -93.879276
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland swale.

Habitat ID: H-085
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 131

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	10	No	FACW
2. *Panicum virgatum*	20	Yes	FAC
3. *Iva annua*	20	Yes	FAC
4. *Rhynchospora caduca*	20	Yes	OBL
5. *Paspalum plicatulum*	30	Yes	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	20	x 1 =	20	
FACW Species	10	x 2 =	20	
FAC Species	70	x 3 =	210	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	250	(B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 131

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	85	7.5YR 5/6	15	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 132
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027452
Long: -93.879205
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland pipeline right of way.

Vegetation - Use scientific names of plants.

Sampling Point: 132

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Verbena brasiliensis*	20	Yes	NI
2.	*Ilex vomitoria*	40	Yes	FAC
3.	*Ampelopsis arborea*	10	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		70	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.	*Rubus trivialis*	20	Yes	FACU
2.				
3.				
4.				
5.				
6.				
		20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	70	(A)	230 (B)

Prevalence Index = B/A = 3.29

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 132

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Clayey Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 133
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027461
Long: -93.879111
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-086
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a vegetated drainage ditch adjacent to roadway.

Vegetation - Use scientific names of plants.

Sampling Point: 133

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	80	Yes	OBL
2. *Leersia oryzoides*	15	No	OBL
3. *Eleocharis montevidensis*	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	95	x 1 =	95
FACW Species	5	x 2 =	10
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	105 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 133

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type^1	Loc^2	Texture	Remarks
0-16	10YR 4/2	85	7.5YR 5/6	15	C	M	Silty Clay	

^{1}Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. ^{2}Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^3:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

^{3}Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project City/ County: Orange Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC State: Texas Sampling Point: 134
Investigator(s): KK, MJ Section, Township, Range:
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Convex Slope (%): <1
Subregion (LRRA or MLRA): LRR-T Lat: 30.027322 Long: -93.878978 Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID: Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland adjacent to roadway.

Vegetation - Use scientific names of plants.

Sampling Point: 134

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Verbena brasiliensis*	20	Yes	NI
2. *Ilex vomitoria*	40	Yes	FAC
3. *Ampelopsis arborea*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	70	(A)	230 (B)

Prevalence Index = B/A = 3.29

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 134

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Clayey Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 135
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027323
Long: -93.878957
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-088
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 135

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Juncus effusus*	30	Yes	OBL
2. *Leersia oryzoides*	60	Yes	OBL
3. *Typha latifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 135

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	85	7.5YR 5/6	15	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 136
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027421
Long: -93.877434
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-089
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a forested wetland located along ground level pipeline surrounded by herbaceous wetlands.

Vegetation - Use scientific names of plants.

Sampling Point: 136

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.	*Triadica sebifera*	50	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		50	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Salix nigra*	20	Yes	OBL
2.	*Baccharis halimifolia*	30	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		50	= Total Cover	
Herb Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
			= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	0	x 2 =	0
FAC Species	80	x 3 =	240
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	260 (B)

Prevalence Index = B/A = 2.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 136

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	90	7.5YR 5/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 137
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027112
Long: -93.878149
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1C

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-087	Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a wetland adjacent to pipeline access road.

Vegetation - Use scientific names of plants.

Sampling Point: 137

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	70	Yes	FACW
2. *Rhynchospora caduca*	10	No	OBL
3. *Sesbania drummondii*	10	No	FACW
4. *Distichlis spicata*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	80	x 2 =	160
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 137

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	85	7.5YR 5/6	15	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/27/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 138
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027138
Long: -93.878180
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: PEM1C
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland adjacent to roadway.

Vegetation - Use scientific names of plants.

Sampling Point: 138

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Verbena brasiliensis*	20	Yes	NI
2. *Ilex vomitoria*	40	Yes	FAC
3. *Ampelopsis arborea*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 33% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	70	(A)	230 (B)

Prevalence Index = B/A = 3.29

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%
No Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 138

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Clayey Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/28/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 139
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026975
Long: -93.874617
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:

Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland slope adjacent to shallow swale wetland.

Vegetation - Use scientific names of plants.

Sampling Point: 139

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Paspalum notatum*	60	Yes	FACU
2. *Cyperus virens*	20	Yes	FACW
3. *Juncus effusus*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	20	x 1 =	20	
FACW Species	20	x 2 =	40	
FAC Species	0	x 3 =	0	
FACU Species	60	x 4 =	240	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	300	(B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 139

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/28/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 140
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026980
Long: -93.874572
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-093
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0-16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a shallow swale wetland adjacent to upland forest and pipeline access road.

Vegetation - Use scientific names of plants.

Sampling Point: 140

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Eleocharis montevidensis*	10	No	FACW
2. *Juncus effusus*	10	No	OBL
3. *Typha domingensis*	10	No	OBL
4. *Phragmites australis*	70	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	20	x 1 =	20	
FACW Species	80	x 2 =	160	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	180	(B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 140

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	85	7.5YR 5/6	15	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/28/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 141
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027314
Long: -93.871562
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-095
Habitat Type: PEM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a vegetated shallow drainage ditch.

Vegetation - Use scientific names of plants.

Sampling Point: 141

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	40	Yes	FACW
2. *Eleocharis montevidensis*	40	Yes	FACW
3. *Paspalum notatum*	20	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	80	x 2 =	160
FAC Species	0	x 3 =	0
FACU Species	20	x 4 =	80
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	240 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 141

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	85	7.5YR 5/6	15	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/28/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 142
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027283
Long: -93.871570
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-096
Habitat Type: PFO

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 0.5
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. The sample plot is located within a forested wetland adjacent to wetland drainage feature.

Vegetation - Use scientific names of plants.

Sampling Point: 142

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Triadica sebifera*	100	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		100	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Cyperus virens*	60	Yes	FACW
2.	*Juncus effusus*	40	Yes	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	60	x 2 =	120
FAC Species	100	x 3 =	300
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	200	(A)	460 (B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 142

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	90	7.5YR 5/6	10	C	M	Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 5/28/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 143
Investigator(s): KK, MJ
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027259
Long: -93.871571
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland adjacent to pipeline access road. .

Vegetation - Use scientific names of plants.

Sampling Point: 143

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Stenotaphrum secundatum*	95	Yes	FAC
2.	*Cyperus virens*	5	No	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	5	x 2 =	10
FAC Species	95	x 3 =	285
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	295 (B)

Prevalence Index = B/A = 2.95

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 143

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 144
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818217
Long: -93.621173
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E1UBLx
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. The sample plot is located within an upland adjacent to pipeline access road. .

Vegetation - Use scientific names of plants.

Sampling Point: 144

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%

______ Prevalence Index is ≤3.0[1]

______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. Bareground 100%

SOIL Sampling Point: 144

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Silty Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 145
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818580
Long: -93.623308
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ps
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-126
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 145

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 145

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 146
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818863
Long: -93.633588
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ns

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-126	Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 146

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	50	Yes	FACW
2. *Bolboschoenus robustus*	40	Yes	OBL
3. *Typha angustifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100 (A)		150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 146

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 147
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.819170
Long: -93.637905
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ns
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 147

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	60	Yes	FACW
2. *Bolboschoenus robustus*	35	Yes	OBL
3. *Iva frutescens*	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	x 1 =	35
FACW Species	65	x 2 =	130
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	165 (B)

Prevalence Index = B/A = 1.65

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 147

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 148
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.819456
Long: -93.642842
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ps

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123

Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 148

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	95	Yes	OBL
2. *Bolboschoenus robustus*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 148

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 149
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.819917
Long: -93.648859
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-125
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 149

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 149

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 150
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.820157
Long: -93.652609
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ns

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 150

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	95	Yes	OBL
2. *Typha angustifolia*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 150

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 151
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.820309
Long: -93.654945
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ns

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 151

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	80	Yes	OBL
2. *Crinum americanum*	10	No	OBL
3. *Hydrocotyle umbellata*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 151

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 152
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.821157
Long: -93.668658
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM5P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located on channel at pipeline centerline crossing. Phragmites australis too thick and tall for airboat entry

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 152

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	90	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	90	x 2 =	180
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	90	(A)	180 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. 10% open water

SOIL

Sampling Point: 152

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 153
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.821341
Long: -93.671544
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 153

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	80	Yes	OBL
2. *Bolboschoenus robustus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 153

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 154
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.821552
Long: -93.674398
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery

- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 154

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Schoenoplectus californicus*	95	Yes	OBL
2.	*Bolboschoenus robustus*	5	No	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 154

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 155
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.821555
Long: -93.677235
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM5P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 155

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	95	Yes	OBL
2. *Phragmites australis*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	95	x 1 =	95	
FACW Species	5	x 2 =	10	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	105	(B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 155

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 156
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.821789
Long: -93.679828
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 156

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Spartina spartinae*	40	Yes	OBL
2. *Schoenoplectus californicus*	40	Yes	OBL
3. *Persicaria hydropiperoides*	10	No	OBL
4. *Hydrocotyle umbellata*	5	No	OBL
5. *Crinum americanum*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 156

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 157
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822044
Long: -93.682196
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-124
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 157

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	50	Yes	FACW
2. *Typha angustifolia*	40	Yes	OBL
3. *Schoenoplectus californicus*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100 (A)		150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 157

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 158
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822210
Long: -93.685445
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 158

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	90	Yes	OBL
2. *Typha angustifolia*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 158

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 159
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822407
Long: -93.687774
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 159

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 159

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 160
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822523
Long: -93.690727
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes	☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes	☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes	☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 160

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 160

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 161
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822635
Long: -93.693249
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123	Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 161

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

<u>Total % Cover of:</u>		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 161

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 162
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.822953
Long: -93.696292
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 162

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	85	Yes	OBL
2. *Schoenoplectus californicus*	10	No	OBL
3. *Typha angustifolia*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 162

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 163
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.823123
Long: -93.700067
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 163

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Sesbania drummondii*	2	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	2	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	90	Yes	OBL
2. *Bolboschoenus robustus*	8	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	98	x 1 =	98
FACW Species	2	x 2 =	4
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	102 (B)

Prevalence Index = B/A = 1.02

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 163

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 164
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.823282
Long: -93.702600
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 164

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	60	Yes	OBL
2. *Persicaria hydropiperoides*	30	Yes	OBL
3. *Phragmites australis*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	90	x 1 =	90	
FACW Species	10	x 2 =	20	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	110	(B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 164

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 165
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.823447
Long: -93.705251
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 165

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Sesbania drummondii*	2	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	2	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	98	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	98	x 1 =	98
FACW Species	2	x 2 =	4
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	102 (B)

Prevalence Index = B/A = 1.02

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 165

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 166
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.823626
Long: -93.708212
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 8
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 166

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 166

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 167
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.823761
Long: -93.710342
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	8
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 167

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 167

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 168
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824298
Long: -93.713575
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 4
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located on wetland berm.

Vegetation - Use scientific names of plants.

Sampling Point: 168

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Iva frutescens*	30	Yes	FACW
2. *Bolboschoenus robustus*	30	Yes	OBL
3. *Schoenoplectus californicus*	30	Yes	OBL
4. *Typha angustifolia*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	70	x 1 =	70
FACW Species	30	x 2 =	60
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	130 (B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 168

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 169
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824339
Long: -93.719728
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located on spoilberm.

Vegetation - Use scientific names of plants.

Sampling Point: 169

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Iva frutescens*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Pluchea odorata*	50	Yes	FACW
2. *Persicaria hydropiperoides*	20	Yes	OBL
3. *Typha angustifolia*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	60	x 2 =	120
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	160 (B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 169

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 170
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824422
Long: -93.721754
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 170

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Iva frutescens*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	30	Yes	OBL
2. *Typha angustifolia*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	10	x 2 =	20	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	70	(A)	80	(B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 170

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 171
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824421
Long: -93.721778
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☐ Yes ☑ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☐ Yes ☑ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met. Plot located on a gravel road.

Vegetation - Use scientific names of plants.

Sampling Point: 171

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: ______ (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

______ Dominance Test is >50%

______ Prevalence Index is ≤3.0[1]

______ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. Plot located on a gravel road. Bareground 100%

SOIL

Sampling Point: 171

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.Plot located on a gravel road. No plot was dug.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 172
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824635
Long: -93.724114
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121	Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 172

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	90	Yes	OBL
2. *Spartina spartinae*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 172

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 173
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824762
Long: -93.726448
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 173

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	90	Yes	OBL
2. *Spartina spartinae*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 173

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 174
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.824890
Long: -93.729275
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 3
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 174

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Distichlis spicata*	90	Yes	OBL
2. *Eleocharis montevidensis*	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 174

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 175
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.825077
Long: -93.731792
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Creole mucky clay
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 3
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 175

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	90	Yes	OBL
2. *Distichlis spicata*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 175

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 176
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.825241
Long: -93.734039
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Creole mucky clay
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 176

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Distichlis spicata*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 176

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 177
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.825391
Long: -93.737701
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery
☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of two required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located on south of spoil bank.

Vegetation - Use scientific names of plants.

Sampling Point: 177

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 177

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 178
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.825628
Long: -93.740629
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 178

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	50	Yes	OBL
2. *Spartina patens*	50	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 178

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 179
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.825888
Long: -93.744825
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 179

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	90	Yes	OBL
2. *Typha angustifolia*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 179

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 180
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826099
Long: -93.747804
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 3
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met. Plot located on ridge of spoil bank.

Vegetation - Use scientific names of plants.

Sampling Point: 180

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Iva frutescens*	40	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
		40	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Bolboschoenus robustus*	30	Yes	OBL
2.	*Spartina patens*	20	Yes	FACW
3.	*Leersia oryzoides*	10	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		60	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	60	x 2 =	120
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	160 (B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 180

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 181
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826335
Long: -93.751530
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 181

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	99	Yes	FACW
2. *Leersia oryzoides*	1	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	1	x 1 =	1	
FACW Species	99	x 2 =	198	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	199	(B)

Prevalence Index = B/A = 1.99

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 181

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 182
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826502
Long: -93.754192
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 182

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	50	Yes	OBL
2. *Spartina patens*	40	Yes	FACW
3. *Typha angustifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	40	x 2 =	80
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	140 (B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 182

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 183
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826625
Long: -93.757144
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Mermentau clay
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 183

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	50	Yes	OBL
2. *Spartina patens*	40	Yes	FACW
3. *Typha angustifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	40	x 2 =	80
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	140 (B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 183

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 184
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826800
Long: -93.759703
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Creole mucky clay
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 184

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Schoenoplectus americanus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 184

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 185
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.826969
Long: -93.762370
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Mermentau clay
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	4
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 185

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus americanus*	90	Yes	OBL
2. *Fimbristylis littoralis*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 185

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 186
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.827149
Long: -93.764962
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-121	Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 186

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	50	Yes	FACW
2. *Bolboschoenus robustus*	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 186

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 187
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.827457
Long: -93.768357
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 187

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	80	Yes	OBL
2. *Spartina patens*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 187

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 188
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.827510
Long: -93.771216
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 4
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 188

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	90	Yes	FACW
2. *Typha angustifolia*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	90	x 2 =	180
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	190 (B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 188

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 189
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.827847
Long: -93.775075
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 189

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 189

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 190
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.827915
Long: -93.778399
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 4
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 190

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 190

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 191
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.828200
Long: -93.781515
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 191

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Spartina patens*	100	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 191

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 192
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.828374
Long: -93.784147
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 192

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	95	Yes	FACW
2. *Bolboschoenus robustus*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	95	x 2 =	190
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	195 (B)

Prevalence Index = B/A = 1.95

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 192

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 193
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.828613
Long: -93.787575
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-118
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	4
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 193

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Iva frutescens*	10	Yes	FACW
2.				
3.				
4.				
5.				
6.				
7.				
		10	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Bolboschoenus robustus*	50	Yes	OBL
2.	*Spartina patens*	40	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		90	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 193

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 194
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.828762
Long: -93.789873
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 194

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Schoenoplectus americanus*	50	Yes	OBL
2. *Spartina patens*	40	Yes	FACW
3. *Typha angustifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	40	x 2 =	80	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	140	(B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 194

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 195
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.828872
Long: -93.792434
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 195

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	70	Yes	FACW
2. *Bolboschoenus robustus*	20	Yes	OBL
3. *Typha angustifolia*	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	70	x 2 =	140
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	170 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 195

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 196
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.829050
Long: -93.794505
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115	Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 196

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	80	Yes	FACW
2. *Schoenoplectus americanus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	80	x 2 =	160
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 196

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^3:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 197
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.829139
Long: -93.797413
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	4
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 197

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	70	Yes	FACW
2. *Typha angustifolia*	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	70	x 2 =	140
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	170 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 197

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 198
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.829290
Long: -93.800088
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 198

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	80	Yes	FACW
2. *Typha angustifolia*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	80	x 2 =	160
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 198

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 199
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.829497
Long: -93.802568
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 4
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 199

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina patens*	50	Yes	FACW
2. *Schoenoplectus americanus*	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	x 1 =	50	
FACW Species	50	x 2 =	100	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	150	(B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 199

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/1/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 200
Investigator(s): H.Kelly, M.Jay
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.829565
Long: -93.803859
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1P5
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-115
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery
☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 200

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bolboschoenus robustus*	50	Yes	OBL
2. *Spartina patens*	40	Yes	FACW
3. *Vigna luteola*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 200

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	90	10 YR 5/6	10	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 201
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027800
Long: -93.874109
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located near upland berm running E-W.

Habitat ID: H-094
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☑ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 201

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Liquidambar styraciflua*	50	Yes	FAC
2.	*Pinus taeda*	10	No	FAC
3.				
4.				
5.				
6.				
7.				
		60	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Acer rubrum*	15	Yes	FAC
2.	*Pinus taeda*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		25	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Morella cerifera*	15	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		15	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Eleocharis parvula*	20	Yes	OBL
2.	*Hydrocotyle umbellata*	10	Yes	OBL
3.	*Cyperus virens*	10	Yes	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		40	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.	*Rubus trivialis*	5	Yes	FACU
2.				
3.				
4.				
5.				
6.				
		5	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 88% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	10	x 2 =	20
FAC Species	100	x 3 =	300
FACU Species	5	x 4 =	20
UPL Species	0	x 5 =	0
Column Totals:	145	(A)	370 (B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 201

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	60	7.5 YR 5/6	40	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 202
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027819
Long: -93.874111
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 202

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Acer rubrum*	20	Yes	FAC
3. *Pinus taeda*	15	Yes	FAC
4.			
5.			
6.			
7.			
	55	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	50	Yes	FAC
2. *Morella cerifera*	15	Yes	FAC
3. *Ligustrum sinense*	5	No	FAC
4.			
5.			
6.			
7.			
	70	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	5	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 83% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	125	x 3 =	375
FACU Species	5	x 4 =	20
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	395 (B)

Prevalence Index = B/A = 3.04

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%. No herbacious stratum - thick pine leaf litter.

SOIL

Sampling Point: 202

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	90	7.5 YR 5/6	10	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 203
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027177
Long: -93.871389
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-097
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 203

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Bacopa monnieri*	70	Yes	OBL
2. *Cyperus virens*	10	No	FACW
3. *Alternanthera philoxeroides*	10	No	OBL
4. *Distichlis spicata*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100 (A)		110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 203

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/6	30	C	M	Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 204
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 5
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027199
Long: -93.871390
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located adjacent to improved road surface.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 204

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Triadica sebifera*	20	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		20	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Cynodon dactylon*	50	Yes	FACU
2.	*Cyperus virens*	20	Yes	FACW
3.	*Nothoscordum bivalve*	10	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		80	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	20	x 3 =	60
FACU Species	60	x 4 =	240
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	340 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 204

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 205
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027660
Long: -93.869305
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☐ Surface Water
☐ High Water Table
☐ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☐ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 205

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	30	Yes	FAC
2. *Triadica sebifera*	30	Yes	FAC
3. *Juniperus virginiana*	20	Yes	FACU
4.			
5.			
6.			
7.			
	80	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Smilax bona-nox*	5	Yes	FAC
2. *Rubus trivialis*	5	Yes	FACU
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That are OBL, FACW, or FAC:	67%	(B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	95	x 3 =	285
FACU Species	25	x 4 =	100
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	385 (B)

Prevalence Index = B/A = 3.21

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
No	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 205

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 206
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027730
Long: -93.868552
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located in small creek

Habitat ID: H-099
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☑ Crayfish Burrows
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 12
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and two secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 206

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Sagittaria latifolia*	20	Yes	OBL
2. *Alternanthera philoxeroides*	20	Yes	OBL
3. *Zizaniopsis miliacea*	60	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 206

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	70	7.5 YR 6/6	30	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 207
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027727
Long: -93.868522
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located in cleared right-of-way.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 207

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	50	Yes	FACU
2. *Stenotaphrum secundatum*	50	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	50	x 3 =	150
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	350 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 207

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	90	7.5 YR 6/8	10	C	M	Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 208
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027082
Long: -93.871012
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-101
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery

- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 208

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 208

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/6	30	C	M	Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 209
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027101
Long: -93.871079
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located adjacent to improved road surface.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 209

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Triadica sebifera*	20	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		20	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Cynodon dactylon*	50	Yes	FACU
2.	*Cyperus virens*	20	Yes	FACW
3.	*Nothoscordum bivalve*	10	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		80	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 67% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	20	x 2 =	40	
FAC Species	20	x 3 =	60	
FACU Species	60	x 4 =	240	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	340	(B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 209

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 210
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027001
Long: -93.870765
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-102
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☑ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and one secondary indicator of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 210

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Liquidambar styraciflua*	50	Yes	FAC
2.	*Pinus taeda*	10	No	FAC
3.				
4.				
5.				
6.				
7.				
		60	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.	*Acer rubrum*	15	Yes	FAC
2.	*Pinus taeda*	10	Yes	FAC
3.				
4.				
5.				
6.				
7.				
		25	= Total Cover	
Shrub Stratum (Plot size : 30)				
1.	*Morella cerifera*	15	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		15	= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Eleocharis parvula*	20	Yes	OBL
2.	*Hydrocotyle umbellata*	10	Yes	OBL
3.	*Cyperus virens*	10	Yes	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		40	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.	*Rubus trivialis*	5	Yes	FACU
2.				
3.				
4.				
5.				
6.				
		5	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant
Species Across All Strata: 8 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 88% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	10	x 2 =	20
FAC Species	100	x 3 =	300
FACU Species	5	x 4 =	20
UPL Species	0	x 5 =	0
Column Totals:	145	(A)	370 (B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 210

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	60	7.5 YR 5/6	40	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 211
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026999
Long: -93.870750
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☐
Wetland Hydrology Present?	☐ Yes ☑ No	No: ☑

Remarks:
Hydrophytic vegetation and hydric soils were observed; however, hydrology was not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 211

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Acer rubrum*	20	Yes	FAC
3. *Pinus taeda*	15	Yes	FAC
4.			
5.			
6.			
7.			
	55	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	50	Yes	FAC
2. *Morella cerifera*	15	Yes	FAC
3. *Ligustrum sinense*	5	No	FAC
4.			
5.			
6.			
7.			
	70	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	5	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 83% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	125	x 3 =	375
FACU Species	5	x 4 =	20
UPL Species	0	x 5 =	0
Column Totals:	130	(A)	395 (B)

Prevalence Index = B/A = 3.04

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 211

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	90	7.5 YR 5/6	10	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 212
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026199
Long: -93.870333
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-103
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☐ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 212

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cyperus virens*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 212

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/6	30	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^3:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 213
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026109
Long: -93.870330
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 213

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	30	Yes	FAC
2. *Pinus taeda*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Ilex vomitoria*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	30	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 75% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	80	x 3 =	240
FACU Species	30	x 4 =	120
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	360 (B)

Prevalence Index = B/A = 3.27

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
No	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 213

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 214
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.025064
Long: -93.870357
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-104
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 214

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Bacopa monnieri*	40	Yes	OBL
2. *Eleocharis montevidensis*	20	Yes	FACW
3. *Cyperus virens*	20	Yes	FACW
4. *Juncus effusus*	20	Yes	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	60	x 1 =	60	
FACW Species	40	x 2 =	80	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	140	(B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 214

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/8	30	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 215
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 2
Subregion (LRRA or MLRA): LRR-T
Lat: 30.025081
Long: -93.870401
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located on small upland mound.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): >16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches): >16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 215

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Triadica sebifera*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Iva frutescens*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	40	Yes	FACU
2. *Stenotaphrum secundatum*	35	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 75% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	15	x 2 =	30
FAC Species	45	x 3 =	135
FACU Species	40	x 4 =	160
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	325 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 215

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 216
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043539
Long: -93.903743
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-064
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 216

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Leersia oryzoides*	60	Yes	OBL
2. *Alternanthera philoxeroides*	20	Yes	OBL
3. *Hydrocotyle umbellata*	10	No	OBL
4. *Cyperus virens*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 216

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/3/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 217
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): 2
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043588
Long: -93.903751
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 217

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Stenotaphrum secundatum*	60	Yes	FAC
2. *Hydrocotyle umbellata*	20	Yes	OBL
3. *Paspalum notatum*	10	No	FACU
4. *Leersia oryzoides*	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	0	x 2 =	0
FAC Species	60	x 3 =	180
FACU Species	10	x 4 =	40
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	250 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 217

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	95	7.5 YR 6/8	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 218
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.990246
Long: -93.854819
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-113
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 218

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 218

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 219
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.990378
Long: -93.854800
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Rock Berm

Habitat ID:
Habitat Type: up

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☑ Yes ☐ No Depth (Inches): 10
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 219

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1. *Parkinsonia aculeata*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Baccharis halimifolia*	80	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Herb Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Ampelopsis arborea*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	20	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	120	x 3 =	360
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	120	(A)	360 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 219

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 220
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.999217
Long: -93.864778
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-112
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 10
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 220

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	20	Yes	OBL
2. *Typha latifolia*	40	Yes	OBL
3. *Spartina spartinae*	30	Yes	OBL
4. *Phragmites australis*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 220

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^3:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 221
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.997842
Long: -93.863314
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-112
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 221

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Typha angustifolia*	20	Yes	OBL
2.	*Typha latifolia*	40	Yes	OBL
3.	*Spartina spartinae*	30	Yes	OBL
4.	*Phragmites australis*	10	No	FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		100	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	90	x 1 =	90	
FACW Species	10	x 2 =	20	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	110	(B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 221

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)
☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 222
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.996159
Long: -93.861296
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-112
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks (B1)
☐ Sediment Deposits
☑ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☑ Water-Stained Leaves (B9)
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of two required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 10
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 222

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	30	Yes	OBL
2. *Typha latifolia*	50	Yes	OBL
3. *Phragmites australis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 222

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site:	Blue Marlin Offshore Port Project	City/ County:	Orange	Sampling Date:	6/10/2020
Applicant/Owner:	Blue Marlin Offshore Port LLC	State:	Texas	Sampling Point:	223
Investigator(s):	R. Calvin, H. Kelly	Section, Township, Range:			
Landform (hillside, terrace, etc.):	Plain	Local relief (concave, convex, none):	Concave	Slope (%):	<1
Subregion (LRRA or MLRA):	LRR-T	Lat: 29.994119	Long: -93.858673	Datum:	NAD 83, Decimal Degrees
Soil Map Unit Name:	IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal			NWI Classification:	E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-112	Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks (B1)
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	10
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 223

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Baccharis halimifolia*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	30	Yes	OBL
2. *Typha latifolia*	50	Yes	OBL
3. *Phragmites australis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	10	x 3 =	30
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	150 (B)

Prevalence Index = B/A = 1.36

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 223

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 224
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.002511
Long: -93.868943
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 10
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 224

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 224

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 225
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.004442
Long: -93.870792
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 10
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 225

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	80	Yes	OBL
2. *Schoenoplectus californicus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 225

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 226
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.007080
Long: -93.871544
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 226

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	80	Yes	OBL
2. *Schoenoplectus californicus*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 226

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project City/ County: Orange Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC State: Texas Sampling Point: 227
Investigator(s): R. Calvin, H. Kelly Section, Township, Range:
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): <1
Subregion (LRRA or MLRA): LRR-T Lat: 30.009487 Long: -93.871429 Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: IjmB—Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073 Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 227

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 227

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 228
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.012256
Long: -93.871247
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 228

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	30	Yes	OBL
2. *Typha latifolia*	50	Yes	OBL
3. *Phragmites australis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant
Species Across All Strata: 3 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	20	x 2 =	40
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 228

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 229
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.015019
Long: -93.871247
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-073
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☑ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☑ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 229

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 229

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 230
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.016184
Long: -93.871184
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: up

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	<16
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	<16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 230

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Paspalum notatum*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	30	Yes	FACU
2. *Ampelopsis arborea*	20	Yes	FAC
3.			
4.			
5.			
6.			
	50	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	60	x 3 =	180
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	380 (B)

Prevalence Index = B/A = 3.45

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
No	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 230

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 231
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.038730
Long: -93.969429
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located on island in wetland habitat complex.

Habitat ID: H-081
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 12
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 231

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 231

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 232
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.036793
Long: -93.971901
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located on wetland island.

Habitat ID: H-080
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	12
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 232

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Baccharis halimifolia*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Typha angustifolia*	80	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Ipomoea sagittata*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species	10	x 2 =	20
FAC Species	20	x 3 =	60
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	160 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 232

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 233
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.035101
Long: -93.974079
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: E2EM1P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located on wetland island.

Habitat ID: H-080
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 12
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 233

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	90	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1. *Ipomoea sagittata*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	10	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant
Species Across All Strata: 2 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	90	x 1 =	90	
FACW Species	10	x 2 =	20	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	110	(B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 233

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 234
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.033143
Long: -93.975847
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1R

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-080
Habitat Type: E2EM

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 12
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 234

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	50	Yes	OBL
2. *Phragmites australis*	50	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 234

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^3**:**

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 235
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.031341
Long: -93.977958
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: R1UBVx
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland. Plot located adjacent to canal.

Habitat ID: H-080
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☑ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☑ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of two required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	12
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 235

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 235

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 236
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.029728
Long: -93.980280
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-009
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 12
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 236

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	50	Yes	FACW
2. *Schoenoplectus californicus*	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	50	x 2 =	100
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	150 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 236

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 237
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.027979
Long: -93.982117
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-009
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 12
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 237

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 237

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 238
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.026334
Long: -93.984580
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1A
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-009
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	12
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 238

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 238

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/10/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 239
Investigator(s): R. Calvin, H. Kelly
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.024932
Long: -93.987002
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1A

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-009
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 12
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 239

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	100	x 2 =	200	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 239

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/1	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 240
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.043539
Long: -93.903604
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-111
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 6
Saturation Present? ☑ Yes ☐ No Depth (Inches): 6
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 240

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Liquidambar styraciflua*	20	Yes	FAC
2.	*Triadica sebifera*	20	Yes	FAC
3.	*Quercus nigra*	15	Yes	FAC
4.				
5.				
6.				
7.				
		55	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Leersia oryzoides*	20	Yes	OBL
2.	*Carex cherokeensis*	10	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		30	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	10	x 2 =	20
FAC Species	55	x 3 =	165
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	85	(A)	205 (B)

Prevalence Index = B/A = 2.41

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 240

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 241
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.040515
Long: -93.899954
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-110
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☐ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☑ Water-Stained Leaves
☐ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 241

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Triadica sebifera*	20	Yes	FAC
3. *Quercus nigra*	15	Yes	FAC
4.			
5.			
6.			
7.			
	55	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Leersia oryzoides*	20	Yes	OBL
2. *Carex cherokeensis*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	10	x 2 =	20
FAC Species	55	x 3 =	165
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	85	(A)	205 (B)

Prevalence Index = B/A = 2.41

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 241

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 242
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.039114
Long: -93.898457
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-109
Habitat Type: pss

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Four primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 242

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1. *Triadica sebifera*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	30	Yes	FACW
2. *Hydrocotyle umbellata*	30	Yes	OBL
3. *Sagittaria latifolia*	30	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	30	x 2 =	60
FAC Species	50	x 3 =	150
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	140	(A)	270 (B)

Prevalence Index = B/A = 1.93

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 242

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	90	7.5 YR 5/4	10	C	M	Silty Clay	Organic
6-16	10 YR 4/2	70	7.5 YR 5/4	30	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 243
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.034623
Long: -93.893477
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Barbary mucky clay, 0 to 1 percent slopes, frequently flooded
NWI Classification: PEM1T

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-065
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	6
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	6

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 243

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Triadica sebifera*	20	Yes	FAC
3. *Quercus nigra*	15	Yes	FAC
4.			
5.			
6.			
7.			
	55	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Carex cherokeensis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	55	x 3 =	165
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	75	(A)	205 (B)

Prevalence Index = B/A = 2.73

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 243

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	80	7.5 YR 6/6	20	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 244
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.022627
Long: -93.870846
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-104
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 244

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 244

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/8	30	C	M	Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 245
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.021627
Long: -93.871009
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2SS3P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑
Hydric Soils Present?	☐ Yes ☑ No	
Wetland Hydrology Present?	☐ Yes ☑ No	

Remarks:
Hydrophytic vegetation was observed; however, hydrology and hydric soils were not. The sample plot is not within a wetland. Plot located on berm.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches): 0
Water Table Present?	☐ Yes ☑ No	Depth (Inches): <16
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): <16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 245

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Paspalum notatum*	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1. *Rubus trivialis*	30	Yes	FACU
2. *Ampelopsis arborea*	20	Yes	FAC
3.			
4.			
5.			
6.			
	50	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	60	x 3 =	180
FACU Species	50	x 4 =	200
UPL Species	0	x 5 =	0
Column Totals:	110	(A)	380 (B)

Prevalence Index = B/A = 3.45

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 245

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 246
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.021525
Long: -93.871173
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2SS3P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-106
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 246

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	100	x 1 =	100	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	100	(B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL Sampling Point: 246

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/8	30	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 247
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.021364
Long: -93.871084
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2SS3P

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-107
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 1
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Three primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 247

		Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)				
1.	*Quercus nigra*	70	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
		70	= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Leersia oryzoides*	30	Yes	OBL
2.	*Carex cherokeensis*	10	Yes	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		40	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:	
OBL Species	30	x 1 =	30	
FACW Species	10	x 2 =	20	
FAC Species	70	x 3 =	210	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	110	(A)	260	(B)

Prevalence Index = B/A = 2.36

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 247

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/2	80	7.5 YR 6/8	20	C	M	Clay Loam	
3-16	10YR 5/1	70	7.5 YR 6/8	30	C	M	Clay Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 248
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.016337
Long: -93.871190
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-108
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	10
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 248

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Spartina spartinae*	50	Yes	OBL
2. *Phragmites australis*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	50	x 1 =	50	
FACW Species	20	x 2 =	40	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	70	(A)	90	(B)

Prevalence Index = B/A = 1.29

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 248

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 249
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000780
Long: -93.866397
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland. Plot located on upland roadbase.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): <16
Saturation Present? ☑ Yes ☐ No Depth (Inches): <16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 249

Tree stratum (Plot size : 30)		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size : 30)				
1.	*Paspalum notatum*	20	Yes	FACU
2.	*Cynodon dactylon*	20	Yes	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		40	= Total Cover	
Woody Vine Stratum (Plot size : 30)				
1.				
2.				
3.				
4.				
5.				
6.				
			= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	40	x 4 =	160
UPL Species	0	x 5 =	0
Column Totals:	40	(A)	160 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%
No Prevalence Index is ≤3.0[1]
No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 249

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-16	10 YR 3/2	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:
The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 250
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000709
Long: -93.866300
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E1UBLx

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)

Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No

Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-077
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 10	
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0	
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0	**Wetland Hydrology Present?:** Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 250

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	90	Yes	FACW
2. *Spartina alterniflora*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	90	x 2 =	180
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	190 (B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 250

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 251
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000479
Long: -93.865997
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-078
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 251

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	90	Yes	FACW
2. *Spartina spartinae*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	90	x 2 =	180
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	190 (B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 251

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 252
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000396
Long: -93.865895
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No

Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☐ Yes ☑ No Depth (Inches): 0
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 252

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Paspalum notatum*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 252

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 253
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000099
Long: -93.865501
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland? Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type:

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth (Inches):	0
Water Table Present?	☐ Yes ☑ No	Depth (Inches):	>16
Saturation Present? (includes capillary fringe)	☐ Yes ☑ No	Depth (Inches):	>16

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 253

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Paspalum notatum*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	100	x 4 =	400
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ No: ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL

Sampling Point: 253

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loam	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Orange
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Texas
Sampling Point: 254
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 30.000063
Long: -93.865405
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal
NWI Classification: E2EM1P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-112
Habitat Type: pem

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☑ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 10
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Six primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 254

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	40	Yes	OBL
2. *Spartina spartinae*	30	Yes	OBL
3. *Typha angustifolia*	20	Yes	OBL
4. *Phragmites australis*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90	x 1 =	90
FACW Species	10	x 2 =	20
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	110 (B)

Prevalence Index = B/A = 1.10

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 254

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 6/2	90	7.5 YR 6/6	10	C	M	Silty Sand	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 255
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.820712
Long: -93.660640
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM5P
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland?	Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-123
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

☑ Surface Water
☑ High Water Table
☑ Saturation
☐ Water Marks
☐ Sediment Deposits
☐ Drift Deposits (B3)
☐ Algal Mat or Crust
☐ Iron Deposits
☐ Inundated Visible on Aerial Imagery

☐ Water-Stained Leaves
☑ Aquatic Fauna
☐ Marl Deposits (B15) (LRRU)
☐ Hydrogen Sulfide Odor (C1)
☑ Oxidized Rhizoshperes in Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soil (C6)
☐ Thick Muck Surface (C7)
☐ Other

Secondary Indicators (minimum of tw o required)
☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface
☐ Drainage Patterns (B10)
☐ Moss Trim Lines
☐ Dry-Season Water Table
☐ Crayfish Burrows
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 255

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 255

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 256
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.814202
Long: -93.619828
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ns
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-126
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 256

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 256

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 257
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.805537
Long: -93.617344
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-126
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 257

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 257

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 258
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.797054
Long: -93.614833
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ps
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-126
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 258

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 258

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 259
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.787911
Long: -93.612050
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1N
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-128
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 259

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	90	Yes	FACW
2. *Typha angustifolia*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant
Species Across All Strata: 1 (B)

Percent of Dominant Species
That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	x 1 =	10	
FACW Species	90	x 2 =	180	
FAC Species	0	x 3 =	0	
FACU Species	0	x 4 =	0	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	190	(B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

Yes	Dominance Test is >50%
Yes	Prevalence Index is ≤3.0[1]
No	Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 259

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 260
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.775757
Long: -93.608347
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Creole mucky clay
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-128
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 260

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 260

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 261
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.771217
Long: -93.606976
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Creole mucky clay
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-128
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)
Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 261

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Schoenoplectus californicus*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	100	x 1 =	100
FACW Species	0	x 2 =	0
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 261

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Mucky Presence (A8) (LRR P, T, U)
- ☐ 1 cm Muck (A9) (LLR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S,T,
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12) (LLR T,
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 262
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.763809
Long: -93.604817
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Hackberry-Mermentau complex, gently undulating
NWI Classification: None
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐
Hydric Soils Present?	☑ Yes ☐ No	
Wetland Hydrology Present?	☑ Yes ☐ No	

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-128
Habitat Type: e2em

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
Water Table Present? ☑ Yes ☐ No Depth (Inches): 0
Saturation Present? ☑ Yes ☐ No Depth (Inches): 0
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 262

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	100	x 2 =	200
FAC Species	0	x 3 =	0
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 262

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1] Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 263
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Convex
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.763566
Long: -93.604750
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Hackberry-Mermentau complex, gently undulating
NWI Classification: None

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☐ Yes ☑ No Hydric Soils Present? ☐ Yes ☑ No Wetland Hydrology Present? ☐ Yes ☑ No	Is the Sampled Area within the Wetland?	Yes: ☐ No: ☑

Remarks:
None of the three parameters, hydrophytic vegetation, hydrology and hydric soils, were met. The sample plot is not within a wetland.

Habitat ID:
Habitat Type: Upland

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water
- ☐ High Water Table
- ☐ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☐ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? ☑ Yes ☐ No Depth (Inches): >16
Water Table Present? ☐ Yes ☑ No Depth (Inches): >16
Saturation Present? ☐ Yes ☑ No Depth (Inches): >16
(includes capillary fringe)

Wetland Hydrology Present?: Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of hydrology were present. The hydrology parameter is not met.

Vegetation - Use scientific names of plants.

Sampling Point: 263

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Cynodon dactylon*	80	Yes	FACU
2. *Paspalum notatum*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 0% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	x 1 =	0	
FACW Species	0	x 2 =	0	
FAC Species	0	x 3 =	0	
FACU Species	100	x 4 =	400	
UPL Species	0	x 5 =	0	
Column Totals:	100	(A)	400	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☐ **No:** ☑

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, or FAC is less than 50%.

SOIL Sampling Point: 263

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☑

Remarks:

The soils parameter is not met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 264
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818955
Long: -93.625353
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: PFO1Ss

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No Hydric Soils Present? ☑ Yes ☐ No Wetland Hydrology Present? ☑ Yes ☐ No	Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-130
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches):	2
Water Table Present?	☑ Yes ☐ No	Depth (Inches):	0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches):	0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 264

	Absolute % Cover	Dominant Species?	Indicator Status
Tree stratum (Plot size : 30)			
1. *Triadica sebifera*	80	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	80	x 3 =	240
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	280 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ No: ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 264

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:
Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:
The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 265
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818852
Long: -93.624305
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2SS1Ps

Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present?	☑ Yes ☐ No	Is the Sampled Area within the Wetland?
Hydric Soils Present?	☑ Yes ☐ No	Yes: ☑
Wetland Hydrology Present?	☑ Yes ☐ No	No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-130
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

Secondary Indicators (minimum of tw o required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines
- ☐ Dry-Season Water Table
- ☐ Crayfish Burrows
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth (Inches): 2
Water Table Present?	☑ Yes ☐ No	Depth (Inches): 0
Saturation Present? (includes capillary fringe)	☑ Yes ☐ No	Depth (Inches): 0

Wetland Hydrology Present?: Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Five primary indicators and no secondary indicators of hydrology were observed. The hydrology parameter is met.

Vegetation - Use scientific names of plants.

Sampling Point: 265

Tree stratum (Plot size : 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Triadica sebifera*	80	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	

Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (B/A)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x 1 =	0
FACW Species	20	x 2 =	40
FAC Species	80	x 3 =	240
FACU Species	0	x 4 =	0
UPL Species	0	x 5 =	0
Column Totals:	100	(A)	280 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index is ≤3.0[1]

No Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody Plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1m) in height.

Woody Vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes: ☑ **No:** ☐

Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 265

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/1	85	10 YR 5/6	15	C	M	Clayey Silt	

[1]Type: C=Concentration, D=Depletion, RM-Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)

(MLRA 153B)

☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region - Version 2.0

Project Site: Blue Marlin Offshore Port Project
City/ County: Cameron
Sampling Date: 6/12/2020
Applicant/Owner: Blue Marlin Offshore Port LLC
State: Louisiana
Sampling Point: 266
Investigator(s): M.Jay, R. Calvin
Section, Township, Range:
Landform (hillside, terrace, etc.): Plain
Local relief (concave, convex, none): Concave
Slope (%): <1
Subregion (LRRA or MLRA): LRR-T
Lat: 29.818755
Long: -93.623545
Datum: NAD 83, Decimal Degrees
Soil Map Unit Name: Bancker muck, 0 to 0.2 percent slopes, very frequently flooded
NWI Classification: E2EM1Ps
Are climatic/hydrological conditions on the site typical for this time of year? ☑ Yes ☐ No (If no, explain in Remarks)
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ Yes ☑ No
Are "Normal Circumstances" Present? ☑ Yes ☐ No
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ Yes ☑ No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS- Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic vegetation present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No

Is the Sampled Area within the Wetland? Yes: ☑ No: ☐

Remarks:
All three parameters, hydrophytic vegetation, hydrology and hydric soils were met. The sample plot is within a wetland.

Habitat ID: H-130
Habitat Type: pfo

Hydrology

Wetland Hydrology Indicators:
Primary indicators (minimum of one required; check all that apply)

- ☑ Surface Water
- ☑ High Water Table
- ☑ Saturation
- ☐ Water Marks
- ☐ Sediment Deposits
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust
- ☐ Iron Deposits
- ☐ Inundated Visible on Aerial Imagery
- ☐ Water-Stained Leaves
- ☑ Aquatic Fauna
- ☐ Marl Deposits (B15) (LRRU)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizoshperes in Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soil (C6)
- ☐ Thick Muck Surface (C7)
- ☐ Other

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Surface Water Present? ☑ Yes ☐ No Depth (Inches): 2
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(includes capillary fringe)

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2.			
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	
Sapling Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size : 30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size : 30)			
1. *Phragmites australis*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size : 30)			
1.			
2.			
3.			
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6.			
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Column Totals:	100	(A)	280 (B)

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Hydrophytic Vegetation Present?

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Remarks: (if observed, list morphological adaptations below).
Percentage of dominant plants that are OBL, FACW, and FAC is greater than or equal to 50%.

SOIL

Sampling Point: 266

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Mucky Presence (A8) (LRR P, T, U)
☐ 1 cm Muck (A9) (LLR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

☐ Polyvalue Below Surface (S8) (LRR S,T,
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

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☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
(MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12) (LLR T,
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ☑ No ☐

Remarks:

The soils parameter is met.

APPENDIX D

PHOTOGRAPHS

E1UB

E2EM

E2EM

PEM

BESI
Benchmark
Ecological Services, Inc.

APPENDIX D

Site Photos

PEM

PEMx

PFO

PFO

BESI Benchmark Ecological Services, Inc.	**APPENDIX D**
	Site Photos

PSS

PUB

PUB

PUBx

BESI Benchmark Ecological Services, Inc.

APPENDIX D

Site Photos

R2UB

Upland

Upland

Upland

BESI Benchmark Ecological Services, Inc.

APPENDIX D

Site Photos

APPENDIX E

ELECTRONIC DATA

APPENDIX B –
ONSHORE CONSTRUCTION BEST MANAGEMENT PRACTICE PLAN

Blue Marlin Offshore Port (BMOP) Project

Volume IIb – Onshore Project Components Environmental Evaluation (Public)

Appendix C-1

Onshore Construction Best Management Practice (BMP) Plan

September 2020

TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

ATWS	Additional Temporary Workspace
BMOP	Blue Marlin Offshore Port LLC
BMP	Best Management Practice
BMP Plan	Onshore Construction Best Management Practices
EI	Environmental Inspector
HDD	Horizontal directional drill
LDWF	Louisiana Department of Wildlife and Fisheries
Project	Blue Marlin Offshore Port Project
ROW	Right-of-way
SPMT	Sunoco Partners Marketing & Terminals
TPWD	Texas Parks and Wildlife Department
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area

1.0 INTRODUCTION

Blue Marlin Offshore Port LLC (BMOP) is proposing to develop a deepwater port (DWP) in United States (U.S.) federal waters for the transportation of crude oil for export to the global market, referred to as the Blue Marlin Offshore Port Project (Project). The proposed Project consists of both offshore (i.e., DWP facilities) and onshore (pipeline facilities) components. The construction of onshore components that apply to this *Onshore Construction Best Management Practices Plan* (BMP Plan) consist of a new-build, approximately 37-mile long, pipeline connecting Sunoco Partners Marketing & Terminals' (SPMT) existing Nederland Terminal in Jefferson County, Texas to the existing Stingray Mainline at Station 501 (NGPL/Stingray interconnect) in Cameron Parish, Louisiana. Aboveground facilities supporting the Project include the BMOP Pump Station in Jefferson County, Texas, and Station 501 and 701 in Cameron Parish Louisiana. An existing natural gas tap located along the existing Stingray Mainline in Cameron Parish, Louisiana (Stingray Tap), will be removed by TC Energy and replaced with a pre-tested pipeline segment.

1.1 Purpose of this Plan

The intent of this BMP Plan is to identify baseline mitigation measures for minimizing and avoiding impacts during construction of the onshore components of the Project. Once the Project is authorized, construction personnel may deviate from the BMPs outlined in this plan if a different measure is identified that provides equal or better environmental protection. Deviations may also be necessary if a BMP is determined to be infeasible or unworkable based on site-specific conditions. At this time, the measures outlined in this BMP Plan are considered *DRAFT* as modifications or amendments may be necessary based on future agency consultation and permit conditions issued for the Project.

1.2 Environmental Training

Experienced, well-trained personnel are essential for successful implementation of the Project. Company personnel and its Contractors will undergo Project-specific environmental training. Varying levels of training will be required depending on the person's role (e.g., supervisors versus laborers). However, all workers will be required to attend a general environmental training session before beginning construction. All persons engaged in Project construction will be informed of the construction plans and permit conditions (e.g., wetland construction), as well as, the laws, rules, and regulations applicable to the work. In addition, prior to construction, all onsite personnel will be informed of the protective measures included in this BMP Plan. Refresher or supplemental training will be required if compliance is not satisfactory or as new issues arise.

2.0 ENVIRONMENTAL INSPECTION

BMOP will assign at least one Environmental Inspector (EI) per pipeline construction spread. The number and experience of EIs assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected.

EIs will have peer status with all other activity inspectors. EIs will also have the authority to stop activities that violate conditions of the environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action.

EIs must have knowledge of the wetland and waterbody conditions of the Project area.

2.1 Environmental Inspector (EI) Responsibilities

At a minimum, EIs will be responsible for:

- Inspecting construction activities for compliance with the environmental requirements of this BMP Plan, environmental permits and approvals, and landowner easement agreements.
- Identifying, documenting, and overseeing corrective actions, as necessary, to bring an activity back into compliance.
- Verifying that the limits of authorized construction work areas (i.e., limits of disturbance) and locations of access roads are visibly marked before clearing and maintained throughout construction.
- Verifying the location of signs and highly visible flagging that marks the boundaries of sensitive resource areas or areas with special requirements.
- Identifying erosion/sediment control and soil stabilization needs in all areas.
- Ensuring that erosion control devices are properly installed to prevent directing water and sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional erosion control devices.
- Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities.
- Ensuring that appropriate topsoil segregation and restoration is completed in designated areas.
- Ensuring restoration of contours and topsoil following installation.
- Advising the Chief Construction Inspector when environmental conditions (e.g., wet weather, frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction.
- Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner.
- Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.
- Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase.
- Verifying that disposal of construction-related waste is completed in accordance with federal, state, and local regulations.
- Inspecting and ensuring the maintenance of temporary erosion control measures at least:
    - On a daily basis in areas of active construction or equipment operation;
    - On a weekly basis in areas with no construction or equipment operation; and
    - Within 24 hours of each 0.5 inch of rainfall;
- Keeping records of compliance with environmental permit and approval conditions.

3.0 PRECONSTRUCTION PLANNING

Prior to construction of a Project component:

Construction Work Areas

- Identify all construction work areas (e.g., construction right-of-way, additional temporary workspace [ATWS] areas, pipe storage and contractor yards, borrow and disposal areas, access roads) that will be needed for safe construction.
- Ensure that appropriate cultural resources and biological surveys have been conducted, as determined necessary by the appropriate federal and state agencies.
- Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.
- Attempt to locate existing drain tiles and irrigation systems.
- Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.
- Identify the location of all waterbodies proposed for use as a hydrostatic test-water source and test-water discharge location.

Road Crossings and Access Points

- Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.
- Cross public roads using either the horizontal direction drill (HDD) or bore construction technique. Should an HDD or bore be unsuccessful, BMOP personnel will coordinate with the relevant county or local highway department to determine the best times for temporary road closures in order to minimize impacts on local traffic.

Disposal Planning

- Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drill cuttings and fluids, excess rock) throughout the construction process. Disposal of materials for beneficial reuse is not to result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

4.0 OVERLAND CONSTRUCTION MEASURES

4.1 Approved Areas of Disturbance

Project-related ground disturbance will be limited to the approved areas only, including the construction right-of-way (ROW), ATWS, pipe storage yards, borrow and disposal areas, and access roads. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.

4.2 Topsoil Segregation

Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method) in:

- Non-inundated jurisdictional wetlands;
- Agricultural areas, including managed pastures and hayfields;
- Residential areas; and
- Other areas at the landowner’s or land managing agency’s request.

Where topsoil segregation is required:

- Segregate up to 12 inches of topsoil; and
- Maintain separation of salvaged topsoil and subsoil throughout all construction activities.

Segregated topsoil is not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.

Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

4.3 Road Crossings and Access Points

Maintain safe and accessible conditions at all road crossings and access points during construction.

If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.

Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions.

Repair any damages to roadway surfaces, shoulders, and bar ditches.

4.4 Temporary Erosion Controls

Install temporary erosion controls either before or immediately after initial disturbance of the soil. Temporary erosion controls are to be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

Temporary Trench Plugs

- Temporary trench plugs are intended to segment a continuous open trench prior to backfill. Position temporary trench plugs, as necessary, to reduce trenchline erosion.
- Temporary trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.

Sediment Barriers

- Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources. At a minimum, install and maintain temporary sediment barriers across the entire construction ROW at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
- Sediment barriers may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sandbags, or other appropriate materials.
- Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary, to prevent sediment flow into the wetland or waterbody.

Mulch

- Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.
- Mulch can consist of weed-free straw or hay, wood fiber hydro-mulch, erosion control fabric, or some functional equivalent.
- Mulch all disturbed upland areas (except cultivated cropland) before seeding if:
    - Final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas); or
    - Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
- If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
- If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
- Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
- Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

4.5 Trench Dewatering

Dewater the trench (either on or off the construction ROW) in a manner that does not cause erosion and does not result in silt-laden water flowing into any wetland or waterbody. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

4.6 Hydrostatic Testing

Apply for state-issued water withdrawal permits and for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required. BMPs for hydrostatic testing include:

- If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address secondary containment and refueling of these pumps (see Section 12).

<u>Test-water Intake</u>

- Screen the intake hose to minimize the potential for entrainment of fish.
- Do not use state-designated exceptional value waters or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
- Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.
- Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

<u>Test-Water Discharge</u>

- Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.
- Do not discharge into state-designated exceptional value waters or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

4.7 Soil Compaction

Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.

Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

4.8 Cleanup

Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

During cleanup:

- A travel lane may be left open temporarily to allow access by construction traffic if temporary erosion control structures are installed, inspected, and maintained. When access is no longer required the travel lane must be removed and the ROW restored.
- Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench is to be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.
- Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner’s request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
- Grade the construction ROW to restore pre-construction contours and leave the soil in the proper condition for planting in agricultural areas.
- Remove construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
- Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

4.9 Permanent Erosion Controls

Permanent erosion control measures include:

Trench Breakers

- Trench breakers are intended to slow the flow of subsurface water along the trench. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
- At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries. Do not install trench breakers within a wetland.
- In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

- Trench breakers may be constructed of materials such as sandbags or polyurethane foam. Do not use topsoil in trench breakers.

5.0 WETLAND CONSTRUCTION MEASURES

Wetland delineation field surveys of the Project area were completed in May through June of 2020. Mapping of the wetlands which were identified in the Project footprint is provided in Appendix A-3 of the MARAD application (Volume IIb). The Project will have to adhere to its U.S. Army Corps of Engineers (USACE) wetland crossing permit. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements and landowner easement agreements.

BMPs for constructing across wetlands include:

- Wetland buffers (e.g., ATWS setbacks, refueling restrictions) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.
- If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use marsh buggies or low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.
- The construction ROW may be used for access when the wetland soil is firm enough to avoid rutting or the construction ROW has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, terra mats or using a marsh buggy). In wetlands that cannot be appropriately stabilized, all construction equipment, other than that needed to install the wetland crossing, shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction ROW.
- The only access roads, other than the construction ROW, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.
- Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
- Use “push-pull” or “float” techniques to place the pipe in the trench where water and other site conditions allow.
- Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.
- Cut vegetation just above ground level, leaving existing root systems in place, and remove it from the wetland for disposal.
- Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction ROW in wetlands unless the Chief Inspector and EI determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction ROW.
- Segregate up to one foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated. Immediately after backfilling is complete, restore the segregated topsoil to its original location.

- Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction ROW.
- Remove all Project-related material used to support equipment on the construction ROW upon completion of construction.

Temporary Sediment Control

- Install sediment barriers across the entire construction ROW immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.
- Where wetlands are adjacent to the construction ROW and the ROW slopes toward the wetland, install sediment barriers along the edge of the construction ROW as necessary to contain spoil within the construction ROW and prevent sediment flow into the wetland.
- Install sediment barriers along the edge of the construction ROW as necessary to contain spoil and sediment within the construction ROW through wetlands. Remove these sediment barriers during ROW cleanup.

Restoration

- Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.
- Restore pre-construction wetland contours to maintain the original wetland hydrology.
- For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction ROW at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In some areas, with the approval of the EI, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.
- Do not use fertilizer, lime, or mulch unless required in writing by the appropriate federal or state agency.
- Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section.

5.1 Post Construction

A Project-specific *Revegetation Plan* for temporarily disturbed areas, including wetland areas has been developed for the Project. The *Revegetation Plan* includes post-construction monitoring and maintenance restoration measures and is provided in Appendix C-2 of the MARAD application (Volume IIb).

Routine vegetation mowing or clearing in wetland areas will be performed in accordance with the appropriate federal or state wetland crossing permits.

Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate federal or state agency.

6.0 WATERBODY CONSTRUCTION MEASURES

Waterbody delineation field surveys of the Project area were conducted in May and June of 2020. Mapping of the waterbodies which were identified in the Project footprint is provided in Appendix A-3 of the MARAD application (Volume IIb). The Project will have to adhere to its USACE waterbody crossing permit. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.

BMPs for constructing across waterbodies include:

- Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.
- Waterbody buffers (e.g., extra work area setbacks, refueling restrictions) are to be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.
- Limit use of equipment operating in the waterbody to what is needed to construct the crossing
- For minor waterbodies (10 feet wide or less), complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period. Equipment bridges are not required for minor waterbody crossings, unless required by permit or approval conditions.
- For intermediate waterbodies (over 10 feet wide, less than 100 feet wide), complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible. All construction equipment must cross on an equipment bridge.
- Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the EI.

<u>Temporary Erosion and Sediment Control</u>

- Install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete.
- Install sediment barriers across the entire construction ROW at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during the construction day but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent.
- Where waterbodies are adjacent to the construction ROW and the ROW slopes toward the waterbody, install sediment barriers along the edge of the construction ROW as necessary to contain spoil within the construction ROW and prevent sediment flow into the waterbody.
- Use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

Spoil Pile Placement and Control

- All spoil from minor and intermediate waterbody crossings must be placed in the construction ROW at least 10 feet from the water’s edge or in ATWS areas to the extent practicable.
- Use sediment barriers to prevent the flow of spoil or silt-laden water into any waterbody.

Equipment Bridges

- Equipment bridges are required for intermediate and major waterbody crossings, and any minor waterbody crossings where required by permit or approval conditions.
- Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.
- Construct and maintain equipment bridges to allow unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:
    - Equipment pads and culvert(s);
    - Equipment pads or railroad car bridges without culverts;
    - Clean rock fill and culvert(s); and
    - Flexi-float or portable bridges.
- Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.
- Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.
- Design and maintain equipment bridges to prevent soil from entering the waterbody.
- Remove temporary equipment bridges as soon as practicable after permanent seeding.
- If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove temporary equipment bridges as soon as practicable after final cleanup.
- Obtain any necessary approval from the USACE, or the appropriate state agency for permanent bridges.

Restoration

- For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities.
- Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the EI.
- Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank recontouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.
- Application of riprap for bank stabilization must comply with USACE, or its delegated agency, permit terms and conditions. Unless otherwise specified in permits, limit the use of riprap to areas

where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.

- Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands.
- Install a permanent slope breaker across the construction ROW at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody.

HDD Construction

For each of the proposed HDD crossings, site-specific crossing plans are provided in Appendix B-8 (Volume IIb). The site-specific plans identify all areas to be disturbed by construction for each waterbody crossing. The plans also include ATWS areas, spoil storage areas, sediment control structures, etc.

Potential construction-related impacts during HDD construction include an inadvertent release of drilling mud. An *HDD Contingency Plan* has been developed that describes measures that will be implemented to protect from and respond to an inadvertent release of drilling mud. A copy of the plan is provided in Appendix C-5 (Volume IIb).

6.1 Sabine Lake Construction

The pipeline will cross Sabine Lake with pipelay using both a dredge barge and the HDD method. The conditions listed in Table 1 apply to construction within the Lake.

TABLE 1
Requirements for Construction within Sabine Lake

Condition No.	Condition
1	TBD Based on Agency Consultation
2	TBD
3	TBD

6.2 Post-Construction

Limit routine vegetation mowing or clearing adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody’s mean highwater mark, to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way.

Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

7.0 WILDLIFE MANAGEMENT AREA CONSTRUCTION MEASURES

The pipeline will cross the Lower Neches Wildlife Management Areas (WMA), Nelda Stark and Old River Units. The Lower Neches WMA, Nelda Stark and Old River Units, are owned and managed by Texas Parks and Wildlife Department (TPWD) for research, demonstration, and/or public hunting. Consultation with the TPWD has been conducted concerning the route through the Lower Neches WMAs. The conditions listed in Table 2 apply to the construction requirements within the in the WMAs crossed by the Proect.

TABLE 2
Requirements for Construction within the Lower Neches WMA

Condition No.	Condition
1	TBD Based on Agency Consultation
2	TBD
3	TBD

8.0 RESIDENTIAL CONSTRUCTION MEASURES

For all properties with residences located within 50 feet of construction work areas:

- Avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements.
- Excavate the trench only once the pipe has been welded and is ready to lay in the trench.
- Immediately backfilling the excavated trench once the pipe is installed;
- Notify the homeowner one week prior to commencing construction activities.
- Fence the edge of the construction work area for a distance of 100 feet on either side of the residence.
- Maintain access to residential properties at all times.
- Restore all lawn areas and landscaping immediately following clean-up operations, or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

9.0 FUGITIVE DUST CONTROL MEASURES

Wet suppression is the predominate method of suppressing fugitive dust emissions through the application of water, mainly via water trucks. The amount of water required to sufficiently control fugitive dust emissions is dependent on a number of variables including; surface moisture content, ambient conditions (e.g., temperature, wind, humidity, precipitation), construction activities occurring (e.g., vehicle/equipment traffic, vehicle speeds, vehicle weight), etc. Disturbed and unpaved areas are to be kept sufficiently damp during working hours in dry conditions to minimize wind-blown or traffic-generated fugitive dust emissions. Areas to be watered include, but are not limited to:

- The construction corridor, including ATWS;

- Access roads;
- Aboveground facility sites;
- Active grading areas;
- Soil stockpiles; and
- Unpaved parking/staging areas.

The frequency of water applications will vary based on weather and site conditions. More frequent applications will be required in dry conditions and in areas with a high potential for fugitive dust generation. Water for fugitive dust control will be obtained from municipal water systems or other approved sources and will be of potable quality.

The track-out of loose materials will be controlled by installing rock or paved construction entrances on access roads that begin at a junction with paved roads. Any loose material tracked beyond the construction entrances will be recovered via sweeper trucks and/or vacuum trucks.

10.0 INVASIVE SPECIES CONTROL MEASURES

The following measures are to be implemented to minimize the potential to introduce or spread noxious and invasive vegetation species located on state or public land including:

- Inform and train construction personnel regarding noxious weed and invasive species identification and the protocols to prevent or control the spread of invasive species.
- EI(s) will mark the entry and exit of areas of noxious weed infestation with signage along the construction ROW
- Vehicles and equipment will be inspected for remnant soils, vegetation, and debris, and will be cleaned of these materials before they are brought to the Project area. Vessels, vehicles and equipment will be inspected for invasive species including aquatic weeds.
- To prevent the spread of seeds, roots, or other viable plant materials, vessels, vehicle and equipment used in areas containing invasive plant species or aquatic weeds will be cleaned before moving to an uninfested area.
- Seeds for revegetation and straw or hay bales used for sediment barrier installations or mulch distribution, where appropriate, are to be certified weed-free.
- Mechanical treatment or herbicide application will be used to control the spread of invasive species during and after construction. Herbicides will be applied according to manufacturer's printed recommendations and in accordance with applicable agency regulations governing herbicide application. No herbicides or pesticides will be used within 100 feet of waterbodies or wetlands. A qualified contractor will be utilized to determine the appropriate herbicide application method.

11.0 REVEGETATION AND POST-CONSTRUCTION MONITORING

A Project-specific *Revegetation Plan* has been developed for temporarily disturbed areas. The *Revegetation Plan* includes restoration and post-construction monitoring and maintenance measures, including monitoring for invasive species, and is provided in Appendix C-2 (Volume IIb).

12.0 SPILL PREVENTION AND RESPONSE PROCEDURES

A Project-specific *Spill Prevention and Response (SPAR) Plan* has been developed to minimize hazards to human health and/or the environment from any unplanned sudden or non-sudden releases of oils, toxic, hazardous, or other polluting materials to the air, soil, surface water or groundwater. The SPAR Plan is provided in Appendix C-3 (Volume IIb).

13.0 WILDLIFE MITIGATION MEASURES

BMPs to minimize impacts to wildlife due to pipeline construction, include:

- Restrict construction activity within 1,000 feet of an active nesting colony to the non-nesting season (September 1 to February 15) to minimize disturbance to nesting waterbirds. For colonies containing nesting gulls, terns, or black skimmers, all activity occurring within 60 feet (2,000 feet for Brown pelicans) of an active nesting colony will be restricted to the non-nesting period (i.e., September 16 through April 1) unless specifically approved in writing by Louisiana Department of Wildlife and Fisheries (LDWF) and/or TPWD.
- Minimize unnecessary lighting; lighting should only be utilized for safety and security purposes. Light will be directed downward or toward active construction to minimize impacts on wildlife and birds in adjacent habitats.
- Limit nighttime construction traffic, noise, and lighting.
- At HDD locations, direct lighting downward or directly at active construction, where feasible, while maintaining safety.
- Inspect open trenches for wildlife each morning before commencing construction activities.
- Limit access on the ROW with use of signs, fences, and/or gates.
- Enforce speed limits within, to, and from all construction workspaces when not using access roads.
- Prohibit unnecessary idling of internal combustion engines and require that all equipment be shut off when not in use to minimize noise.

APPENDIX C –
ADJOINING PROPERTY OWNERS

Note: The Adjoining Property Owner List contains Privileged and Confidential information and is provided under separate cover.

APPENDIX D –
PERMIT TABLE

TABLE D-1
Key Environmental Permits and Approvals for Construction/Operation of the Project

Agency	Permit/Consultation	Project Component	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
Federal				
U.S. Department of Homeland Security, U.S. Coast Guard (USCG) U.S. Department of Transportation, U.S. Maritime Administration (MARAD)	Deepwater Port Act (DWPA), 33 United States Code (USC) § 1501 et seq.; License application processing, post-licensing design, construction, operations and oversight	All	September 30, 2020	
U.S. Department of Transportation (USDOT), Pipeline and Hazardous Materials Safety Administration (PHMSA)	Consultation on facility/pipeline design, construction, testing, operation and maintenance in accordance to 49 CFR Part 195 - Transportation of Hazardous Liquids by Pipeline	Offshore pipeline Onshore pipeline	Ongoing	
	Notification of Conversion	Stingray Mainline		
U.S. Department of the Interior (DOI), Bureau of Ocean Energy Management (BOEM)	• Outer Continental Shelf Land Act (OCSLA) Consultation regarding potential impacts on OCS lease blocks, pipeline right-of-way, and lease block issuance • Pipeline right-of-way application and coordination • Hazard surveys guidance and coordination • Archaeological coordination	Offshore facilities in federal waters	September 21, 2020	
DOI, Bureau of Safety and Environmental Enforcement (BSEE)	• OCSLA Consultation and platform safety review • Advise USCG and MARAD concerning the potential impacts of DWPA terminals on OCS lease blocks • Oil Pollution Liability Adjustment Consultation • Platform Modification/Conversion Authorization	Offshore facilities in federal waters	September 21, 2020	
	• Platform Process Safety System Permit • CALM Buoy Permit		2021	

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Key Environmental Permits and Approvals for Construction/Operation of the Project

Agency	**Permit/Consultation**	**Project Component**	**Date Submitted / *Anticipated Submittal***	**Date Received / *Anticipated Receipt***
Federal Energy Regulatory Commission (FERC)	Authorization to abandon pipeline under Section 7(b) of the Natural Gas Act (NGA)	Stingray Pipeline Abandonment	September 21, 2020	
U.S. Department of Defense, U.S. Army Corps of Engineers (USACE), New Orleans District / USACE Galveston District	Rivers and Harbors Act (RHA), Section 10 Authorization	Galveston District: Onshore pipeline. New Orleans District: Onshore pipeline in Cameron Parish; Offshore facilities	September 21, 2020	
	Clean Water Act (CWA), Section 404 Permit (Dredge and Fill Permit)	Galveston District: Onshore pipeline New Orleans District: Onshore facilities, onshore pipeline, offshore facilities, offshore pipeline		
	Civil Works Section 408 review	Galveston District: Onshore pipeline	September 21, 2020	
U.S. Environmental Protection Agency (EPA)	CAA, 112g Case by Case MACT Application	Offshore facilities	September 15, 2020	
	CAA, Prevention of Significant Deterioration Permit (if applicable)	Offshore facilities	September 15, 2020	
	CAA, Title V Operating permit for emissions sources	Offshore facilities	September 15, 2020	
	CWA, Section 401 Water Quality Certification review	All	Concurrent with MARAD Application processing	

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Agency	Permit/Consultation	Project Component	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
	CWA NPDES Individual Permit for facility construction and operations		Draft with MARAD application; Permit application 2021	
	Oil Spill Contingency Plan review		Prior to operations	
U.S. Fish and Wildlife Service (USFWS)	ESA Section 7 consultation	All	Concurrent with MARAD Application processing	
	Fish and Wildlife Coordination Act consultation			
	Migratory Bird Treaty Act Coordination			
National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries)	ESA Section 7 consultation	Offshore facilities and onshore pipeline	Concurrent with MARAD Application processing	
	Magnuson-Stevens Fishery Conservation and Management Act consultation / Essential Fish Habitat (EFH) consultation			
	Marine Mammal Protection Act (MMPA) consultation / Incidental Take Authorization			
	Section 304(d) National Marine Sanctuary Act (NMSA) consultation			
Advisory Council on Historic Preservation (ACHP)	National Historic Preservation Act (NHPA) Section 106 consultation: *Official actions are coordinated between the lead federal agency and the ACHP.*	All	Concurrent with MARAD Application processing	
Native American Tribes/Tribal Historic Preservation Officers (THPOs)	NHPA Section 106 Consultation Consultation with Federally Recognized Native American Groups	Onshore facilities	Concurrent with MARAD Application processing	
State of Louisiana				
Louisiana Department of Environmental Quality (LDEQ), Water Quality Division	CWA Section 401 Water Quality Certification	Onshore facilities and onshore pipeline	September 21, 2020	

TABLE D-1
Key Environmental Permits and Approvals for Construction/Operation of the Project

Agency	Permit/Consultation	Project Component	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
	CWA Section 402 NPDES Permit for Discharge of Hydrostatic Test Water	Onshore facilities and onshore pipeline (depending on where discharge will occur)	Prior to construction	
Louisiana Department of Natural Resources (LDNR), Office of Coastal Management	Coastal Use Permit (CUP) Coastal Zone Management Act (CZMA) Consistency Determination	Onshore facilities and onshore pipeline	September 21, 2020	
Louisiana Department of Wildlife and Fisheries (LDWF)	Threatened and Endangered Species Consultation (16 USC § 460 et seq.)	Onshore facilities and onshore pipeline	Concurrent with MARAD Application processing	
Louisiana Office of the Governor	DWPA Consent of the Governor	Offshore facilities	September 15, 2020	
Louisiana Office of State Lands	Permit and lease for State Water Bottoms (Louisiana Revised Statutes 41:1701– 1714)	Onshore pipeline	September 21, 2020	
Louisiana Office of Cultural Development (LOCD) – Division of Archaeology	NHPA Section 106 consultation (state waters and onshore facilities); Approval of Unanticipated Discoveries Plan	Onshore facilities and onshore pipeline	Concurrent with MARAD Application processing	
Louisiana Department of Transportation	Road Crossing Permit	Onshore pipeline	90 days prior to construction	
State of Texas				
Governor's Office	Consent to MARAD to issue DWP license, assumed to be determined as an "Adjacent State" for conversion option and primary state for alternative pipeline	Offshore Facilities	Concurrent with MARAD Application processing	
Texas Railroad Commission (RRC)	Issues CZMA Consistency Determination in coordination with Section 404 permit authorization from USACE	Onshore facilities and onshore pipeline	September 21, 2020	

TABLE D-1
Key Environmental Permits and Approvals for Construction/Operation of the Project

Agency	**Permit/Consultation**	**Project Component**	**Date Submitted / *Anticipated Submittal***	**Date Received / *Anticipated Receipt***
	Issues CWA Section 401 Water Quality Certification in coordination with USACE Section 404 permit authorization	Onshore facilities and onshore pipeline	September 21, 2020	
	Hydrostatic Test Discharge Permit, Title 2, Texas Water Code – Section 26.131(b)	Onshore facilities and onshore pipeline	Prior to construction	
	Permit Application to Operate Product Pipeline, Form T-4 (Texas Administrative Code, Title 16, Part 1, Chapter 3, Rule 3.70)	Onshore pipeline	September 21, 2020	
Texas General Land Office	State Lands Easement	Onshore pipeline	1st Quarter of 2021	
Texas Commission on Environmental Quality (TCEQ), Air Quality Division	Texas Permit by Rule	Onshore facilities	N/A	
Texas Parks and Wildlife Department (TPWD)	Easement to cross Lower Neches Wildlife Management Area / Surface Use Agreement to cross Lower Neches Wildlife Management Area	Onshore pipeline	1st Quarter of 2021	
	Threatened and Endangered Species Consultation (Title 5, TPWD Code - Chapters 67, 68, and 88 and Title 31, Texas Administration Code - Section 65zz0)	Onshore facilities and onshore pipeline	Concurrent with MARAD Application processing	
	Sand and Gravel General Permit for relevant waterbody crossings	Onshore pipeline	2021	
Texas Historical Commission (THC)	• Issues Texas Antiquities Permit for cultural resource field surveys • Issues concurrence with direct and indirect APE for the Project • Issues concurrence with Section 106 determination of effect • Approves Unanticipated Discoveries Plan	Onshore facilities and onshore pipeline	Concurrent with MARAD Application processing	
Texas Department of Transportation (TX DOT)	Road Crossing Permit / Utility Installation Permit	Onshore pipeline	90 days prior to construction	

APPENDIX E –
WETLAND CROSSING TABLE

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
Onshore Pipeline										
0.53 – 0.54	Jefferson	WP1001_PFO_L	PFO	Open Cut	0.00	0.413	--	0.018	--	0.431
0.53 – 0.67	Jefferson	WP1001-PEM_P	PEM	Open Cut	395.57	0.316	--	0.420	--	0.736
0.60	Jefferson	WP1001_PFO_M	PFO	Open Cut	22.41	0.014	--	0.025	--	0.039
0.60 – 0.61	Jefferson	WP1001_PFO_M	PFO	HDD	18.65	--	--	--	0.020	0.000
0.61 – 0.67	Jefferson	WP1001-PEM_P	PEM	HDD	250.67	--	--	--	0.267	0.000
0.62	Jefferson	WP1001_PFO_K	PFO	HDD	178.79	--	--	--	0.260	0.000
1.11	Orange	H-002	PEM	HDD	16.11	--	--	--	0.021	0.000
1.13	Orange	H-003	PFO	HDD	267.26	--	--	--	0.324	0.000
1.20	Orange	H-004	PEM	HDD	51.87	--	--	--	0.058	0.000
1.21-1.23	Orange	H-005	PFO	HDD	102.08	0.016	--	--	0.124	0.016
1.32 – 1.36	Orange	H-007	PFO	Open Cut	408.33	0.489	--	0.424	--	0.913
1.37	Orange	H-079	PEM	Open Cut	21.38	0.341	--	0.063	--	0.404
1.63 – 1.68	Orange	H-008	PEM	Open Cut	214.30	0.443	0.114	0.214	--	0.771
1.67	Orange	H-008	PEM	Bore	40.00	--	--	--	0.045	0.000
1.68	Orange	H-009	PEM	Bore	40.00	--	--	--	0.045	0.000
1.69 – 2.60	Orange	H-009	PEM	Push/Pull	4,345.91	10.065	3.676	4.989	--	18.730
2.61	Orange	H-009	PEM	HDD	969.88	--	--	--	1.114	0.000
2.81	Orange	H-080	E2EM	HDD	692.28	--	--	--	0.795	0.000
2.92 - 3.64	Orange	H-080	E2EM	Push/Pull	1,877.61	3.523	1.687	1.976	--	7.186
3.84	Orange	H-010	PEM	Push/Pull	146.53	0.329	0.027	0.171	--	0.527
3.98	Orange	H-011	PFO	Push/Pull	272.00	0.382	--	0.308	--	0.690

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
3.99	Orange	H-012	PEM	Push/Pull	0.00	0.024	--	--	--	0.024
4.04	Orange	H-013	PEM	Push/Pull	0.00	0.181	--	--	--	0.181
4.08	Orange	H-014	PFO	Push/Pull	22.76	0.093	--	0.035	--	0.128
4.16	Orange	H-015	PFO	Push/Pull	180.98	1.086	--	0.272	--	1.358
4.19	Orange	H-016	PEM	Push/Pull	0.00	0.026	--	--	--	0.026
4.34	Orange	H-017	PEM	Push/Pull	251.34	0.766	--	0.299	--	1.065
4.35	Orange	H-018	PFO	Push/Pull	160.77	0.137	--	0.179	--	0.316
4.52	Orange	H-019	PEM	Push/Pull	37.57	0.244	--	0.055	--	0.299
4.60	Orange	H-020	PEM	Push/Pull	245.84	0.669	--	0.315	--	0.984
4.60	Orange	H-021	PEM	Push/Pull	0.00	0.054	--	0.004	--	0.058
4.60	Orange	H-022	PFO	Push/Pull	92.86	0.000	--	0.055	--	0.055
4.74	Orange	H-024	PEM	Push/Pull	130.14	0.102	--	0.126	--	0.228
4.87	Orange	H-025	PEM	Push/Pull	970.27	2.519	1.284	1.102	--	4.905
4.99	Orange	H-027	PEM	Push/Pull	161.09	0.202	0.009	0.244	--	0.455
5.01	Orange	H-028	PFO	Push/Pull	168.47	0.094	--	0.125	--	0.219
5,11	Orange	H-029	PEM	Push/Pull	0.00	0.070	--	--	--	0.070
5.17	Orange	H-030	PFO	Push/Pull	497.71	0.966	--	0.566	--	1.532
5.24	Orange	H-031	PEM	Push/Pull	195.57	0.455	--	0.223	--	0.678
5.35	Orange	H-033	PEM	Push/Pull	147.79	0.190	--	0.166	--	0.356
5.43	Orange	H-033	PEM	Open Cut	215.05	0.501	--	0.237	--	0.738
5.45	Orange	H-034	PFO	Open Cut	181.64	0.312	--	0.211	--	0.523
5.77	Orange	H-037	PFO	Open Cut	98.35	0.195	--	0.115	--	0.310

TABLE E-1 Wetlands Affected by the Onshore Pipeline										
Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
5.83	Orange	H-040	PFO	Open Cut	346.23	0.628	--	0.400	--	1.028
5.88	Orange	H-041	PEM	Open Cut	109.10	0.138	--	0.074	--	0.212
6.00	Orange	H-042	PEM	Open Cut	0.00	0.083	--	0.007	--	0.090
6.11	Orange	H-043	PEM	Open Cut	0.00	0.039	--	--	--	0.039
6.11	Orange	H-044	PFO	Open Cut	0.00	0.141	--	0.044	--	0.185
6.34	Orange	H-045	PEM	Open Cut	0.00	0.007	--	--	--	0.007
6.61	Orange	H-046	PEM	Open Cut	0.00	0.055	--	--	--	0.055
6.73	Orange	H-047	PEMx	Open Cut	5.16	0.009	--	0.006	--	0.015
6.74	Orange	H-048	PEMx	Open Cut	5.17	0.009	--	0.006	--	0.015
7.05	Orange	H-050	PEM	Open Cut	11.15	0.051	--	0.020	--	0.071
7.10	Orange	H-051	PFO	Open Cut	464.21	0.365	--	0.460	--	0.825
7.16	Orange	H-052	PEM	Open Cut	142.30	0.320	--	0.148	--	0.468
7.25	Orange	H-055	PEM	Open Cut	21.98	0.075	--	0.037	--	0.112
8.17	Orange	H-059	PEM	Open Cut	102.72	0.248	0.107	0.129	--	0.484
8.19	Orange	H-059	PEM	HDD	26.70	--	--	--	0.031	0.000
8.32	Orange	H-064	PEM	HDD	2,095.54	--	--	--	2.235	0.000
8.39	Orange	H-111	PFO	HDD	256.96	--	--	--	0.355	0.000
8.62	Orange	H-110	PFO	HDD	0.00	--	--	--	0.019	0.000
8.71	Orange	H-109	PSS	HDD	192.41	--	--	--	0.306	0.000
8.81	Orange	H-109	PSS	Open Cut	0.00	0.173	0.058	0.000	--	0.231
8.85	Orange	H-062	PFO	Open Cut	747.61	1.615	0.250	0.785	--	2.650
9.06	Orange	H-063	PFO	Open Cut	0.00	0.003	--	--	--	0.003

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
9.12	Orange	H-064	PEM	Open Cut	1,135.82	2.625	0.040	1.305	--	3.970
9.19	Orange	H-065	PFO	Open Cut	128.48	0.263	0.075	0.155	--	0.493
9.27	Orange	H-066	PFO	Open Cut	156.19	1.054	--	0.370	--	1.424
9.51	Orange	H-068	PFO	HDD	72.87	--	--	--	0.098	0.000
9.62	Orange	H-069	PEM	HDD	76.02	--	--	--	0.055	0.000
9.64	Orange	H-071	PEM	HDD	172.92	--	--	--	0.218	0.000
10.26	Orange	H-085	PEM	HDD	0.00	--	--	--	0.019	0.000
10.27	Orange	H-086	PEM	HDD	7.94	--	--	--	0.009	0.000
10.33	Orange	H-088	PEM	HDD	555.23	--	--	--	0.603	0.000
10.38	Orange	H-089	PFO	HDD	0.00	--	--	--	0.010	0.000
10.51	Orange	H-094	PFO	HDD	14.40	--	--	--	0.018	0.000
10.57	Orange	H-094	PFO	Open Cut	584.43	1.201	0.154	0.666	--	2.021
10.71	Orange	H-095	PEM	Open Cut	33.89	0.143	--	0.036	--	0.179
10.72	Orange	H-096	PFO	Open Cut	89.11	0.031	--	0.060	--	0.091
10.79	Orange	H-099	PEM	Open Cut	0.00	--	0.046	--	--	0.046
10.80	Orange	H-101	PEM	Open Cut	0.00	0.067	0.111	0.003	--	0.181
10.81	Orange	H-102	PFO	Open Cut	0.00	0.073	--	0.008	--	0.081
10.86	Orange	H-103	PEM	Push/Pull	0.00	0.052	0.050	--	--	0.102
10.90	Orange	H-104	PEM	Push/Pull	1,294.37	1.536	0.117	1.345	--	2.998
11.19	Orange	H-106	PEM	Push/Pull	0.00	0.070	--	--	--	0.070
11.26	Orange	H-107	PFO	Push/Pull	196.21	0.868	--	0.262	--	1.130
11.42	Orange	H-108	PEM	Push/Pull	1,446.53	3.314	--	1.666	--	4.980

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
11.60	Orange	H-073	E2EM	Push/Pull	4,155.99	9.696	0.587	4.753	--	15.036
12.47	Orange	H-073	E2EM	HDD	1,691.18	--	--	--	1.975	0.000
12.77	Orange	H-077	E2EM	HDD	27.68	--	--	--	0.033	0.000
12.80	Orange	H-078	E2EM	HDD	60.83	--	--	--	0.080	0.000
12.91	Orange	H-112	PEM	HDD	666.59	--	--	--	0.757	0.000
12.99	Orange	H-112	PEM	Open Cut	3,475.00	8.077	0.764	3.989	--	12.830
13.69	Orange	H-112	PEM	HDD	435.06	--	--	--	0.490	0.000
13.76	Orange	H-113	E2EM	HDD	155.34	--	--	--	0.172	0.000
26.00 – 26.94	Cameron	H-115	E2EM	Push/Pull	4,168.32	9.874	--	4.776	--	14.650
26.96 – 28.16	Cameron	H-118	E2EM	Push/Pull	2,739.19	8.630	0.132	3.135	--	11.897
28.20 – 30.01	Cameron	H-121	E2EM	Push/Pull	7401.03	17.163	--	8.504	--	25.667
30.05 – 30.94	Cameron	H-133	E2EM	Push/Pull	2,885.17	6.385	0.001	3.320	--	9.706
30.94 - 36.20	Cameron	H-123	E2EM	Push/Pull	18,232.52	39.699	1.379	20.729	--	61.807
36.21 – 37.02	Cameron	H-126	E2EM	Push/Pull	1,082.05	2.529	0.290	1.371	--	4.190
				TOTAL	**71,349.11 (13.51 miles)**	**142.526**	**10.958**	**71.506**	**10.556**	**224.990**
Staging Areas										
Staging Area 1										
SA-1 (0.50)	Jefferson	Wetland 6/ WP1001_PEM_P	PEM	N/A	N/A	N/A	1.884	N/A	N/A	1.884
		WP1001_PEM_K								
		WP1001_PEM_N								
		Wetland 3	PFO	N/A	N/A	N/A	0.065	N/A	N/A	0.065

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
		WP1001_PFO WP1001_PFO_M								
Staging Area 2										
SA-2 (1.69)	Orange	H-008 H-009	PEM	N/A	N/A	N/A	0.398	N/A	N/A	0.398
Staging Area 3										
SA-3 (5.30)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 4										
SA-4 (6.08)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 5										
SA-5 (7.17)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 6										
SA-6 (7.69)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 7										
SA-7 (8.21)	Orange	H-059	PEM	N/A	N/A	N/A	0.244	N/A	N/A	0.244
Staging Area 8										
SA-8 (9.43)	None	H-066	PFO	N/A	N/A	N/A	0.110	N/A	N/A	0.110
Staging Area 9										
SA-9 (9.31)	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
Staging Area 10										
SA-10 (10.26)	None	H-086	PEM	N/A	N/A	N/A	0.026	N/A	N/A	0.026
Staging Area 11										
SA-11 (10.45)	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 12										
SA-12 10.78	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					TOTAL		**2.727**			**2.727**
Aboveground Facilities										
Mainline Valves										
MLV 1 (MP 1.65)	Orange	H-008	PEM	N/A	N/A	N/A	N/A	0.070	N/A	0.070 Perm.
MLV 2 (MP 4.97)	Orange	H-025	PEM	N/A	N/A	N/A	N/A	0.115	N/A	0.115 Perm.
MLV 3 (MP 10.84)	Orange	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MLV 4 (13.01)	Orange	H-112	PEM	N/A	N/A	N/A	N/A	0.115	N/A	0.115 Perm.
MLV 5 (MP 26.98)	Cameron	H-117 H-118	E2EM	N/A	MLV to be installed on a platform	N/A	N/A	0.093 [e]	N/A	0.093
MLV 6 (30.92)	Cameron	None	None	N/A	MLV to be installed on a platform	N/A	N/A	N/A	N/A	N/A
					TOTAL			**0.393**		**0.300 Perm.** **0.093 Temp.**

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
BMOP Pump Station										
0.00	Jefferson	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A
Station 501										
37.01	Cameron	H-126	E2EM	N/A	N/A	N/A	0.694	1.620 [f]	N/A	**1.620 Perm.** **0.694 Temp.**
Station 701										
N/A	Cameron	H-128	E2EM	N/A	N/A	N/A	0.898	0.463 [g]	N/A	1.361
Stingray Tap Removal Site										
N/A	Cameron	H-126	E2EM	N/A	N/A	1.286	0.000	0.635 [g]	N/A	1.921
N/A	Cameron	H-128								
Access Roads and Canals										
Access Roads										
TAR-01 (MP 0.53)	Jefferson	None	None	N/A	82.15 [h]	N/A	N/A	N/A	N/A	N/A
PAR-03 (MP 1.68)	Orange	H-008	PEM	N/A	14,571.74 [h]	N/A	N/A	0.021	N/A	0.021 Perm.
TAR-03-A (MP 1.73)	Orange	None	None	N/A	891.08 [h]	N/A	N/A	N/A	N/A	N/A
PAR-05 (MP 4.98)	Orange	H-025	PEM	N/A	6,588.91 [h]	N/A	N/A	0.016	N/A	0.016 Perm.
TAR-05-A (MP 5.36)	Orange	H-033	PEM	N/A	4,768.29 [h]	N/A	0.090	N/A	N/A	0.090
TAR-06 (MP 5.69)	Orange	None	None	N/A	7,670.76 [h]	N/A	N/A	N/A	N/A	N/A
TAR-06-A	Orange	None	None	N/A	44,145.86 [h]	N/A	N/A	N/A	N/A	N/A

TABLE E-1 Wetlands Affected by the Onshore Pipeline										
Facility/ Approximate MP[a]	**County/ Parish**	**Wetland ID**	**Wetland Classification**	**Construction Crossing Method**	**Approx. Centerline Crossing Length[b] (feet)**	**Construction[c]**		**Operation[d]**		**Total Affected Area (Acres)**
						TWS (acres)	**ATWS (acres)**	**Permanent ROW (acres)**	**HDD (acres avoided)**	
(6.10)										
TAR-07 (MP 6.74)	Orange	None	None	N/A	247.00 [h]	N/A	N/A	N/A	N/A	N/A
TAR-08 (MP 7.28)	Orange	None	None	N/A	743.84 [h]	N/A	N/A	N/A	N/A	N/A
TAR-09 (MP 7.67)	Orange	None	None	N/A	58.81 [h]	N/A	N/A	N/A	N/A	N/A
TAR-10 (8.23)	Orange	None	None	N/A	392.10 [h]	N/A	N/A	N/A	N/A	N/A
TAR-11 (MP 9.46)	Orange	None	None	N/A	3,740.62 [h]	N/A	N/A	N/A	N/A	N/A
TAR-12 (MP 10.28)	Orange	None	None	N/A	4,991.49 [h]	N/A	N/A	N/A	N/A	N/A
TAR-12-A (MP 10.40)	Orange	None	None	N/A	3,509.25 [h]	N/A	N/A	N/A	N/A	N/A
PAR-13 (MP 10.76)	Orange	H-101	PEM	N/A	4,674.70 [h]	N/A	N/A	0.019	N/A	0.019 Perm.
TAR-14 (MP 10.78)	Orange	None	None	N/A	4,290.2 [h]	N/A	N/A	N/A	N/A	N/A
PAR-15 (MP 12.84)	Orange	H-112	PEM	N/A	1,733.44 [h]	N/A	N/A	0.229	N/A	0.229 Perm.
PAR-19 (MP 30.94)	Cameron	None	None	N/A	14,087.64 [h]	N/A	N/A	N/A	N/A	N/A
TAR-20-A (MP 36.21)	Cameron	None	None	N/A	2,507.6 [h]	N/A	N/A	N/A	N/A	N/A
PAR-20 (MP 36.98)	Cameron	None	None	N/A	24,199.68 [h]	N/A	N/A	N/A	N/A	N/A
TAR-20-B (MP 37.01)	Cameron	None	None	N/A	5,620.94 [h]	N/A	N/A	N/A	N/A	N/A

TABLE E-1
Wetlands Affected by the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Wetland ID	Wetland Classification	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Affected Area (Acres)
						TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
Access Canals (See Waterbody Crossing Table)										
					Access Road Total	**N/A**	**0.090**	**0.285**	**N/A**	**0.285 Perm.** **0.090 Temp.**
					GRAND TOTAL	**143.812**	**15.367**	**73.799**	**10.556**	**2.205 Perm.** **231.876 Temp.**

Notes:
HDD=Horizontal Directional Drill

[a] MP range indicates large wetland/waterbody complex with multiple wetlands and waterbodies that are hydrologically connected. Acreages represents sum of multiple wetland crossings.

[b] Value of 0 indicates the feature is not crossed by pipeline centerline and is only crossed by workspace. For wetland/waterbody complex areas crossed, value represents cumulative total.

[c] Construction Acreage = all workspace during construction activities (TWS & ATWS; excludes Operational ROW)

[d] Operational ROW acreage reflects new 50-foot wide permanent ROW that will be temporarily disturbed during construction. HDD crossing method and bore method (i.e., road crossing) will avoid temporary wetland disturbance in the permanent ROW.

[e] MLV 5 will be installed on a platform. Therefore, impacts will be temporary because no permanent fill is utilized (per USACE recommendations).

[f] Station 501 will be expanded resulting in permanent (fill) impact of E2EM wetland.

[g] Represents temporary construction impacts within the existing Mainline permanent ROW.

[h] Length represents access road length (not approximate centerline crossing length).

APPENDIX F –
WATERBODY CROSSING TABLE

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
Onshore Pipeline											
0.52	Jefferson	SP1002	Canal	Unnamed	Open Cut	12.34	0.018	--	0.016	--	0.034
0.54	Jefferson	SP1001	Canal	Unnamed	Open Cut	32.68	0.052	--	0.032	--	0.085
0.93	Jefferson	H-001	R2UB	Neches River	HDD #1	828.63	--	--	0.000	0.949	0.000
1.06	Orange	H-001	R2UB	Neches River	HDD #1	493.84	--	--	0.000	0.576	0.000
2.72	Orange	H-081	E1UB	Canal to Neches River	HDD #2	239.37	--	--	0.000	0.274	0.000
2.73 – 3.83 [a]	Orange	H-081	E1UB	Unnamed	Push/Pull	3,136.33	8.278	0.508	3.798	--	12.584
4.71	Orange	H-023	R2UB	Perennial Stream	Push/Pull	235.67	0.741	--	0.288	--	1.029
5.04	Orange	H-026	PUB	Pond	Push/Pull	133.45	0.682	--	0.222	--	0.903
5.29	Orange	H-032	R2UB	Perennial Stream	Push/Pull	404.04	0.866	--	0.457	--	1.323
5.38	Orange	H-032	R2UB	Perennial Stream	Push/Pull; Open Cut	247.90	0.597	--	0.299	--	0.897
5.79	Orange	H-039	PUB	Pond	Open cut	41.70	0.151	--	0.072	--	0.223
7.05	Orange	H-049	PUB	Unnamed Drainage	Open cut	13.22	0.138	--	0.089	--	0.227
7.27	Orange	H-054	PUB	Roadside Ditch	Open cut	29.29	--	--	0.019	--	0.019
7.64	Orange	H-057	PUBx	Roadside Ditch	Bore at Bessie Heights Road	3.02	0.004	--	0.003	--	0.004
8.07	Orange	H-058	PUB	Unnamed Drainage	Open Cut	9.15	0.021	--	0.010	--	0.031
8.21	Orange	H-060	PUBx	Unnamed Drainage	HDD #3	13.39	--	--	--	0.015	0.000

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
8.23	Orange	H-061	PUBx	Pond	HDD #3	107.74	--	--	--	0.114	0.000
9.64	Orange	H-070	PUB	Unnamed	HDD #4	19.91	--	--	--	0.013	0..000
10.03	Orange	H-083	PUBx	Pond	Open Cut	0.00	0.219	--	0.003	--	0.222
10.10	Orange	H-084	PUB	Unnamed Drainage	Open Cut	5.99	0.014	0.007	0.007	--	0.027
10.39	Orange	H-090	PUBx	Unnamed Drainage	HDD #5	12.32	--	--	--	0.014	0.000
10.40	Orange	H-091	PUBx	Unnamed Drainage	HDD #5	6.10	--	--	--	0.007	0.000
10.41	Orange	H-092	PUBx	Unnamed Drainage	HDD #5	24.39	--	--	--	0.028	0.000
10.76	Orange	H-098	PUBx	Unnamed Drainage	Open Cut	6.03	0.026	--	0.007	--	0.033
10.78	Orange	H-100	PUBx	Unnamed Drainage	ATWS	0.00	--	0.057	--	--	0.057
10.79	Orange	H-098	PUBx	Unnamed Drainage	Open Cut	6.14	0.015	--	0.007	--	0.023
11.04	Orange	H-105	PUBx	Unnamed Drainage	Open Cut	0.00	0.008	--	0.001	--	0.009
11.56 – 12.56	Orange	H-074	E1UB	Unnamed	Push/Pull	75.41	0.117	0.007	0.108	--	0.233
12.57 – 12.72	Orange	H-074	E1UB	Unnamed	HDD #6	180.74	--		--	0.176	0.000
12.73	Orange	H-075	E1UB	Canal	HDD #6	133.79	--	0.016	--	0.154	0.016
12.78	Orange	H-076	E1UB	Unnamed	HDD #6	104.52	--	--	--	0.112	0.000
13.78 - 13.82	Orange	H-114	E1UB	Sabine Lake	HDD #7 (outside shoreline)	221	--	--	---	0.270	0.00
13.82 – 14.10	Orange	H-114	E1UB	Sabine Lake	HDD #7 (inside lake)	1,503	8.625	--	1.725[e]	--	10.350

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
14.10 – 14.85	Orange	H-114	E1UB	Sabine Lake	Push/Pull	3,941	22.619	--	4.524	--	27.144
14.85 – 15.75	Orange	H-114	E1UB	Sabine Lake	HDD #8	4,762	27.327	--	5.465[e]	--	32.792
15.75 – 19.51	Orange	H-114	E1UB	Sabine Lake	Lay Barge	19,848	113.634	--	22.799	--	136.433
19.51 – 20.41	Cameron	H-114	E1UB	Sabine Lake	Lay Barge	4,751	27.628	--	5.430	--	33.058
20.41 – 20.81	Cameron	H-114	E1UB	Sabine Lake	HDD #9	2,114	12.128	--	2.425[e]	--	14.553
20.81 – 25.59	Cameron	H-114	E1UB	Sabine Lake	Lay Barge	25,216	144.622	--	28.956	--	173.578
25.59 - 26.00	Cameron	H-116	E1UB	Sabine Lake	Push/Pull	0.00	12.548	7.513	2.490	--	22.551
26.00 – 26.86	Cameron	H-116	E1UB	Unnamed	Push/Pull	644.10	1.482	--	0.753	--	2.235
26.87	Cameron	H-117	E1UB	Madame Johnsons Bayou	Push/Pull	123.08	0.219	--	0.160	--	0.379
26.91	Cameron	H-117	E1UB	Madame Johnsons Bayou	Push/Pull	12.13	0.025	--	0.014	--	0.039
26.95	Cameron	H-117	E1UB	Madame Johnsons Bayou	Push/Pull	139.26	0.323	0.002	0.160	--	0.486
26.99	Cameron	H-117	E1UB	Madame Johnsons Bayou	Push/Pull	73.65	0.199	0.028	0.103	--	0.330
27.04	Cameron	H-117	E1UB	Madame Johnsons Bayou	Push/Pull	82.17	0.171	--	0.095	--	0.266
27.04 – 28.16	Cameron	H-119	E1UB	Unnamed	Push/Pull	3,302.57	5.474	--	3.783	--	9.256
28.16 - 28.20	Cameron	H-120	E1UB	Johnsons Bayou	Push/Pull	225.51	0.537	--	0.258	--	0.795
28.20 – 30.01	Cameron	H-122	E1UB	Unnamed	Push/Pull	2,149.75	4.989	--	2.478	--	7.467

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
30.03	Cameron	H-131	E1UB	Deep Bayou	Push/Pull	481.24	1.050	--	0.578	--	1.628
30.15	Cameron	H-131	E1UB	Deep Bayou	Push/Pull	111.35	0.244	--	0.126	--	0.370
30.30	Cameron	H-131	E1UB	Deep Bayou	Push/Pull	144.21	0.279	--	0.156	--	0.436
30.04 – 30.93	Cameron	H-132	E1UB	Unnamed	Push/Pull	1,140.21	2.955	0.100	1.267	--	4.322
30.81	Cameron	H-132D	E1UB	Dredged Channel	Push/Pull	41.97	0.093	--	0.048	--	0.141
30.94 – 36.20	Cameron	H-124	E1UB	Unnamed	Push/Pull	9,406.44	23.736	1.536	10.995	--	36.267
35.07	Cameron	H-124D	E1UB	Dredged Channel	Push/Pull	108.26	0.256	--	0.125	--	0.380
36.21-37.02	Cameron	H-125	E1UB	Unnamed	Push/Pull	2,852.63	6.389	1.337	3.133	--	10.858
36.22	Cameron	H-125D	E1UB	Dredged Channel	Push/Pull	90.47	0.208	0.052	0.104	--	0.363
					TOTAL	**90,042.10 (17.05 miles)**	**429.707**	**3.627**	**93.973**	**2.702**	**544.456**
Staging Areas											
Staging Area 1											
0.50	Jefferson	SA-1	PUBx	Canal	N/A	N/A	N/A	0.028	N/A	N/A	0.028
0.51	Jefferson	SP1002	PUBx	Canal	N/A	N/A	N/A	0.048	N/A	N/A	0.048
Staging Area 2											
1.66	Orange	H-001	R2UB	None	N/A	N/A	N/A	0.001	N/A	N/A	0.001
Staging Area 3											
	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 4											
6.05	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
Staging Area 5											
	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 6											
	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 7											
8.23	Orange	H-060	PUBx	Unnamed pond	ATWS	N/A	N/A	0.052	N/A	N/A	0.052
Staging Area 8											
	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 9											
	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 10											
	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 11											
	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Area 12											
	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
						TOTAL	**0**	**0.129**	**0**	**0**	**0.129**
Aboveground Facilities											
Mainline Valves											
MLV 1 (MP 1.65)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MLV 2 (MP 4.97)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
MLV 3 (MP 10.84)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MLV 4 (13.01)	Orange	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MLV 5 (MP 26.98)	Cameron	H-117	E1UB	Unnamed	MLV to be installed on a platform	N/A	0.000	0.000	0.022 [f]	N/A	0.022
MLV 6 (30.92)	Cameron	H-122	E1UB	Unnamed	MLV to be installed on a platform	N/A	0.000	0.000	0.115 [f]	N/A	0.115
						TOTAL	**0**	**0**	**0.137**	**0**	**0.137**
BMOP Pump Station											
0.00	Jefferson	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Station 501											
37.00	Cameron	H-125 / H-127	E1UB	Unnamed	N/A	N/A	0.000	0.012	0.005 [g]	N/A	0.012Temp. 0.005 Perm.
Station 701											
N/A	Cameron	None	None	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stingray Tap Removal Site											
N/A	Cameron	H-127 / H-129	E1UB	Unnamed	Open Cut	N/A	0.244	0.487	0.00	N/A	0.731
Access Roads and Canals											
Access Roads – No Impacts to Waterbodies											
Access Canals											
TAC-02 (MP 1.68)	Orange	H-001	R2UB	Neches River to Barge Slip	N/A	3,500.96 [h]	N/A	0.00 [i]	N/A	N/A	0.00

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	
TAC-04 (MP 2.73)	Orange	H-081	E1UB	Canal from Neches River to ROW	N/A	7,678.30 [h]	N/A	0.00 [i]	N/A	N/A	0.00
PAC-15-B (MP 12.35)	Orange	H-075	E1UB	Unnamed Canal	N/A	2,636.13 [h]	N/A	0.00 [i]	N/A	N/A	0.00
PAC-15-C (MP 12.87)	Orange	H-075	E1UB	Unnamed Canal	N/A	4,574.70 [h]	N/A	0.00 [i]	N/A	N/A	0.00
PAC-16 (MP 26.95)	Cameron	H-117	E1UB	Madame Johnson Bayou (from ROW to Sabine Lake)	N/A	7,926.46 [h]	N/A	0.00 [i]	N/A	N/A	0.00
TAC-17 (MP 28.18)	Cameron	H-120	E1UB	Johnson Bayou (from ROW to Sabine Lake)	N/A	11,242.88 [h]	N/A	0.00 [i]	N/A	N/A	0.00
TOTAL						**37,559.43 (7.11 miles)**	**0**	**0**	**0**	**0**	**0**

Key:

ATWS – additional temporary workspace

HDD – horizontal directional drill

N/A – not applicable

ROW – right-of-way

Notes:

[a] MP range indicates large wetland/waterbody complex with multiple wetlands and waterbodies that are hydrologically connected. Acreages represents sum of multiple waterbody crossings.

TABLE F-1
Waterbodies Crossed and Crossing Methods for the Onshore Pipeline

Facility/ Approximate MP[a]	County/ Parish	Waterbody ID	Waterbody Classification	Waterbody Name	Construction Crossing Method	Approx. Centerline Crossing Length[b] (feet)	Construction[c]		Operation[d]		Total Temporary Impacts (Acres)
							TWS (acres)	ATWS (acres)	Permanent ROW (acres)	HDD (acres avoided)	

[b] Value of 0 indicates the feature is not crossed by pipeline centerline and is only crossed by workspace. For wetland/waterbody complex areas crossed, value represents cumulative total.

[c] Construction Acreage = all workspace during construction activities (TWS & ATWS; excludes Operational ROW)

[d] Operational ROW acreage reflects new 50-foot wide permanent ROW that will be temporarily disturbed during construction. HDD crossing method and bore method (i.e., road crossing) will avoid temporary waterbody disturbance in the permanent ROW (except for Sabine Lake as noted in "e").

[e] HDD construction method within Sabine Lake will result in temporary impacts due to overlap of construction vessels and Push/Pull and lay barge workspace.

[f] MLV 5 and MLV 6 will be installed on a platform. Therefore, impacts will be temporary.

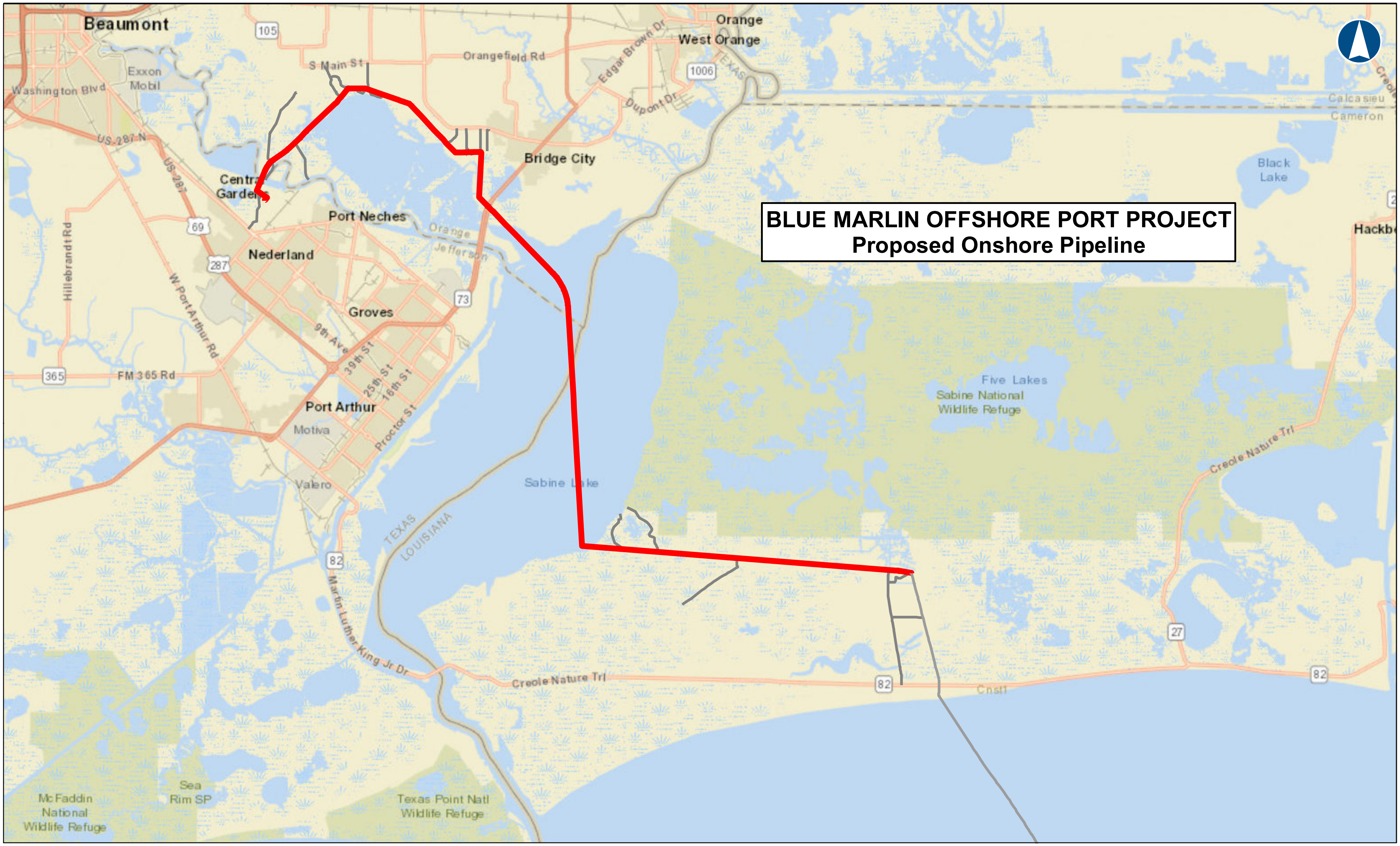
[g] Station 501 will be expanded resulting in permanent (fill) impact of EIUB waterbody (0.005 acre).

[h] Length represents access canal length (not approximate centerline crossing length).

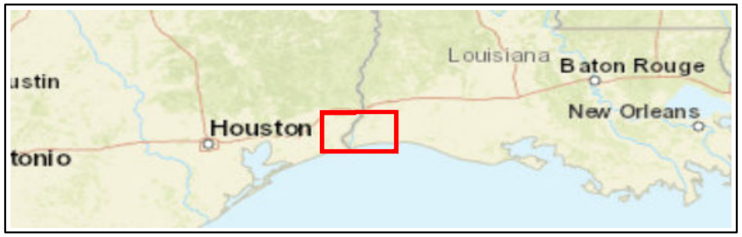
[i] Access canals will not require dredging.

APPENDIX G –
WETLAND AND WATERBODY MAPBOOKS

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Proposed Onshore Pipeline



BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

PREPARED BY

exp Energy Services Inc.
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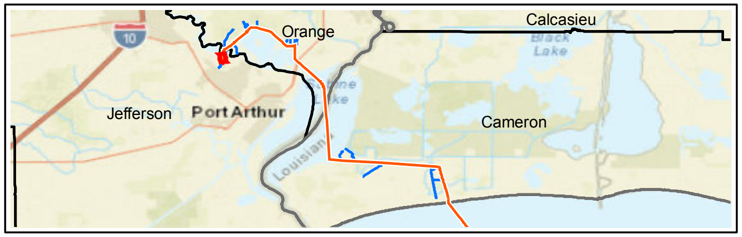
F: +1.713.963.9085
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Canal
- ▬ Project Access Road
- ☐ HDD Easement (Avoidance)
- ☐ Existing Permanent Easement / Facility for Use
- ☐ Permanent Easement
- ☐ Temporay Easement
- ☐ ATWS
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟪 PSS Wetland
- ▨ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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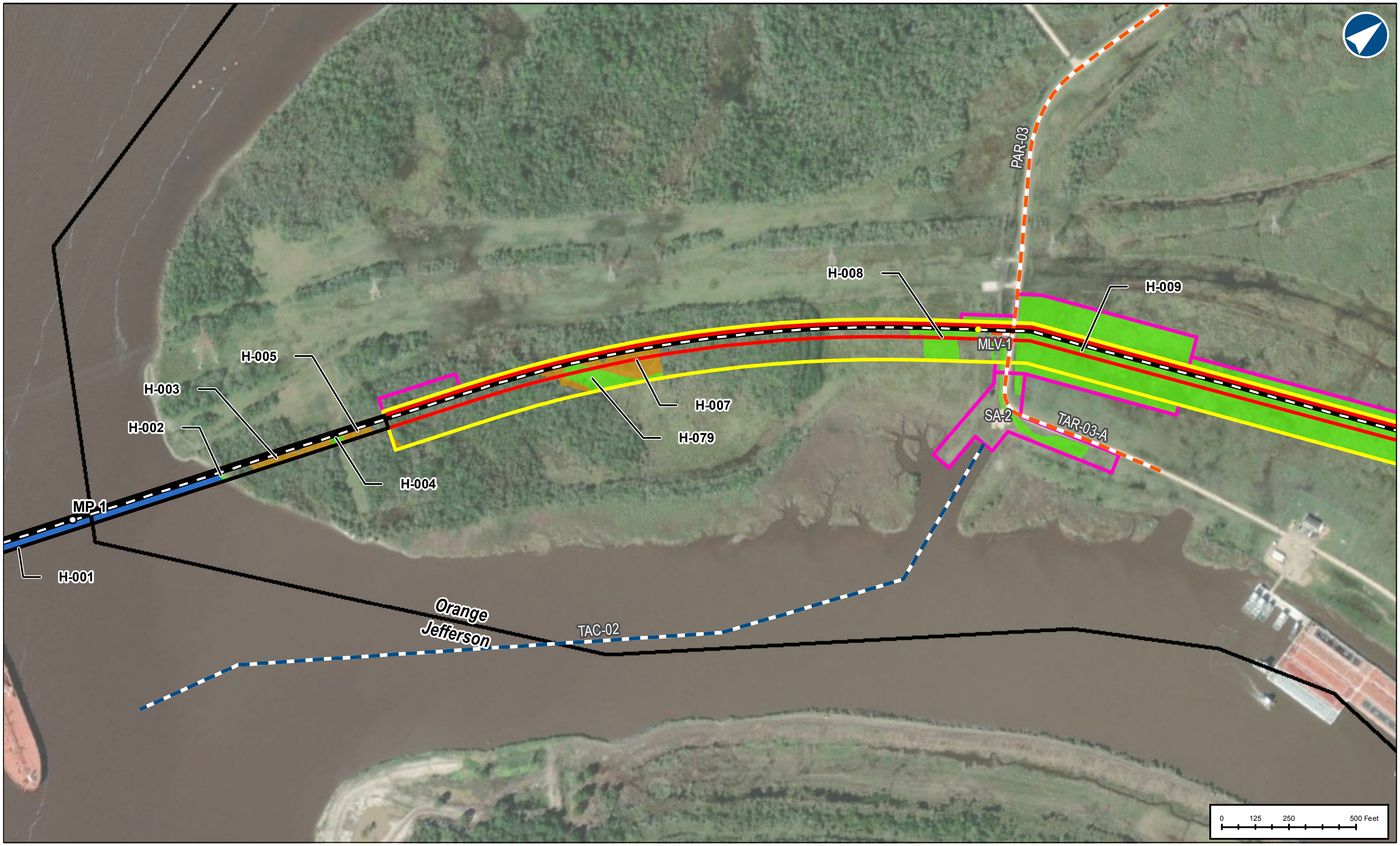
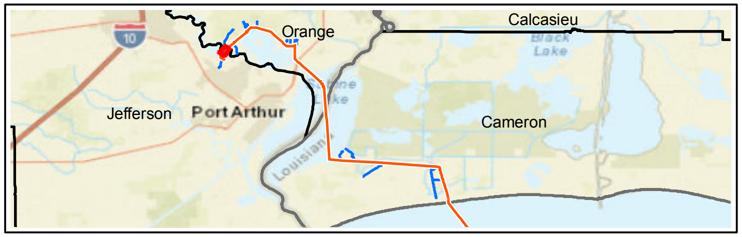
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Canal
Project Access Road
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporay Easement
🟪 ATWS
☐ Permanent Access Road Easement
🟦 Waterbody
🟩 PEM Wetland
🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	JEFFERSON / ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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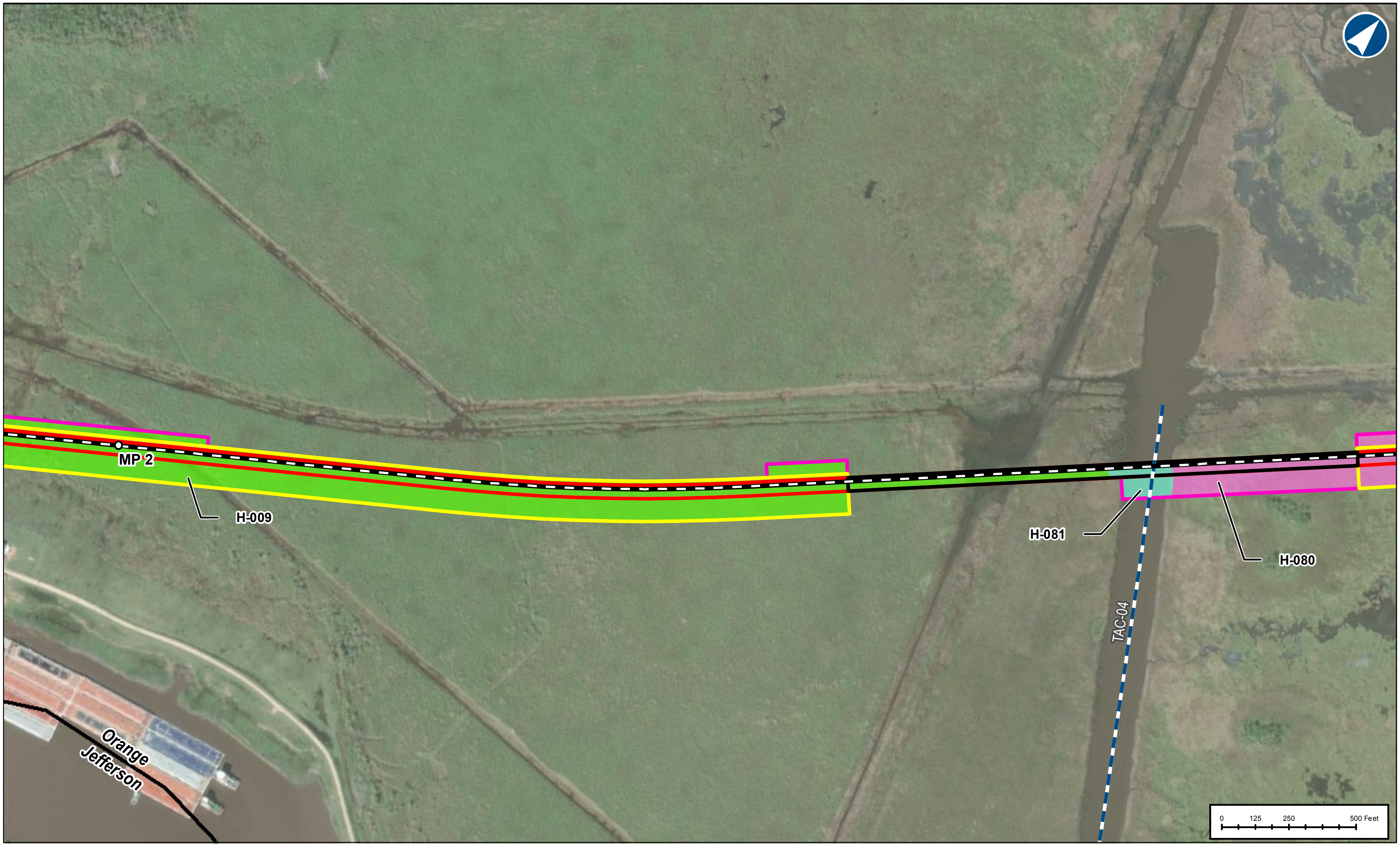
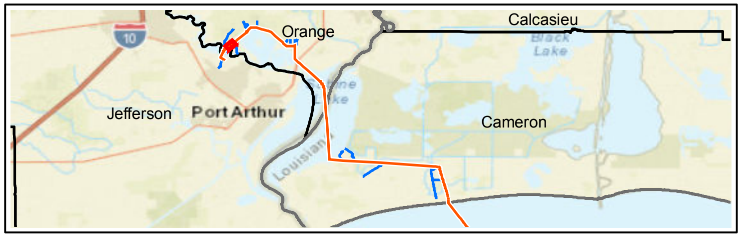
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	2 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○	Proposed Onshore Pipeline Milepost	🟨	Temporay Easement
━	Proposed Onshore Pipeline CL	▭	ATWS
┅	Project Access Canal	▨	Estuarine, unvegetated subtidal
▭	HDD Easement (Avoidance)	▨	Estuarine, vegetated intertidal (salt marsh)
🟥	Permanent Easement	🟩	PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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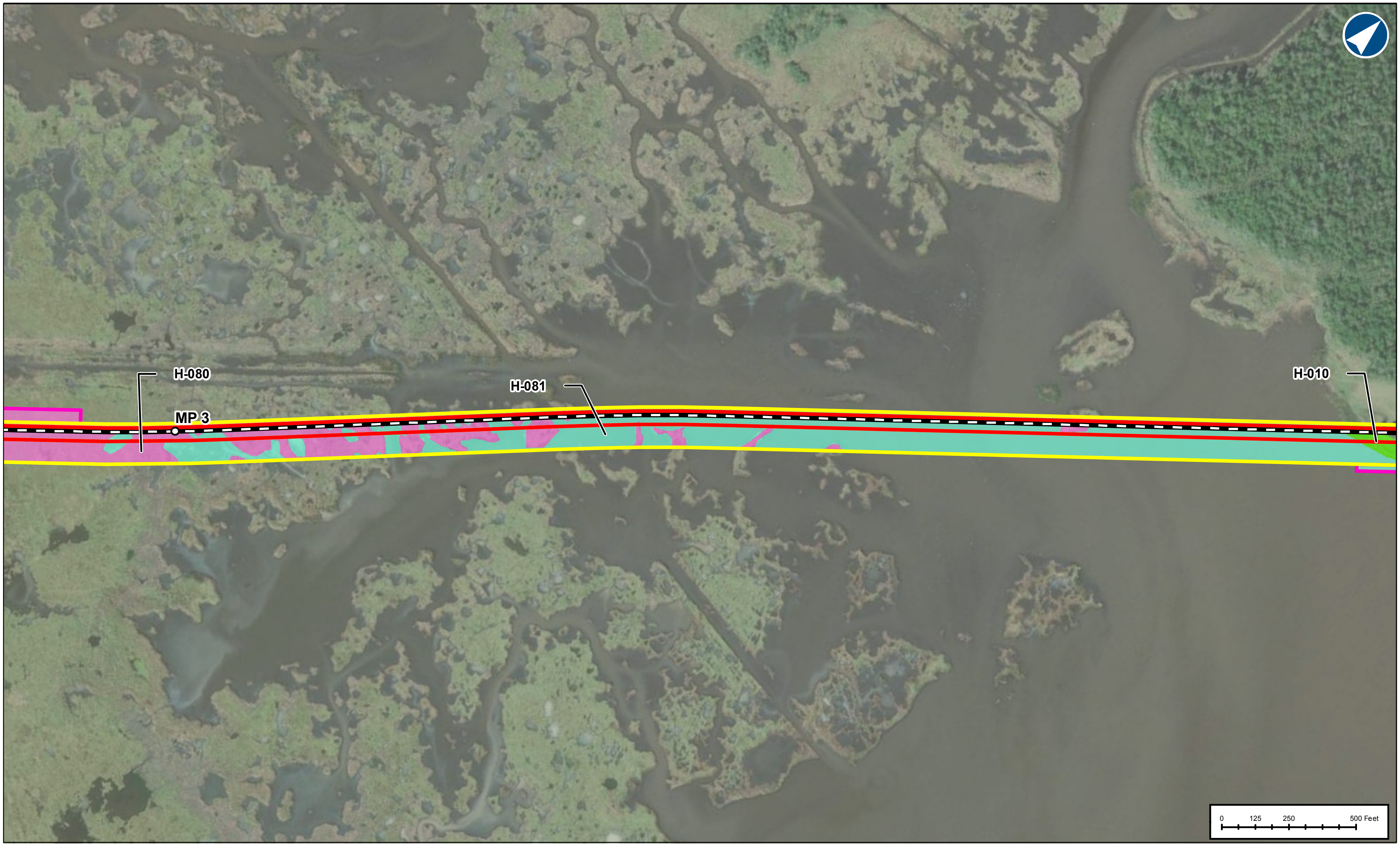
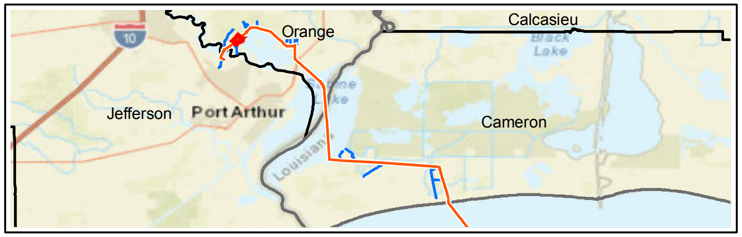
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	3 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporary Easement
- ▭ ATWS
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟩 PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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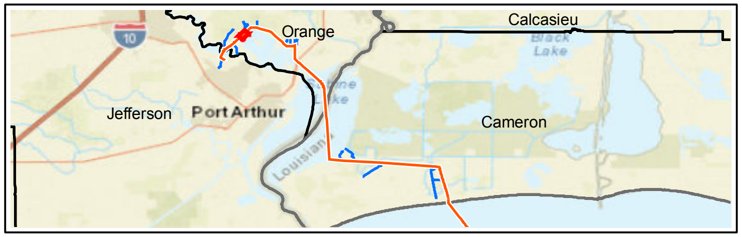
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	4 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost	🟦 Waterbody
━ Proposed Onshore Pipeline CL	🟦 Estuarine, unvegetated subtidal
🟥 Permanent Easement	🟩 PEM Wetland
🟨 Temporay Easement	🟧 PFO Wetland
🟪 ATWS	▨ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	*DRAWN BY:*	CW
STATE:	TEXAS	*CHECKED BY:*	JZ

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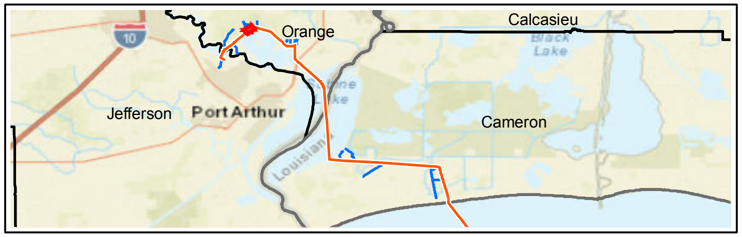
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	*PROJECTION:*	UTM 15 N
DWG:	0801-06-001	*SHEET:*	5 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Road
- ☐ Permanent Easement
- ☐ Temporay Easement
- ☐ ATWS
- ☐ Permanent Access Road Easement
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ

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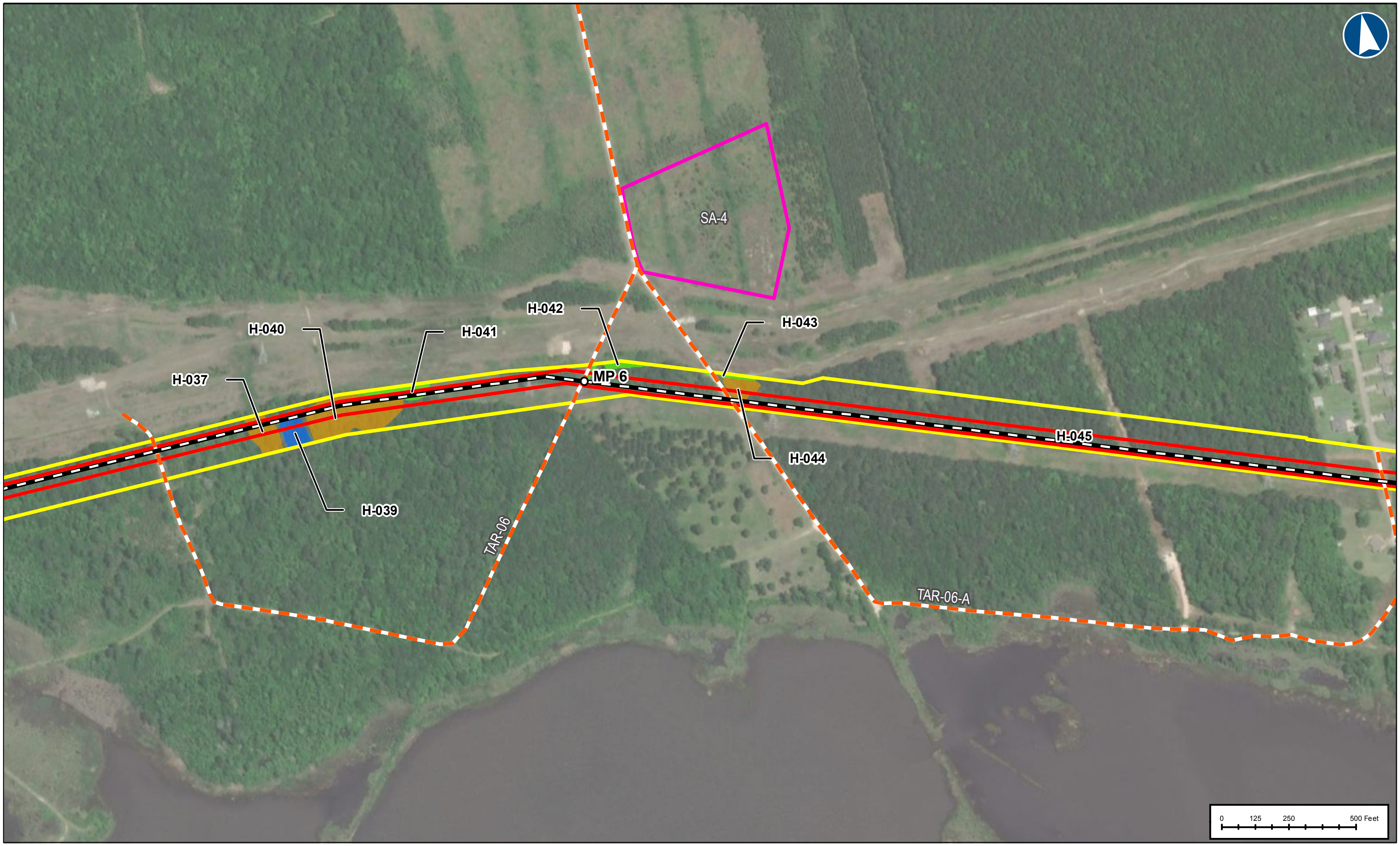
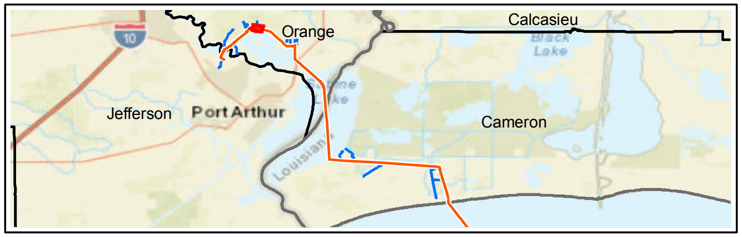
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	***PROJECTION:***	UTM 15 N
DWG:	0801-06-001	***SHEET:***	6 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
▬ Proposed Onshore Pipeline CL
--- Project Access Road
🟥 Permanent Easement
🟨 Temporay Easement
▢ ATWS
🟦 Waterbody
🟩 PEM Wetland
🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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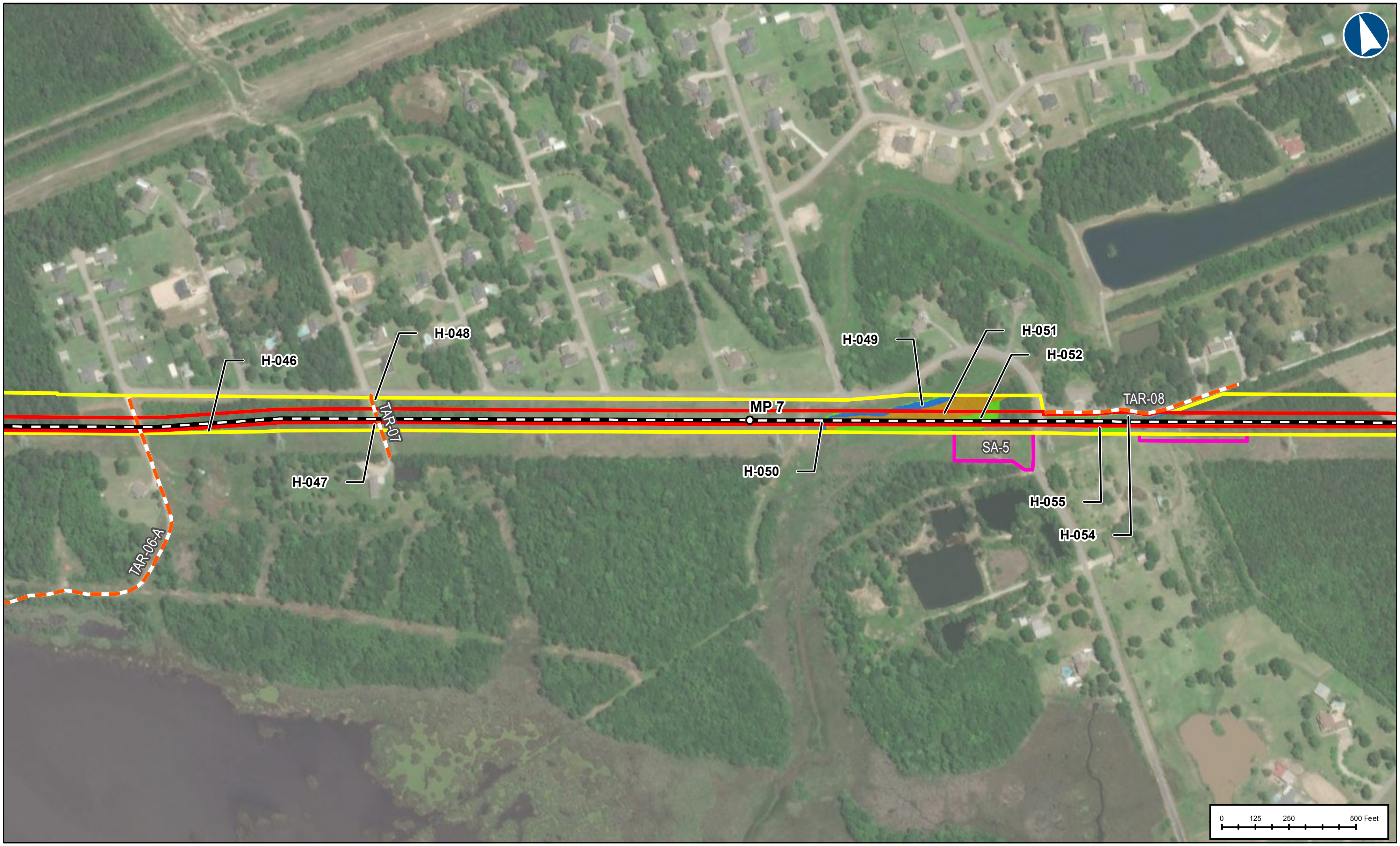
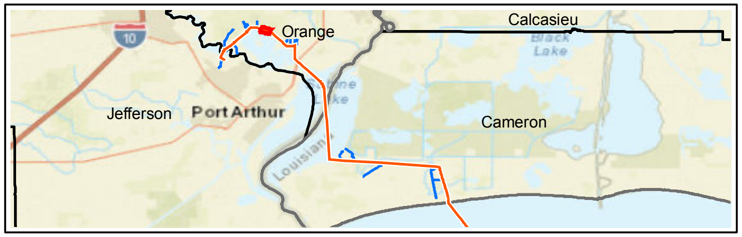
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	7 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ━ Proposed Onshore Pipeline CL
- ╍ Project Access Road
- ▭ Permanent Easement
- ▭ Temporay Easement
- ▭ ATWS
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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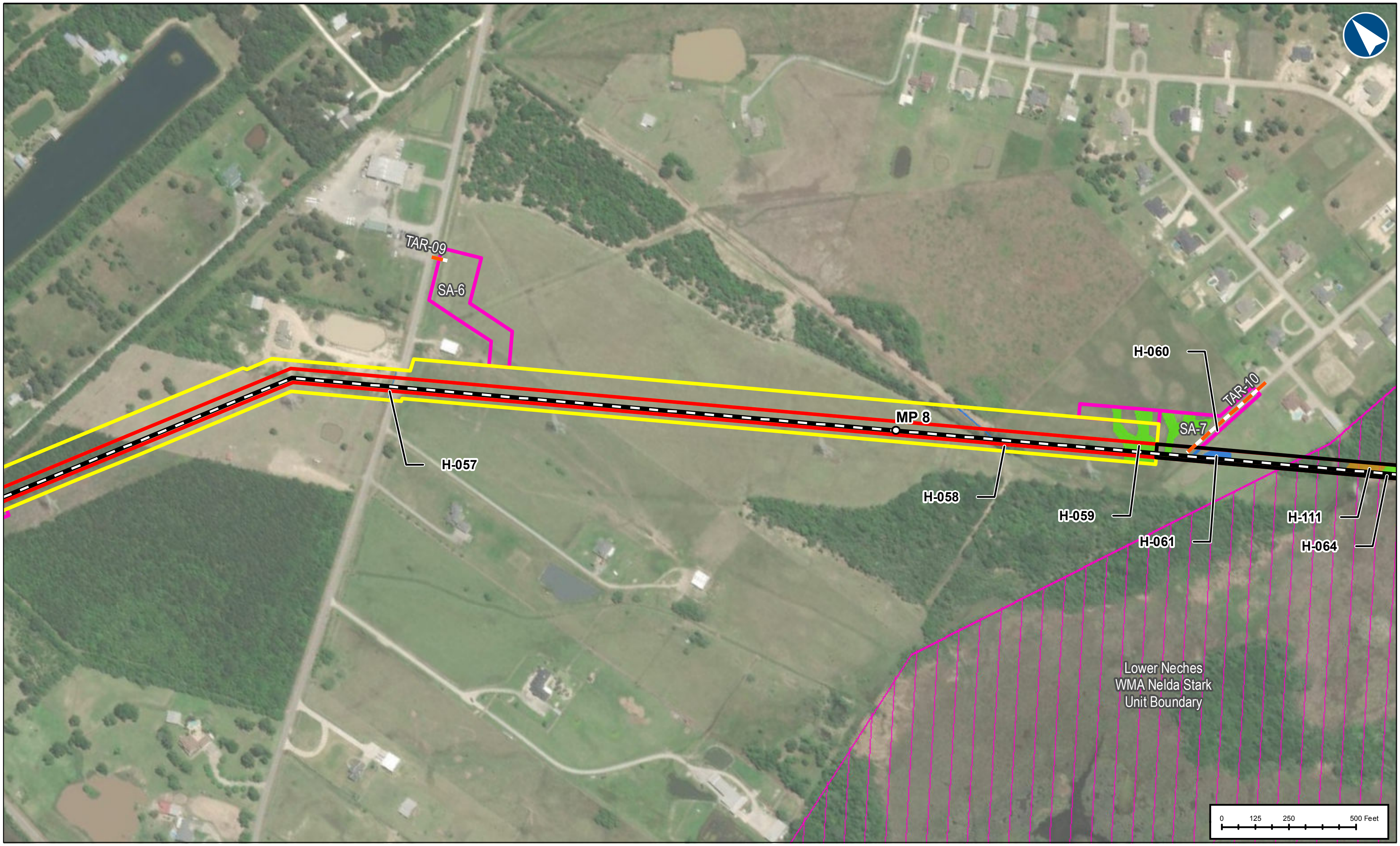
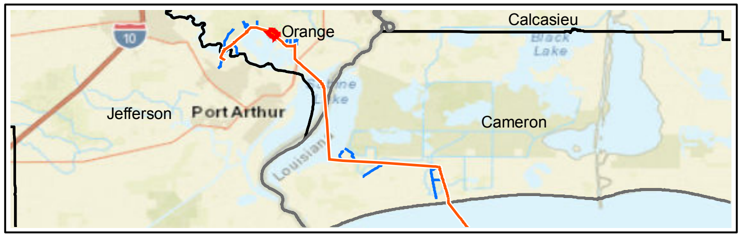
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	8 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- ☐ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporary Easement
- ☐ ATWS
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- ▨ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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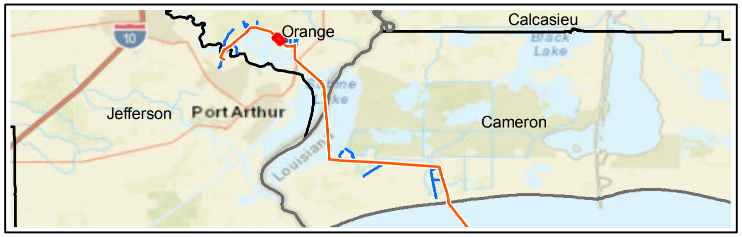
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	9 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○	Proposed Onshore Pipeline Milepost	🟨	Temporay Easement
━	Proposed Onshore Pipeline CL	▭	ATWS
━	Project Access Road	🟩	PEM Wetland
▭	HDD Easement (Avoidance)	🟧	PFO Wetland
🟥	Permanent Easement	▨	Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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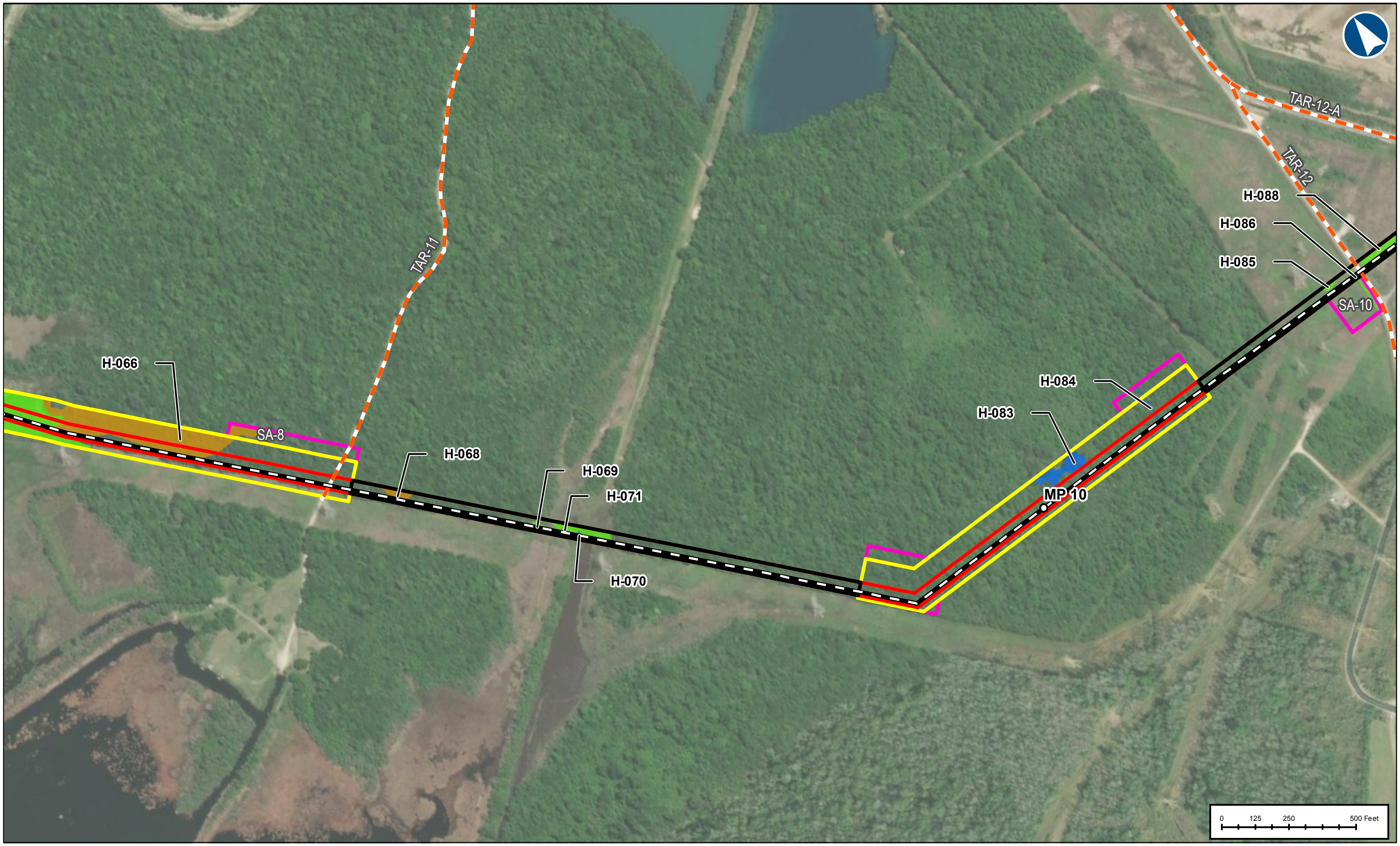
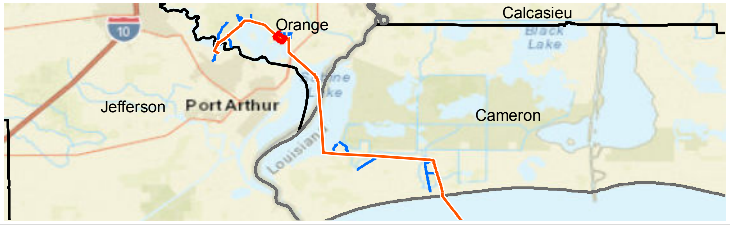
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	10 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○	Proposed Onshore Pipeline Milepost	🟨	Temporay Easement
▬	Proposed Onshore Pipeline CL	🟪	ATWS
▬	Project Access Road	🟦	Waterbody
☐	HDD Easement (Avoidance)	🟩	PEM Wetland
🟥	Permanent Easement	🟧	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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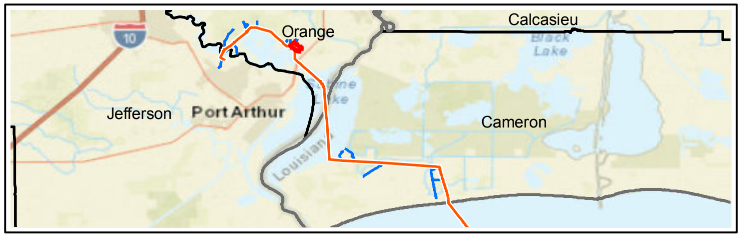
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	11 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○	Proposed Onshore Pipeline Milepost	▭	ATWS
●	Valve Location	▭	Permanent Access Road Easement
━	Proposed Onshore Pipeline CL	🟦	Waterbody
━	Project Access Road	🟩	PEM Wetland
▭	HDD Easement (Avoidance)	🟧	PFO Wetland
▭	Permanent Easement	▭	Lower Neches WMA Old River Unit Boundary
▭	Temporay Easement		

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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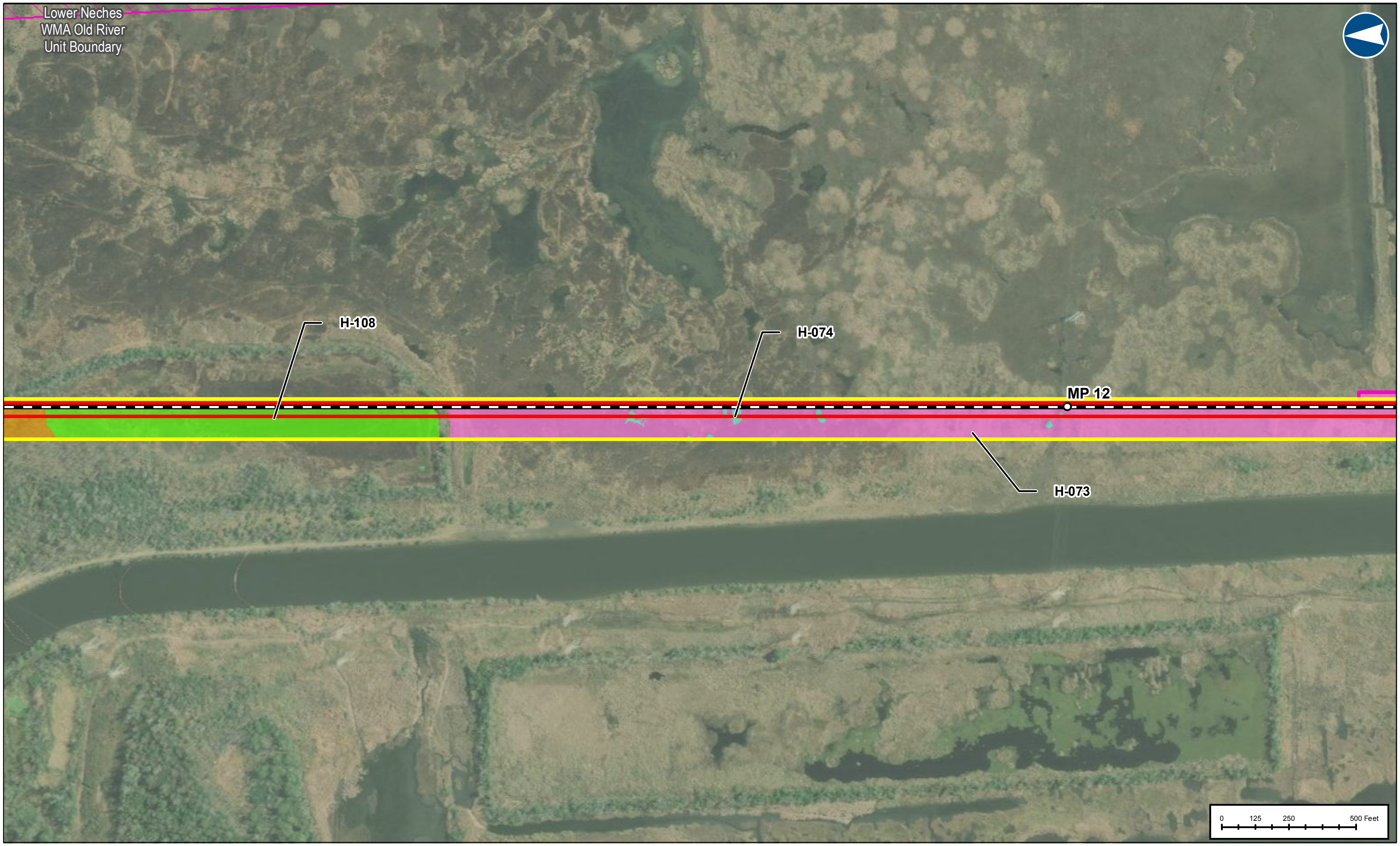
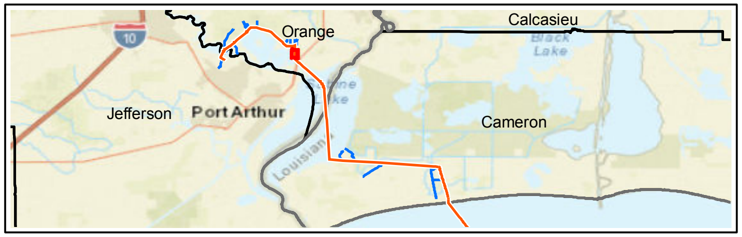
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	12 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost	🟦 Estuarine, unvegetated subtidal
Proposed Onshore Pipeline CL	🟪 Estuarine, vegetated intertidal (salt marsh)
🟥 Permanent Easement	🟩 PEM Wetland
🟨 Temporay Easement	🟧 PFO Wetland
🟪 ATWS	▨ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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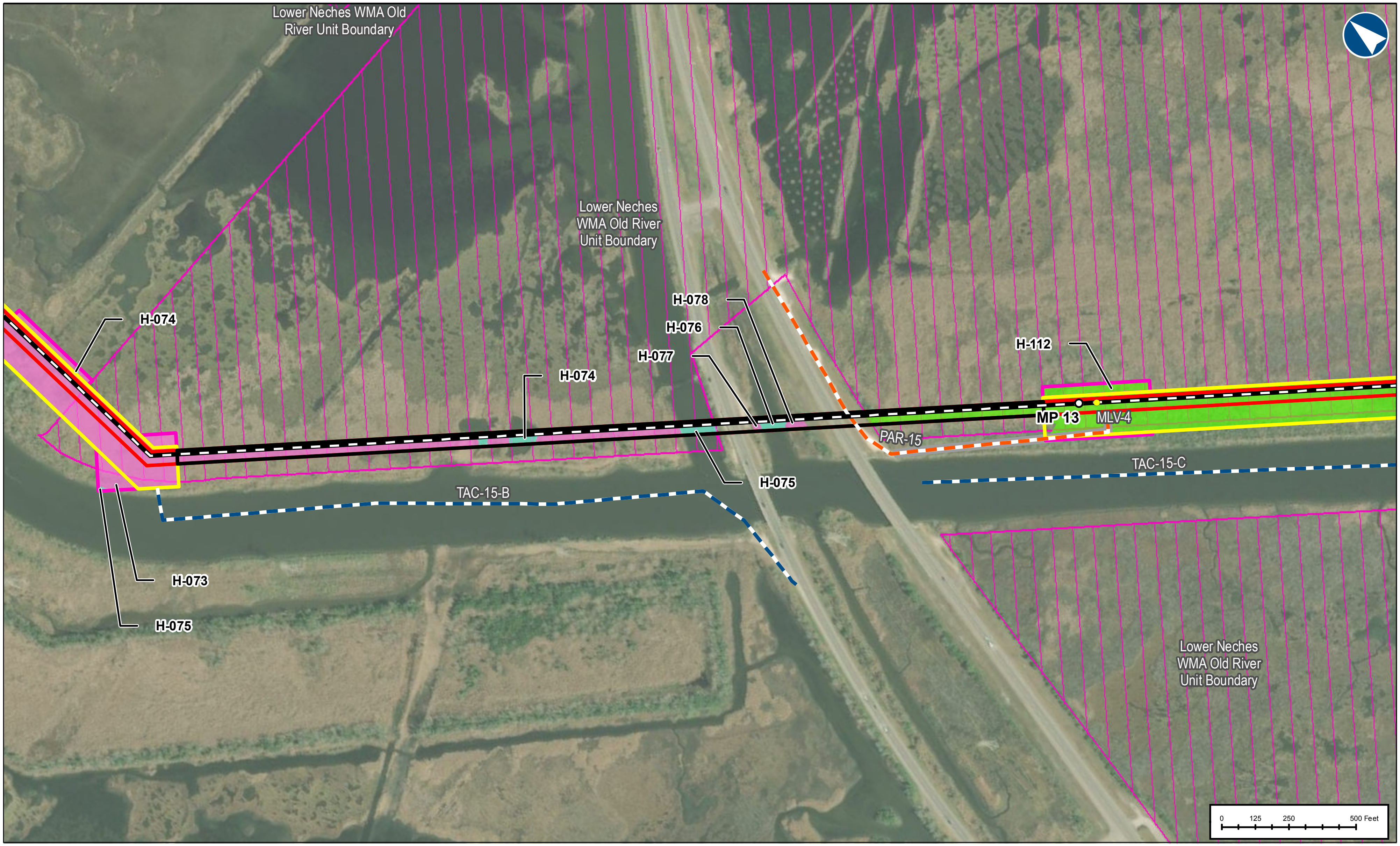
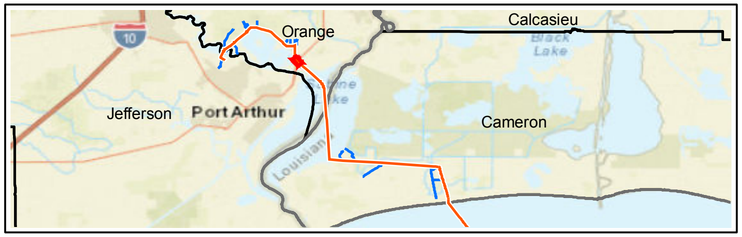
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	13 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Canal
Project Access Road
HDD Easement (Avoidance)
Permanent Easement
Temporay Easement
ATWS
Permanent Access Road Easement
Estuarine, unvegetated subtidal
Estuarine, vegetated intertidal (salt marsh)
PEM Wetland
Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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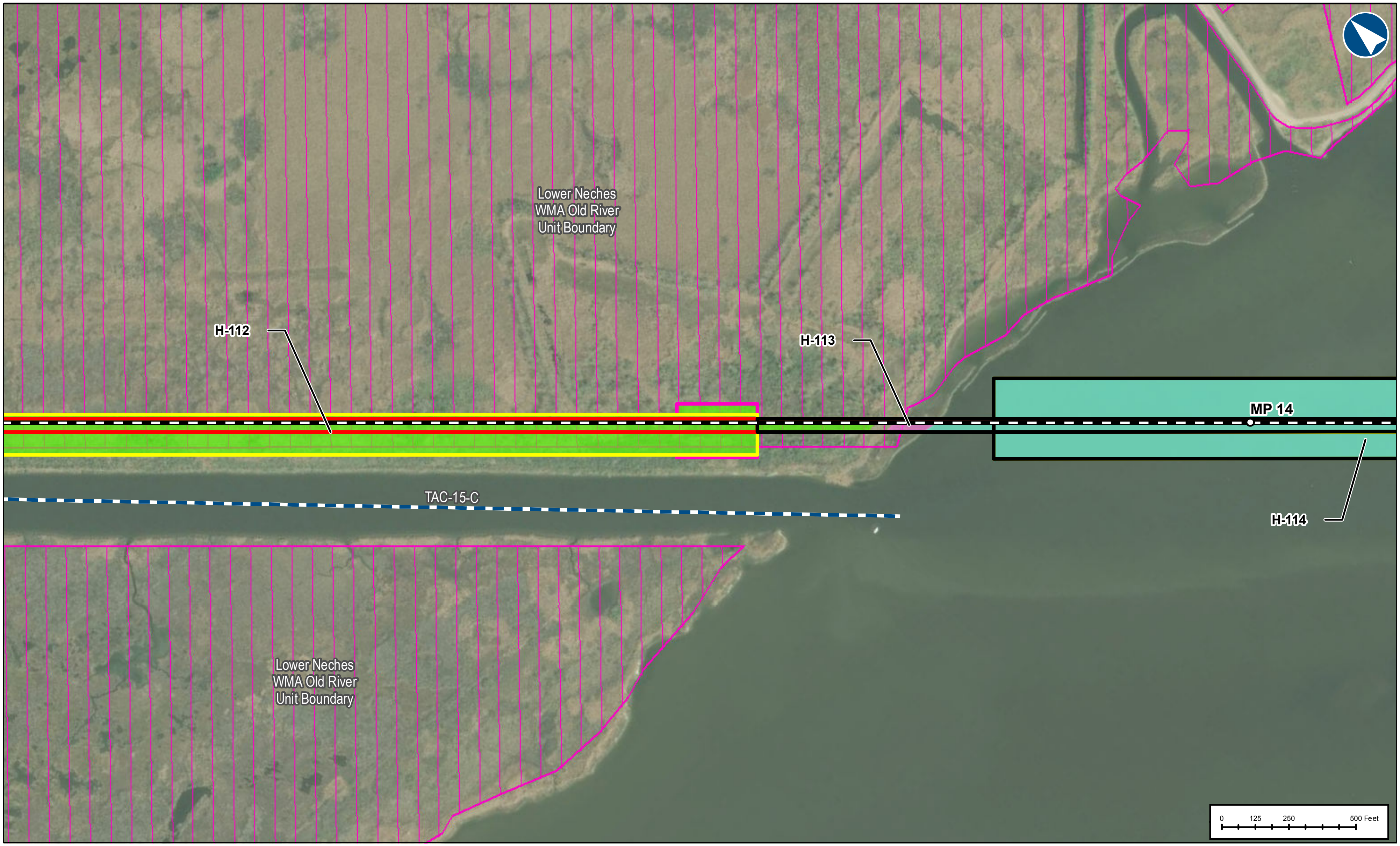
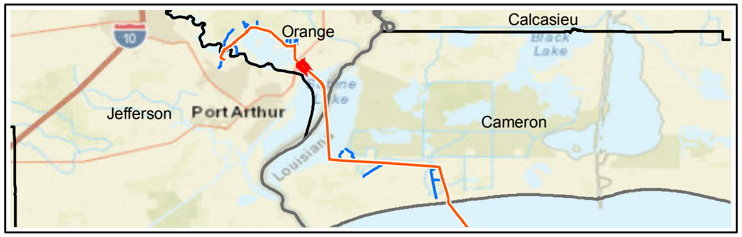
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	14 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ATWS
- 🟦 Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)
- 🟩 PEM Wetland
- ▨ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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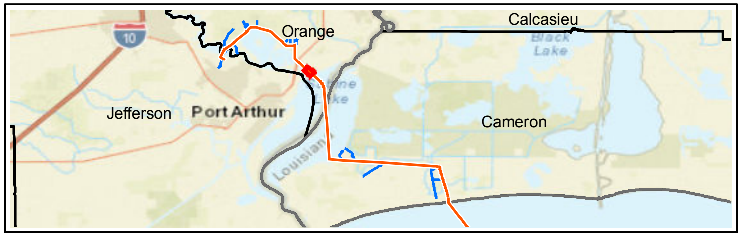
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	15 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- Proposed Onshore Pipeline CL
- HDD Easement (Avoidance)
- Permanent Easement
- Temporay Easement
- Estuarine, unvegetated subtidal
- Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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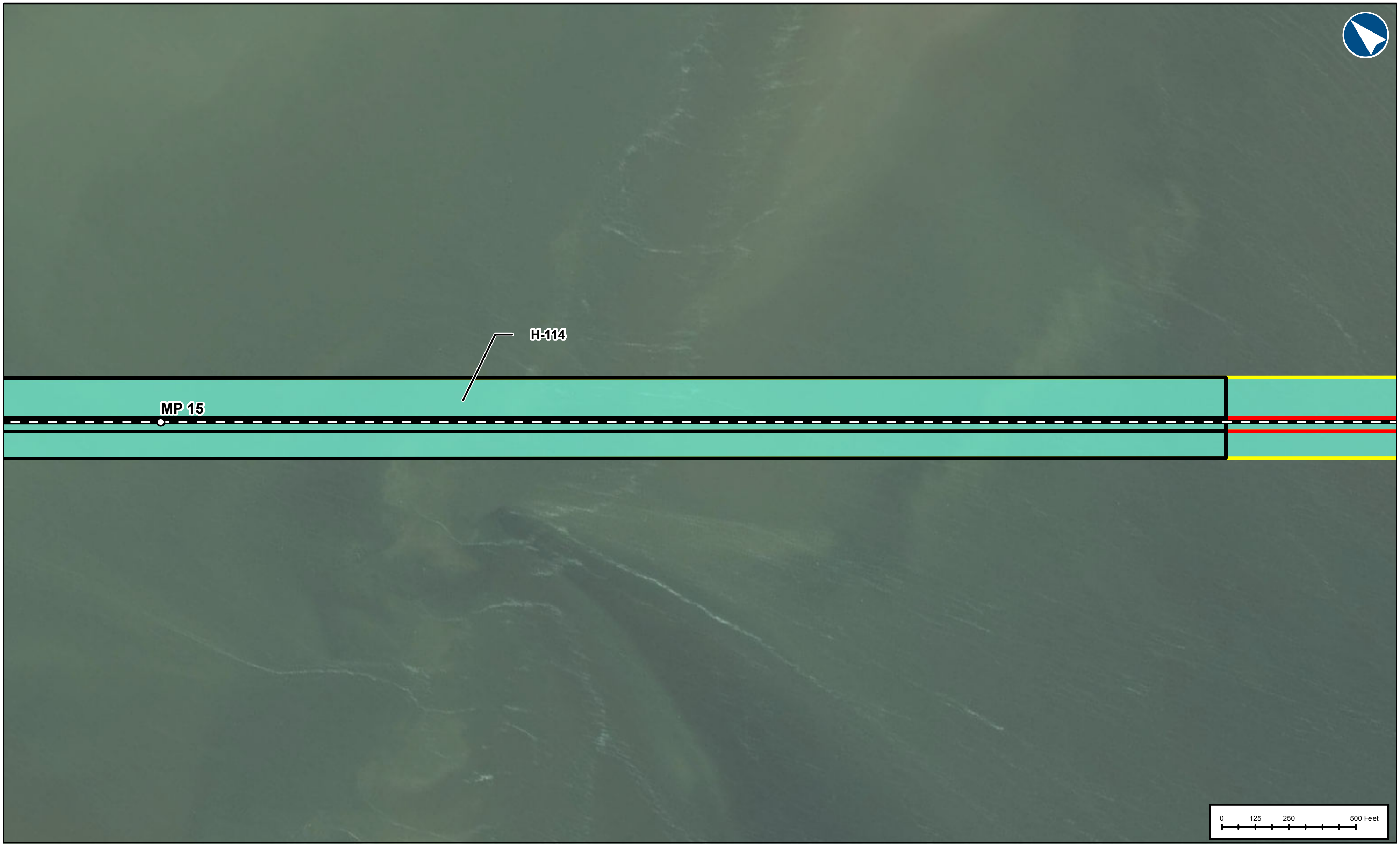
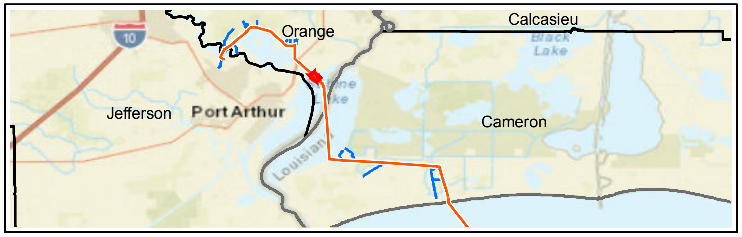
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	16 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost

— Proposed Onshore Pipeline CL

▭ HDD Easement (Avoidance)

🟥 Permanent Easement

🟨 Temporay Easement

🟦 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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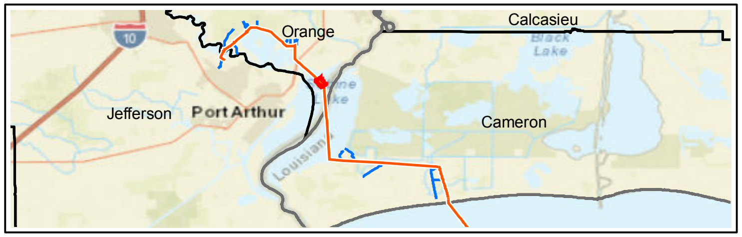
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	17 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

🟥 Permanent Easement

🟨 Temporay Easement

🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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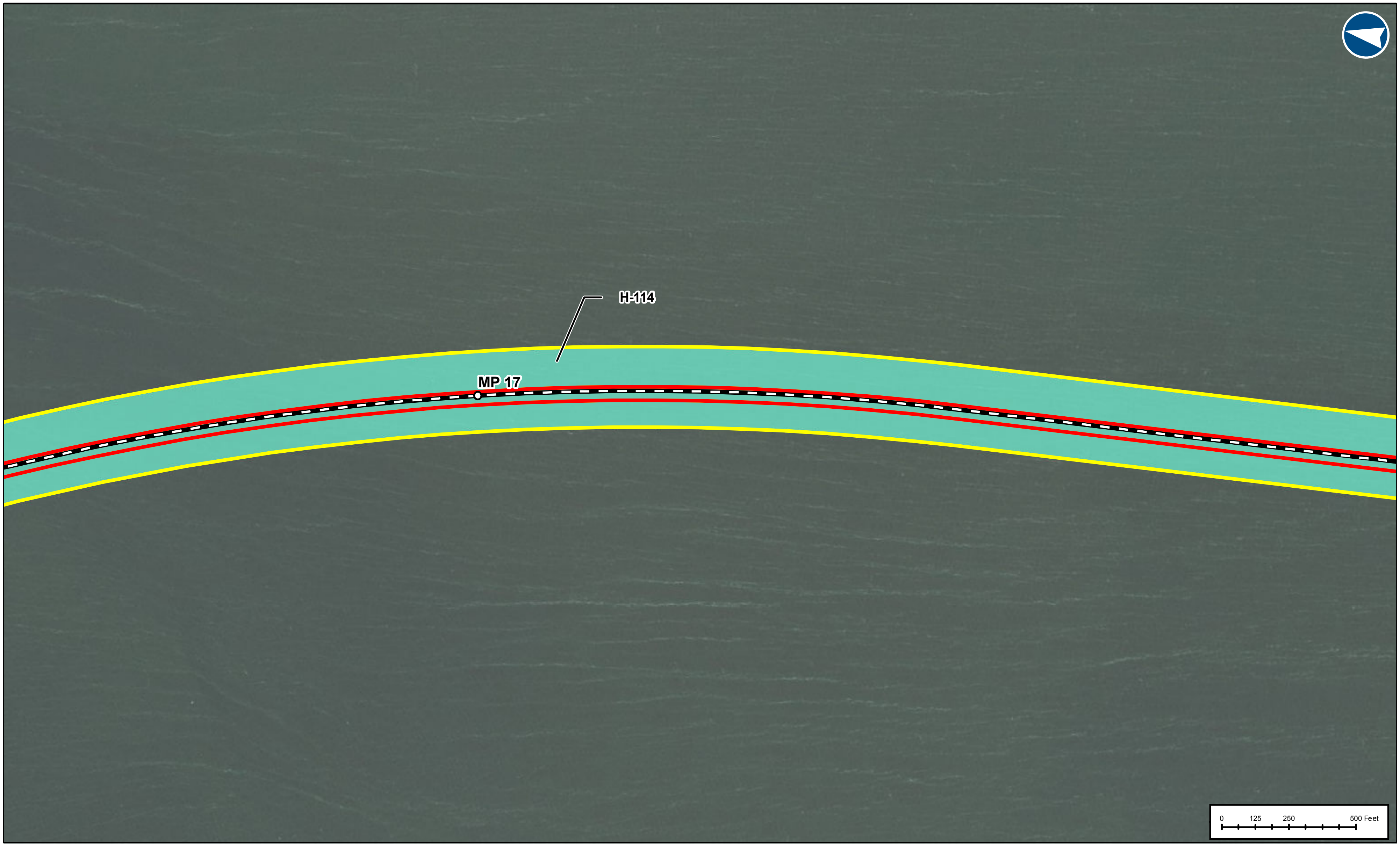
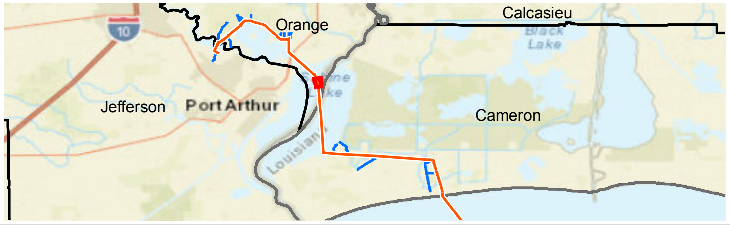
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	18 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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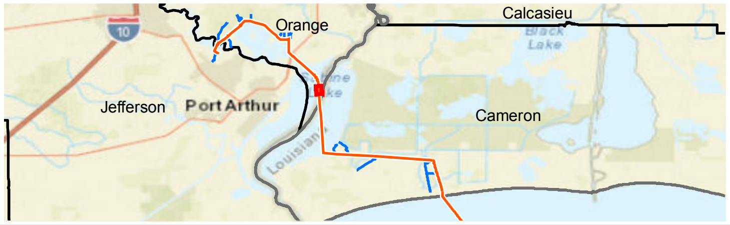
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	19 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost

Proposed Onshore Pipeline CL

🟥 Permanent Easement

🟨 Temporay Easement

🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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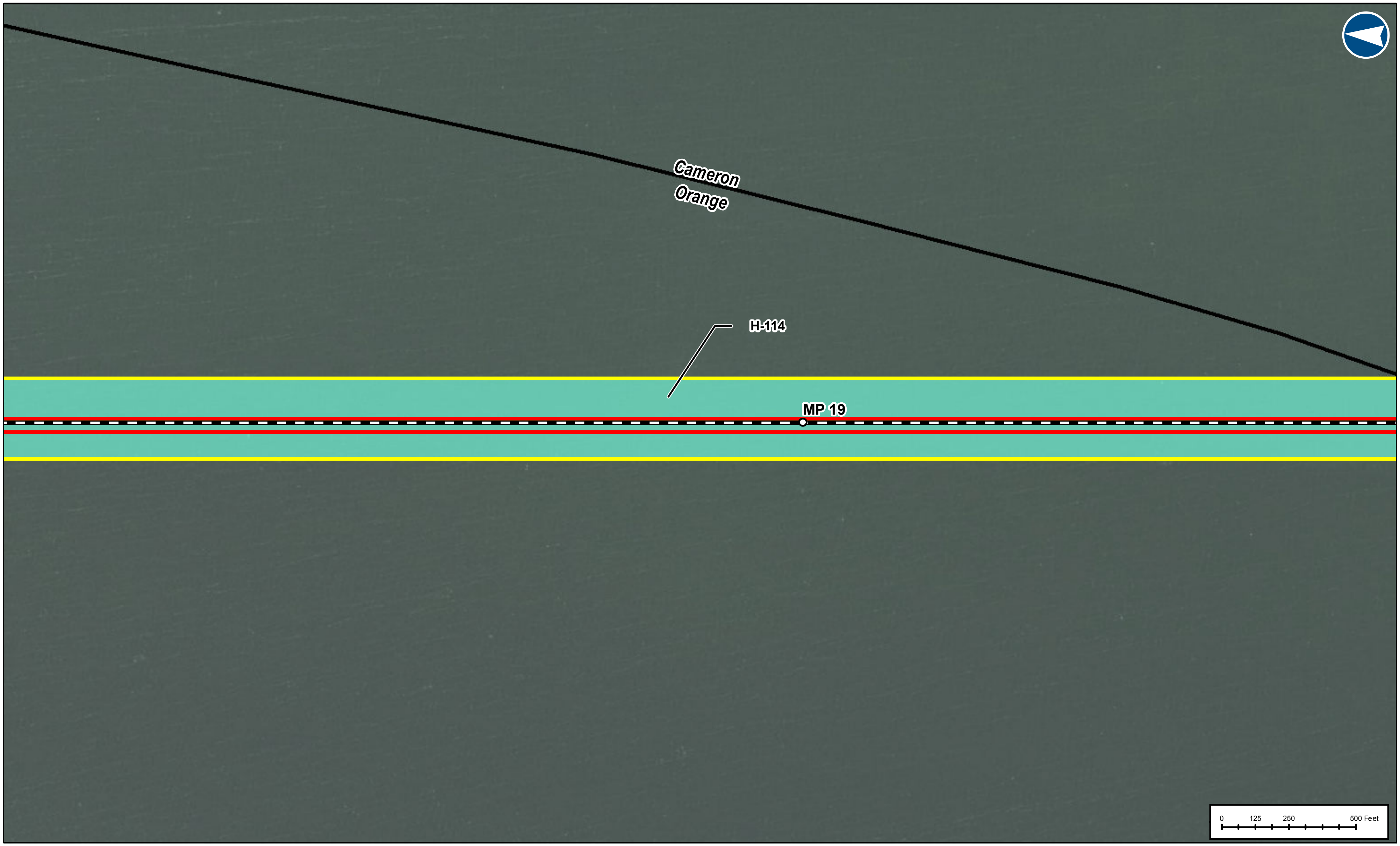
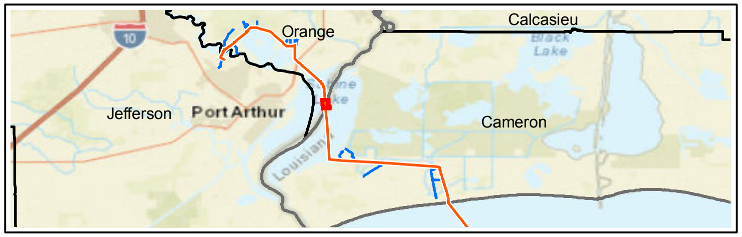
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	20 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

🟥 Permanent Easement

🟨 Temporay Easement

🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE / CAMERON	DRAWN BY:	CW
STATE:	TEXAS / LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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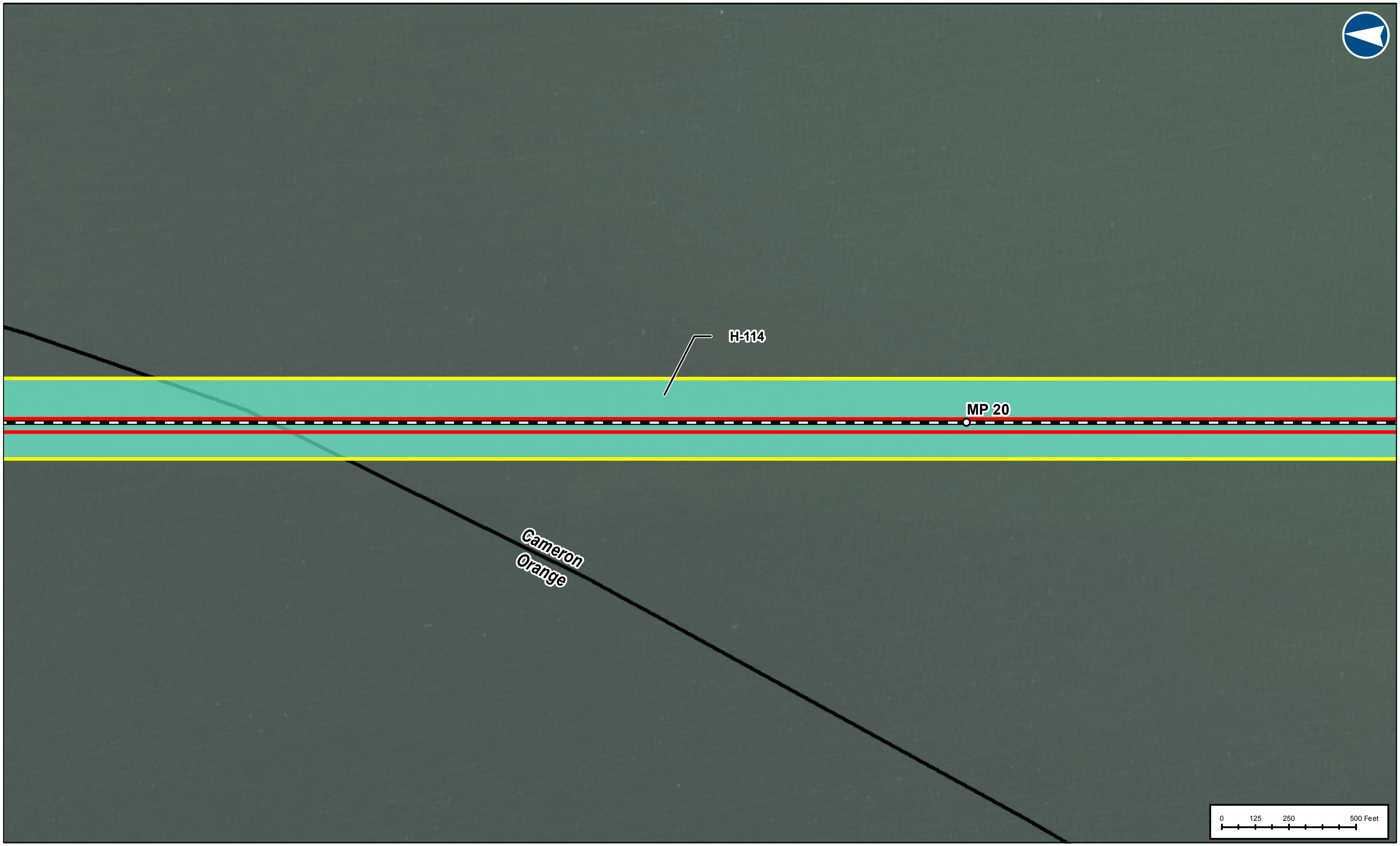
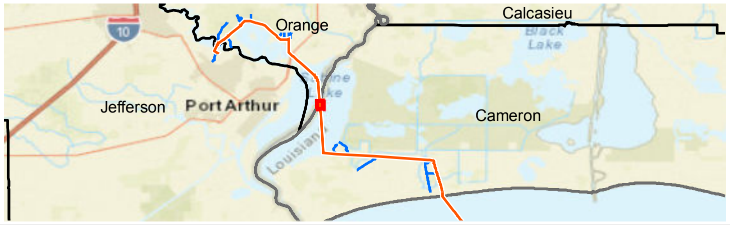
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	21 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE / CAMERON	DRAWN BY:	CW
STATE:	TEXAS / LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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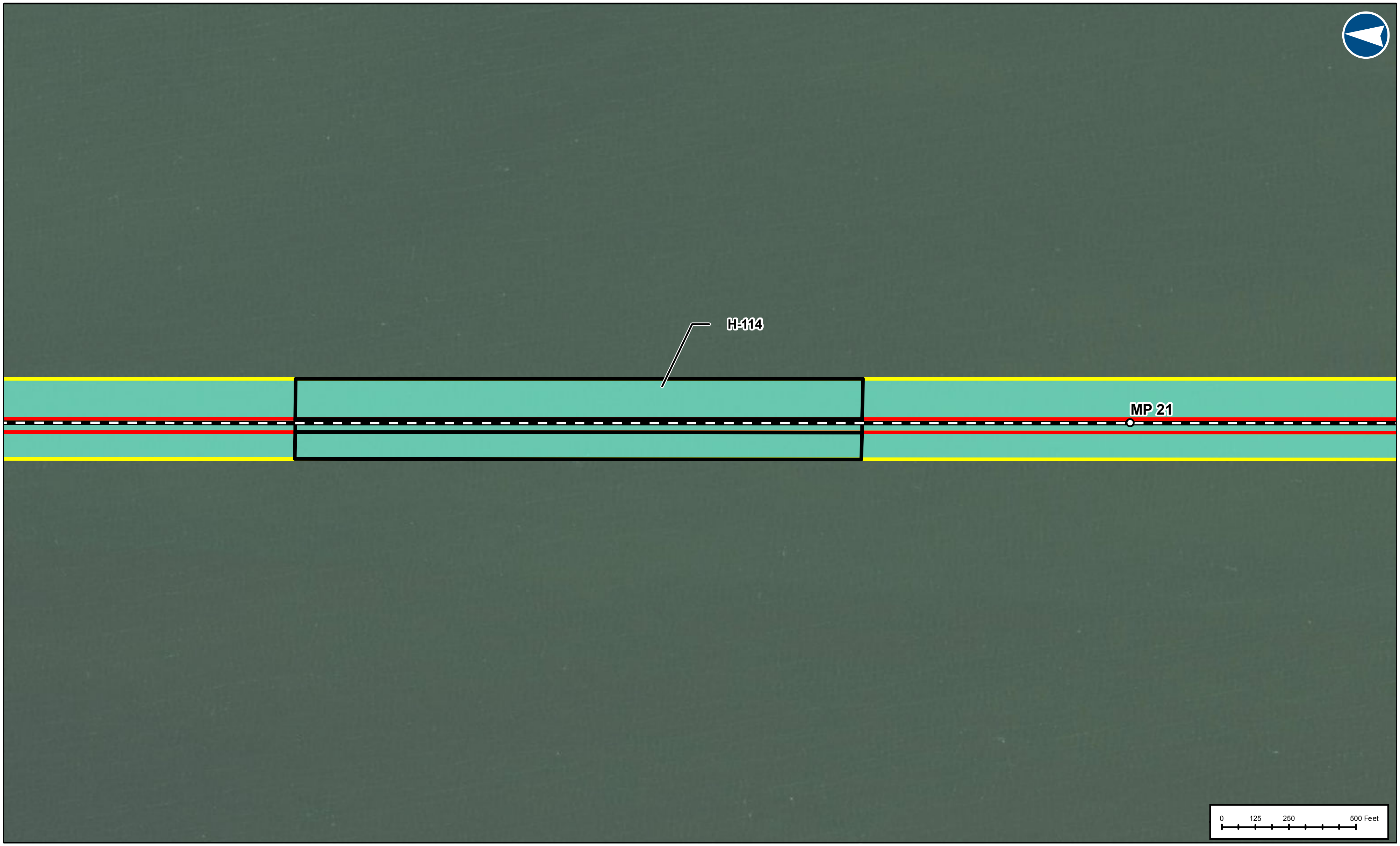
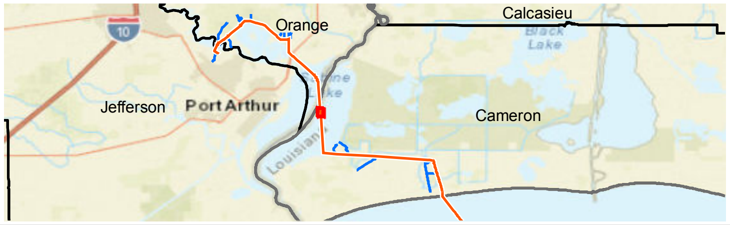
BLUE MARLIN OFFSHORE
PORT PROJECT

DWG:	0801-06-001	SHEET:	22 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
▬ Proposed Onshore Pipeline CL
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporay Easement
🟦 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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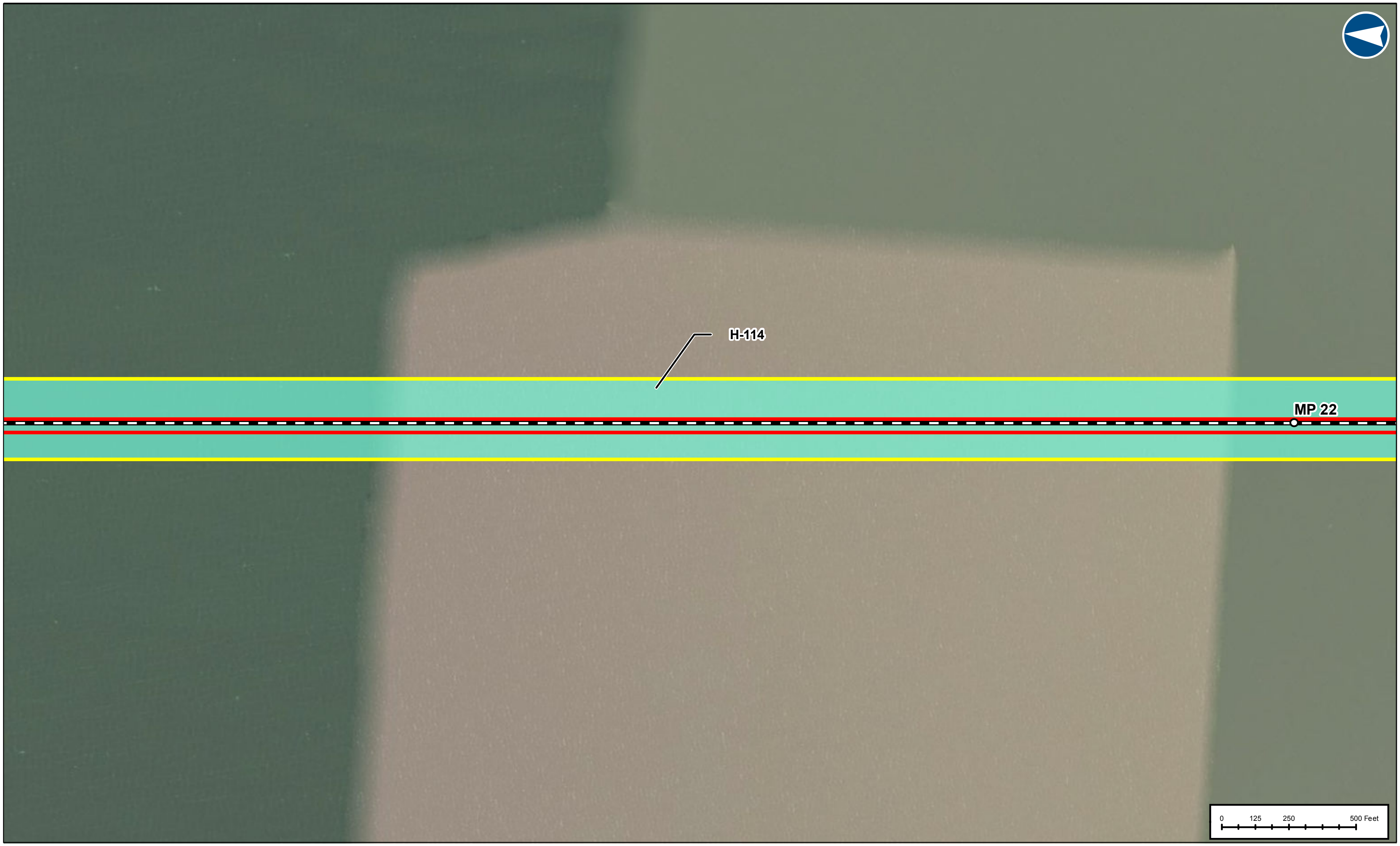
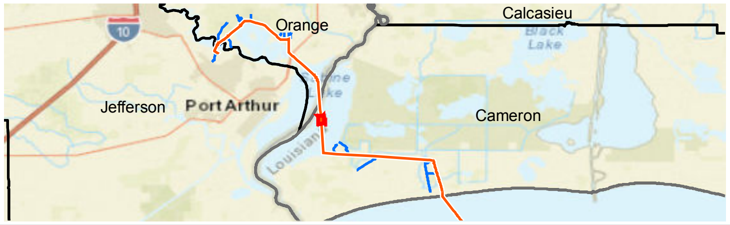
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	23 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

🟥 Permanent Easement

🟨 Temporay Easement

🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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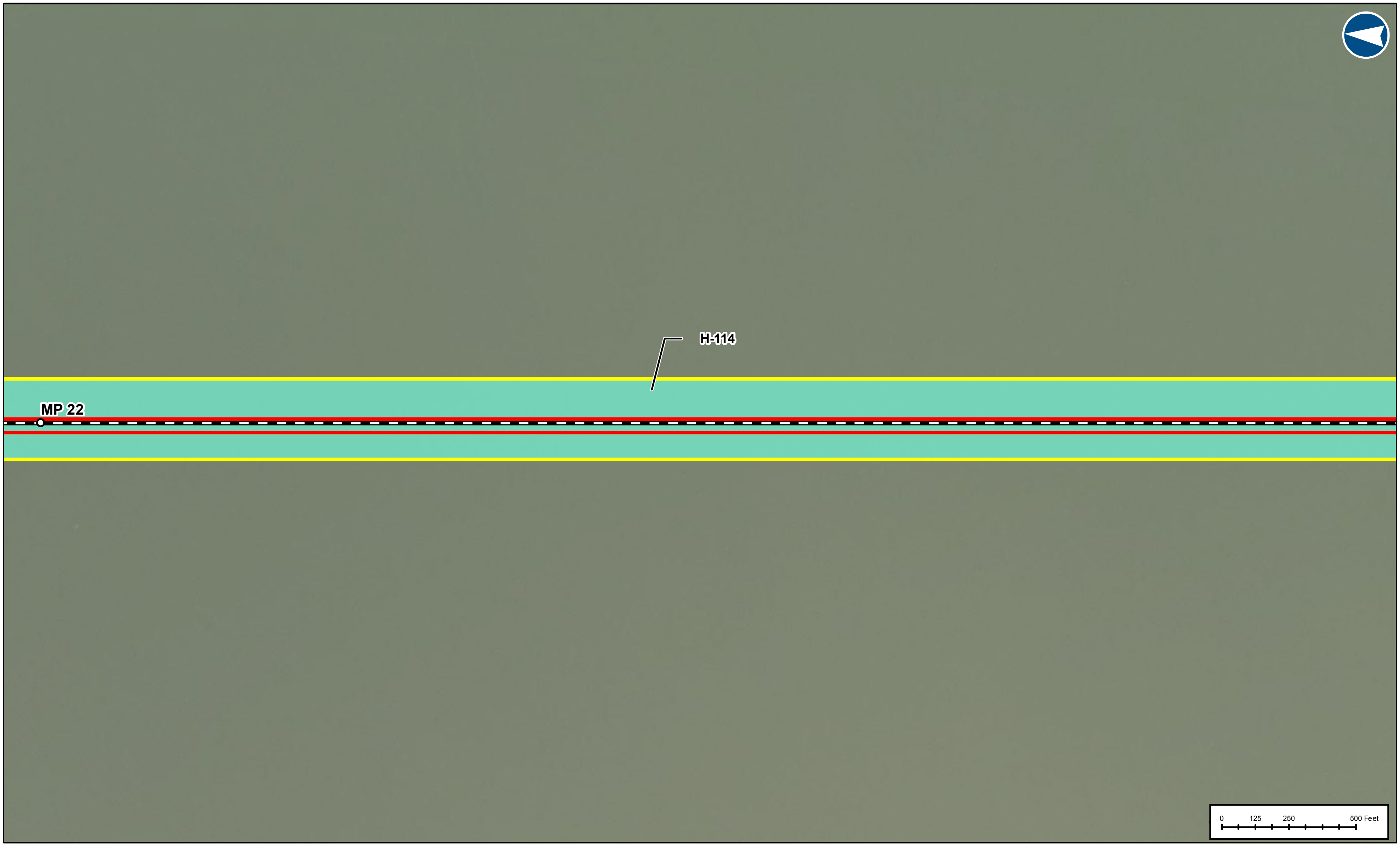
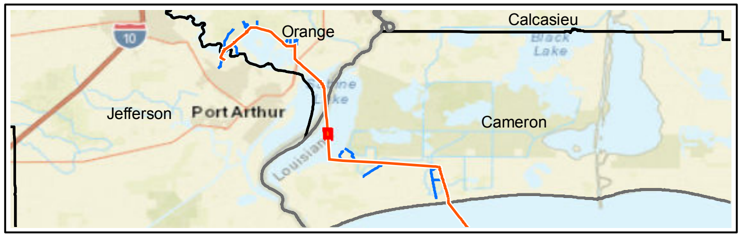
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	24 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

🟥 Permanent Easement

🟨 Temporay Easement

🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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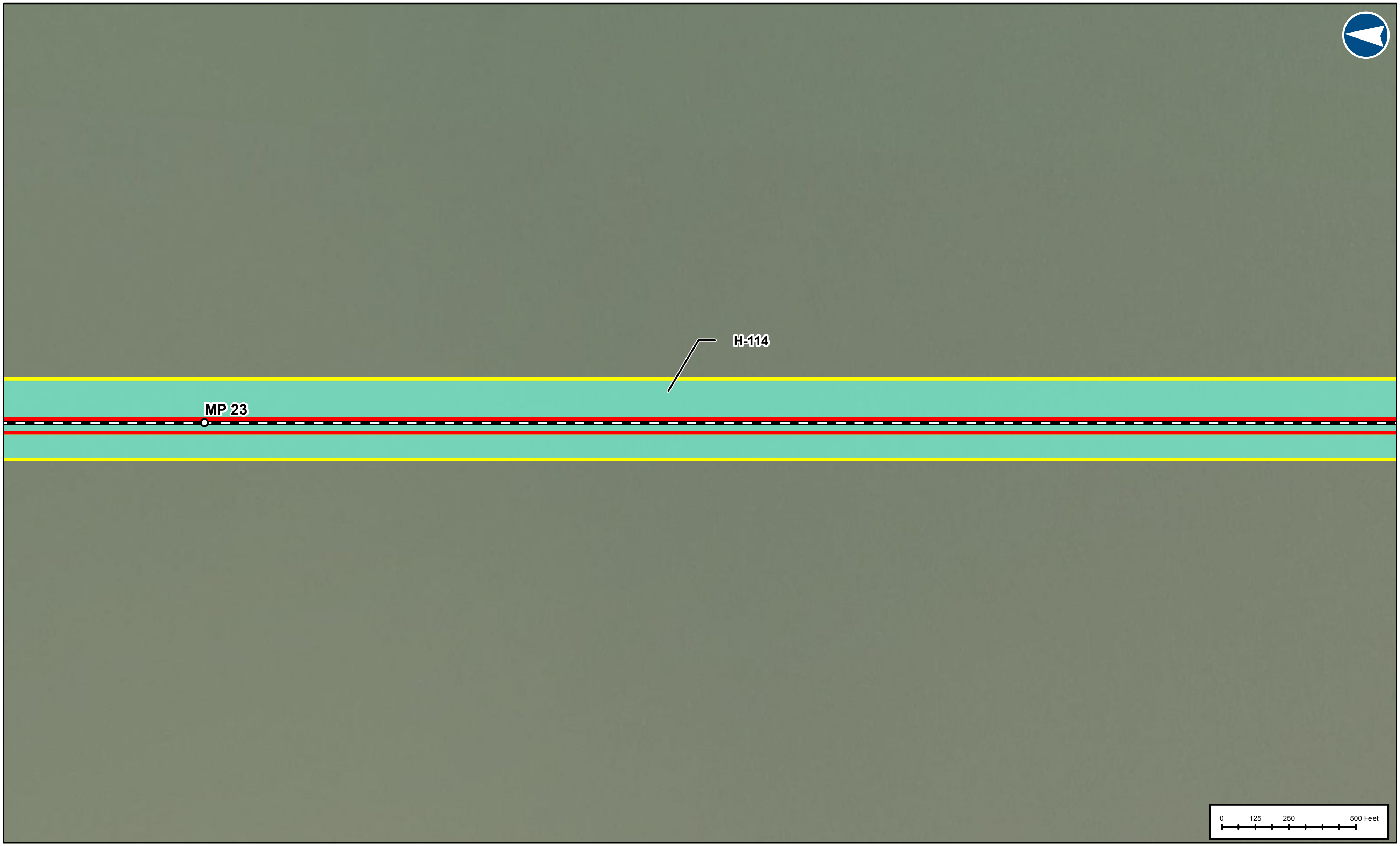
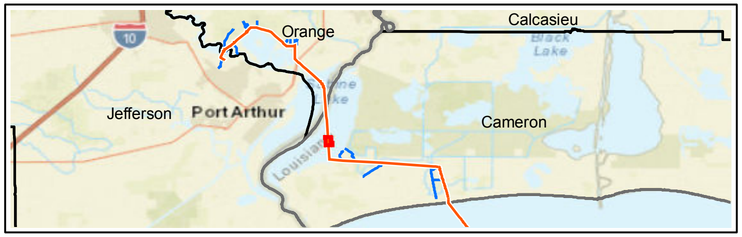
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	25 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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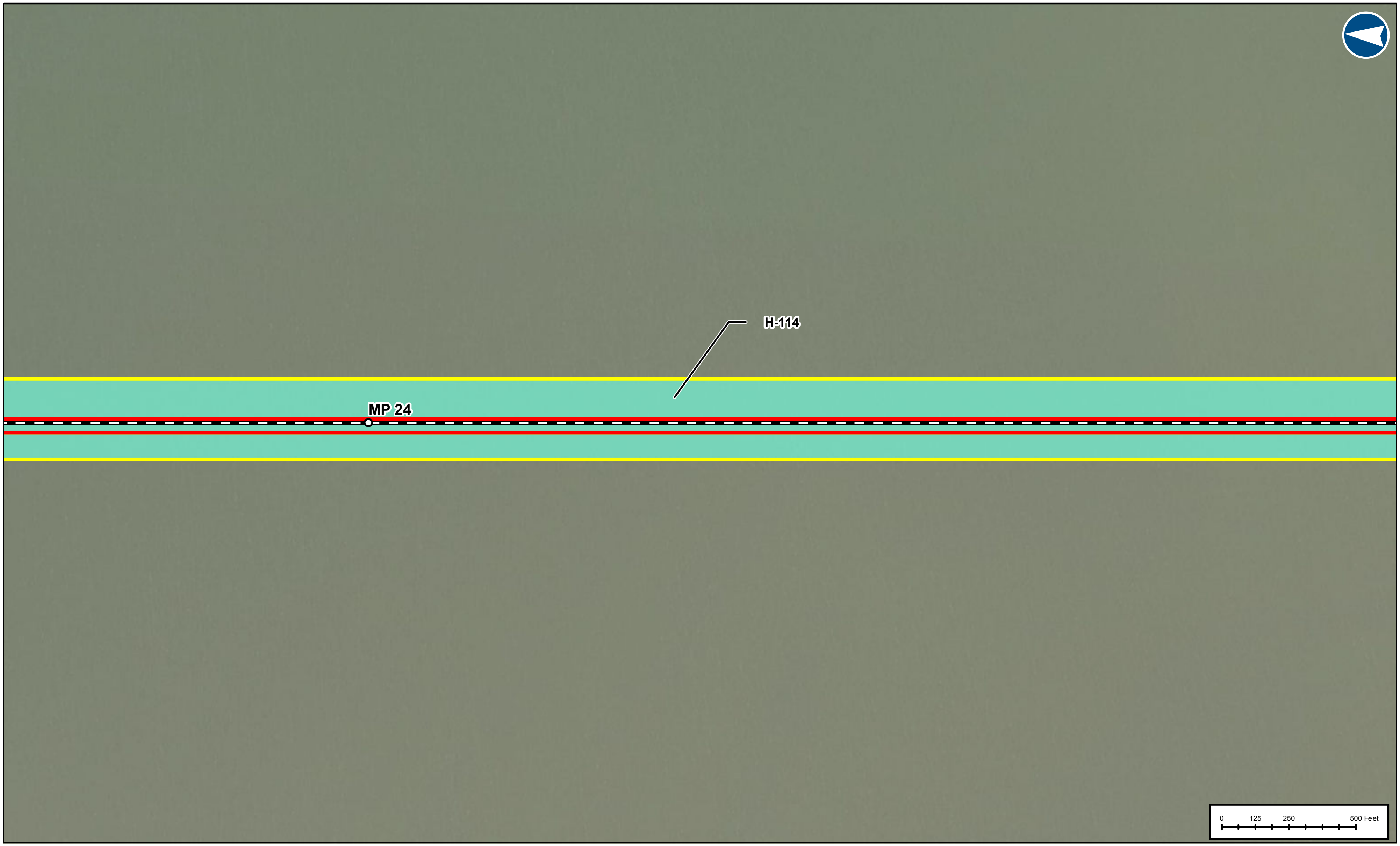
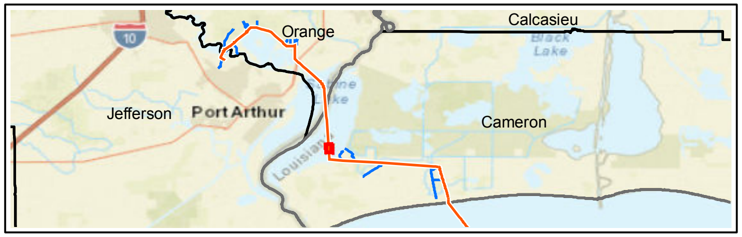
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	26 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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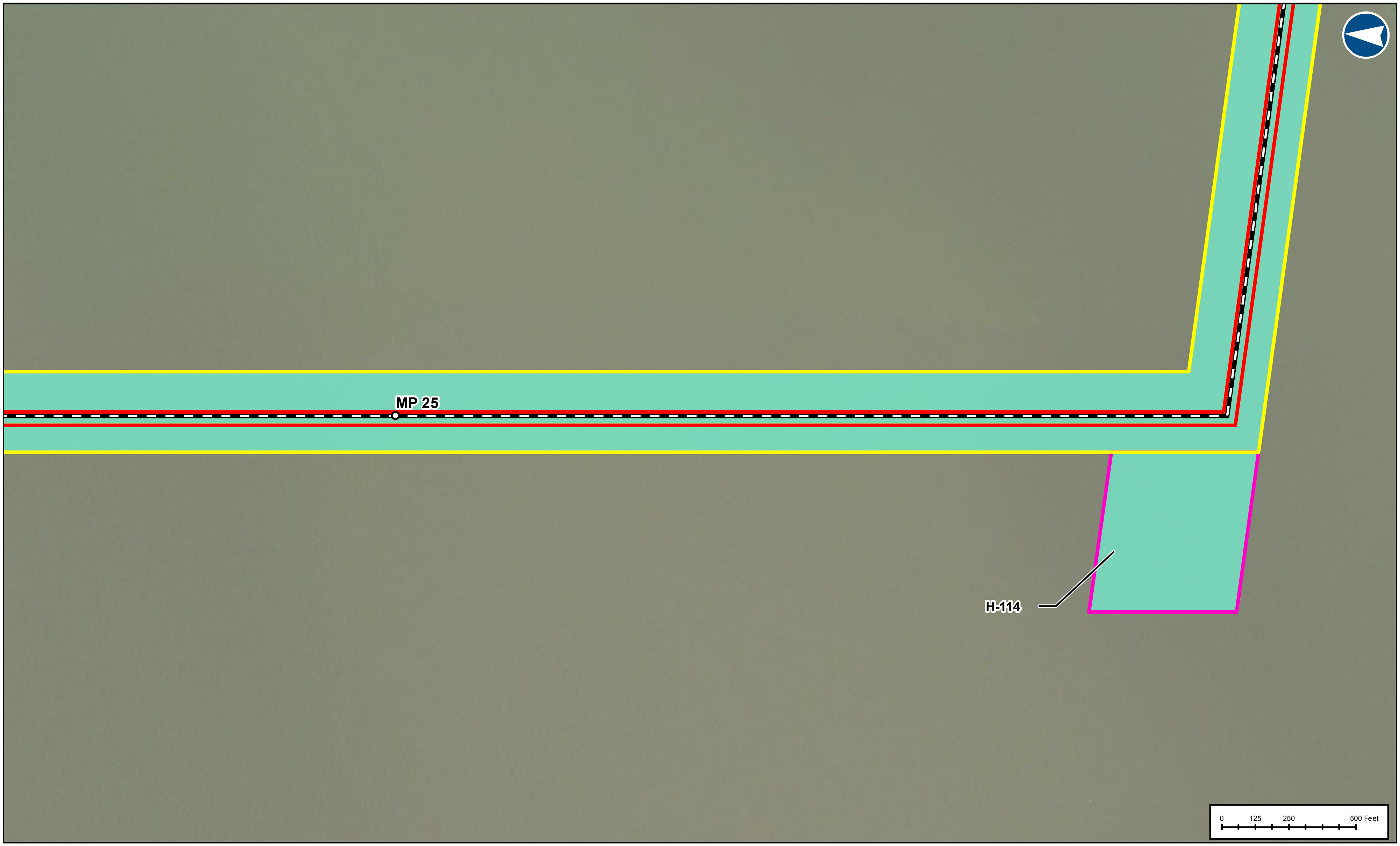
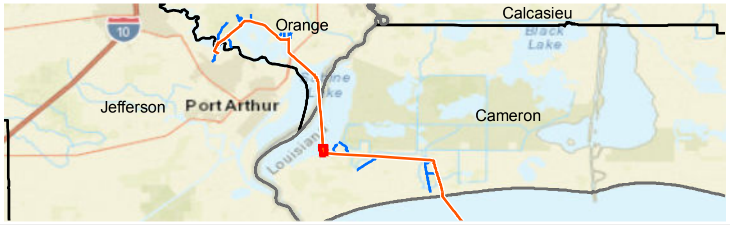
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	27 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- 🟩 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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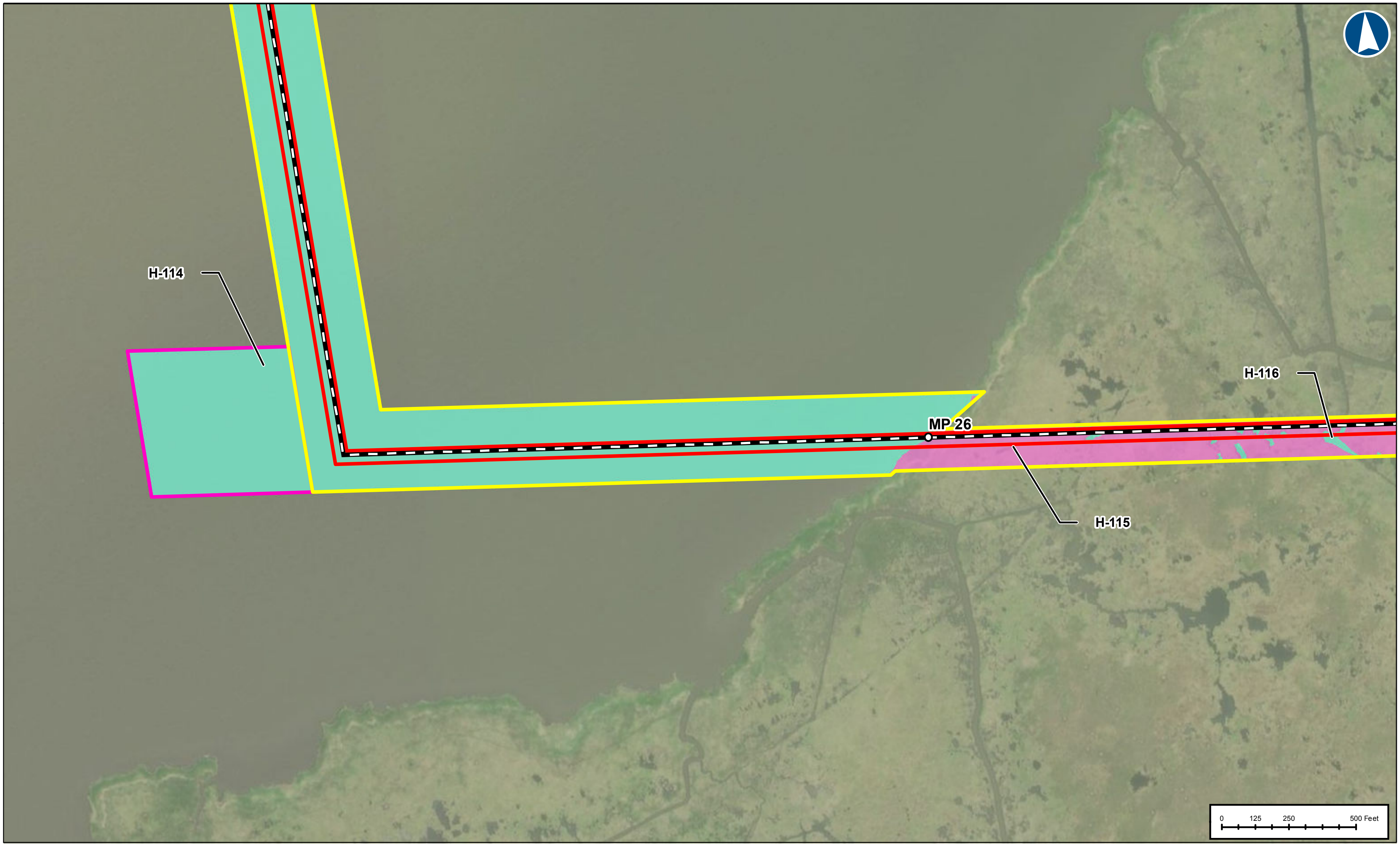
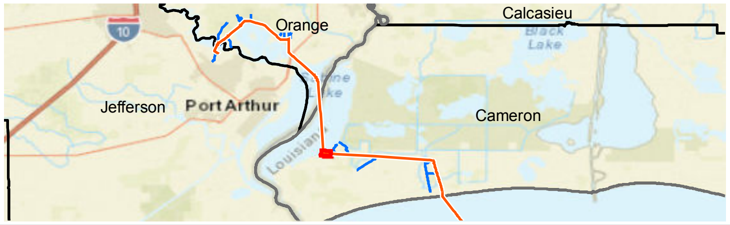
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	28 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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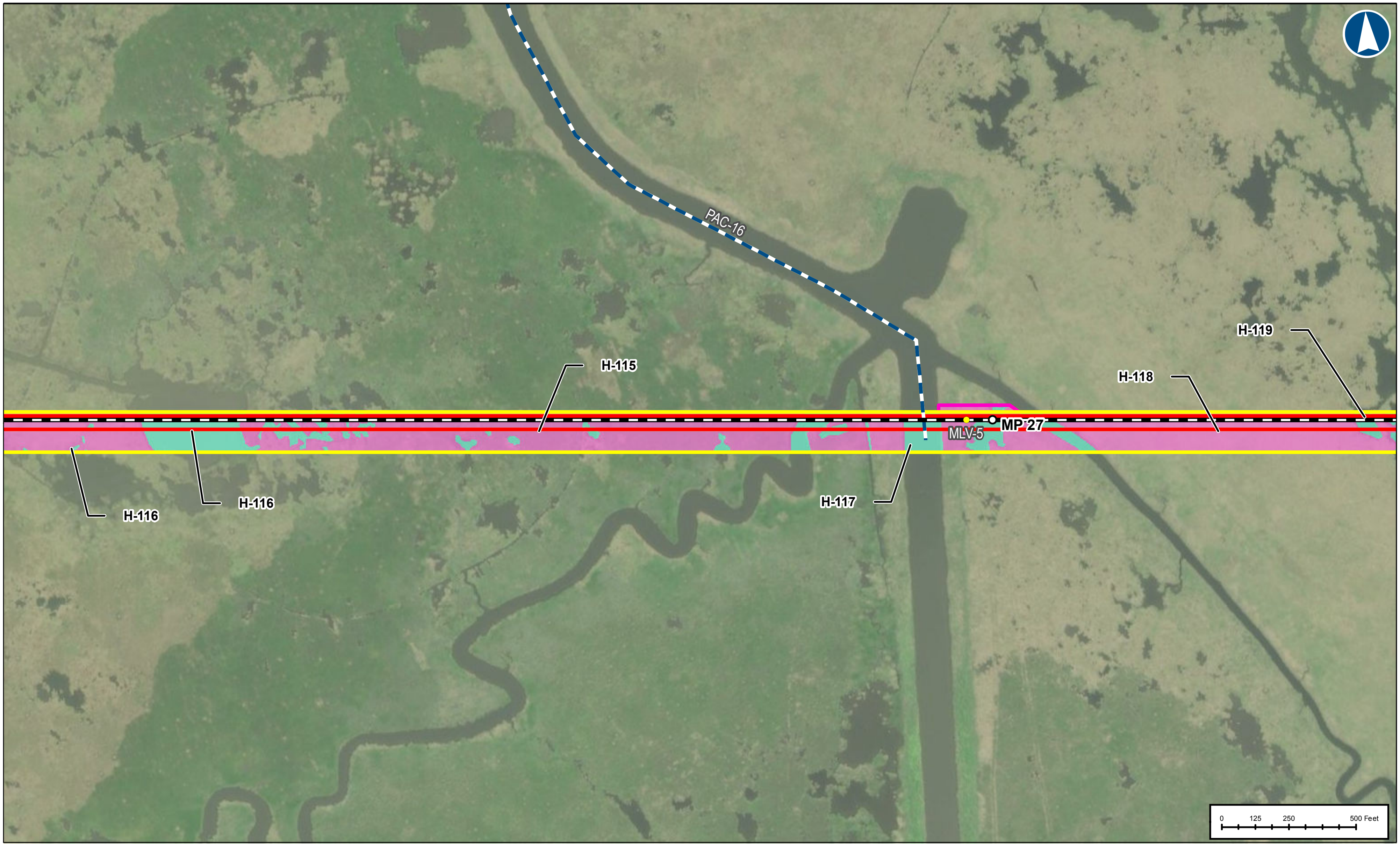
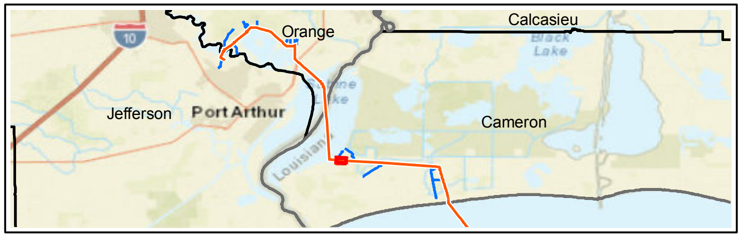
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	29 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○	Proposed Onshore Pipeline Milepost	🟨	Temporay Easement
●	Valve Location	🟪	ATWS
━	Proposed Onshore Pipeline CL	🟩	Estuarine, unvegetated subtidal
━	Project Access Canal	🟪	Estuarine, vegetated intertidal (salt marsh)
🟥	Permanent Easement		

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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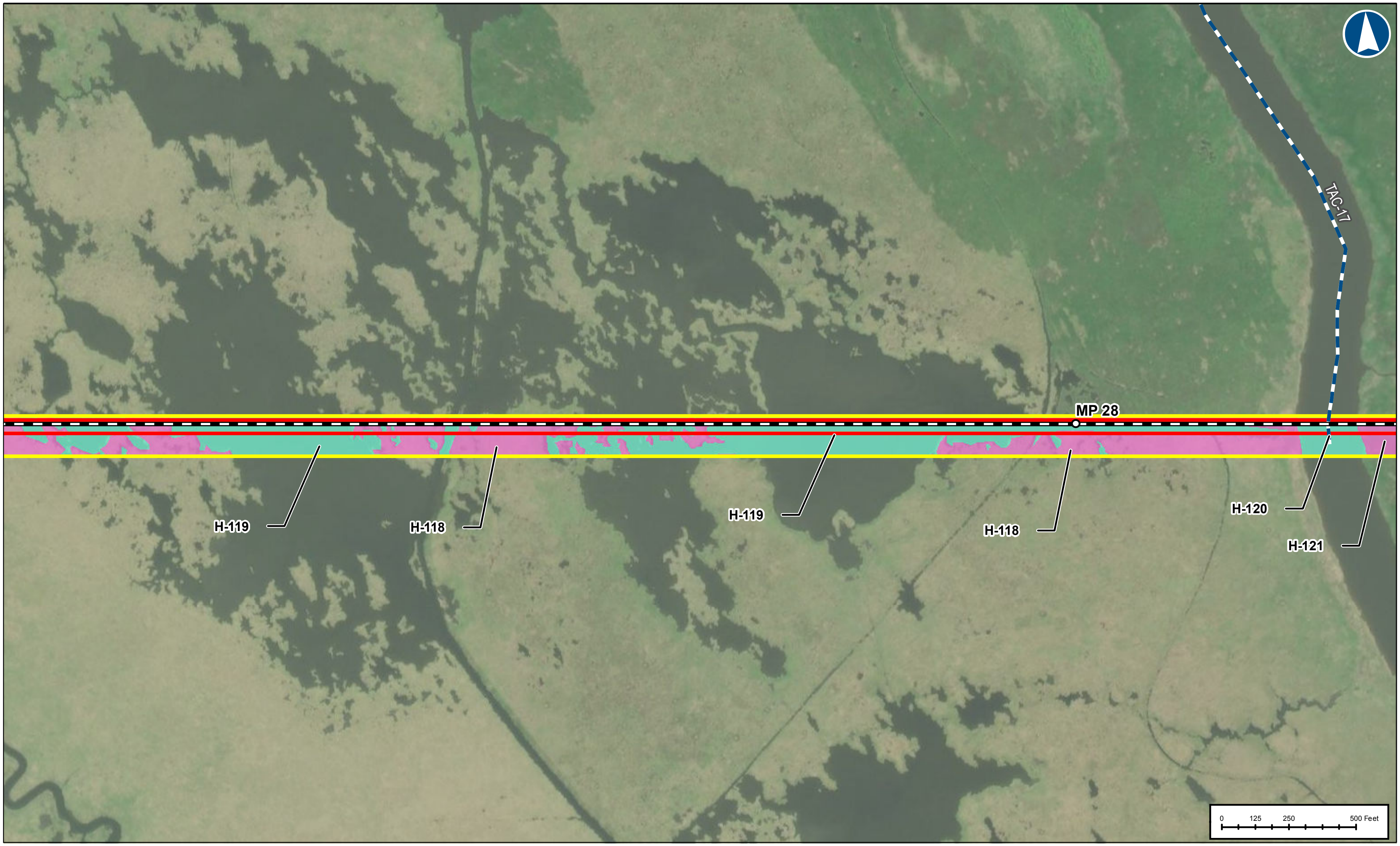
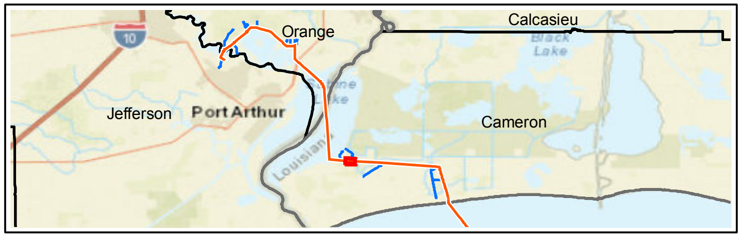
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	30 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
▬ Proposed Onshore Pipeline CL
▬ Project Access Canal
🟥 Permanent Easement
🟨 Temporay Easement
▨ Estuarine, unvegetated subtidal
▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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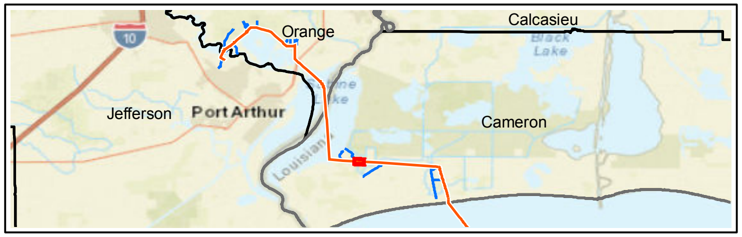
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	31 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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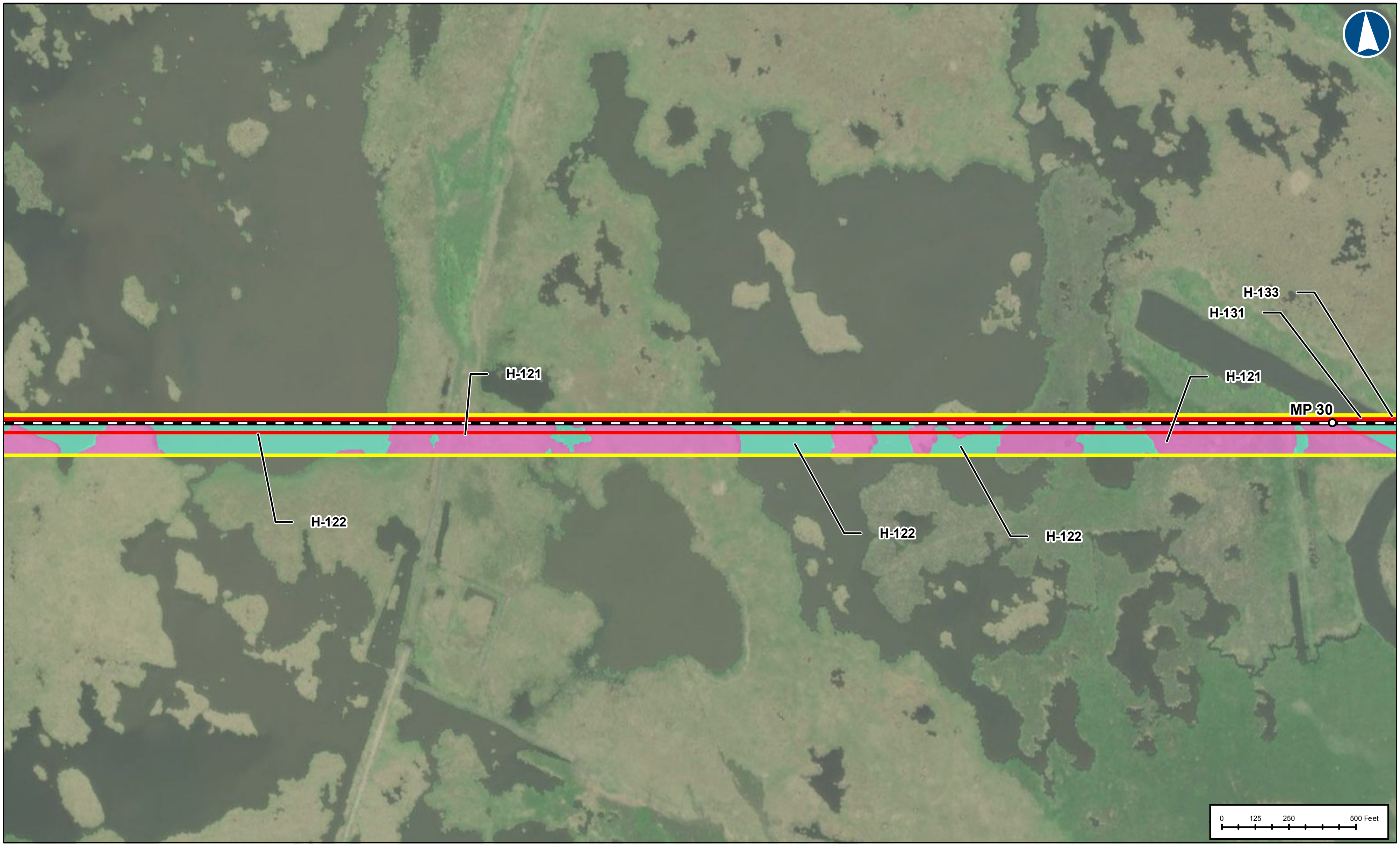
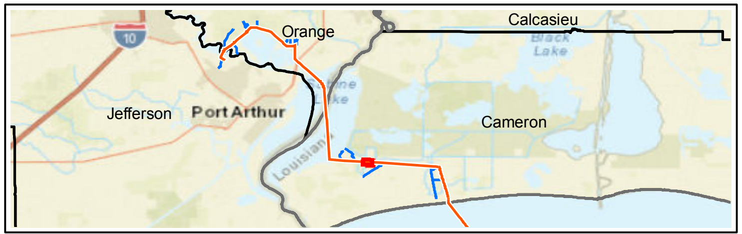
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	32 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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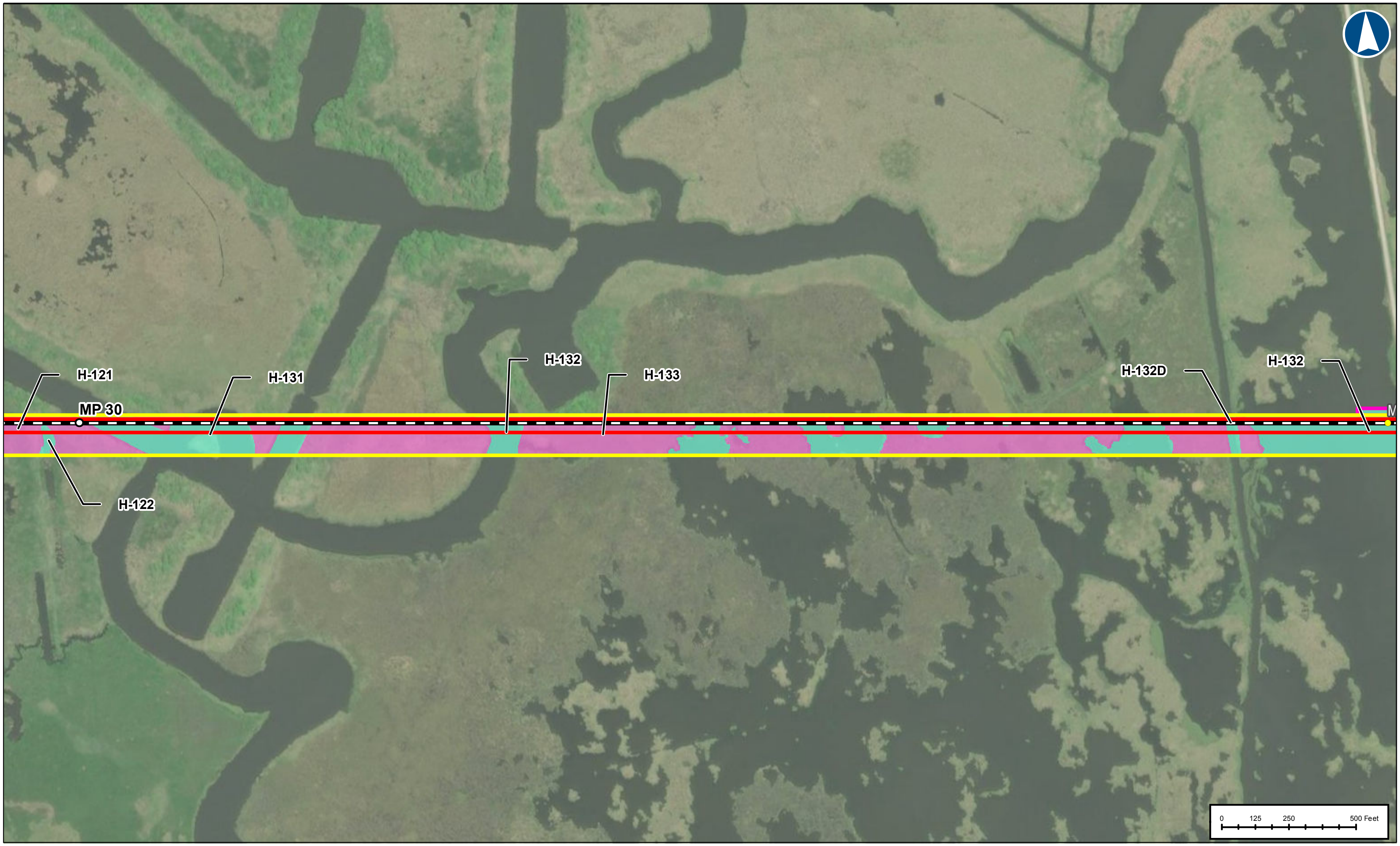
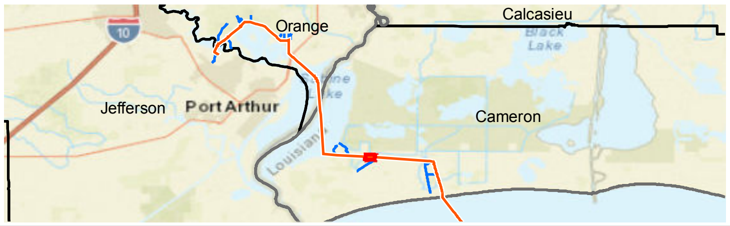
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	33 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ▨ ATWS
- 🟩 Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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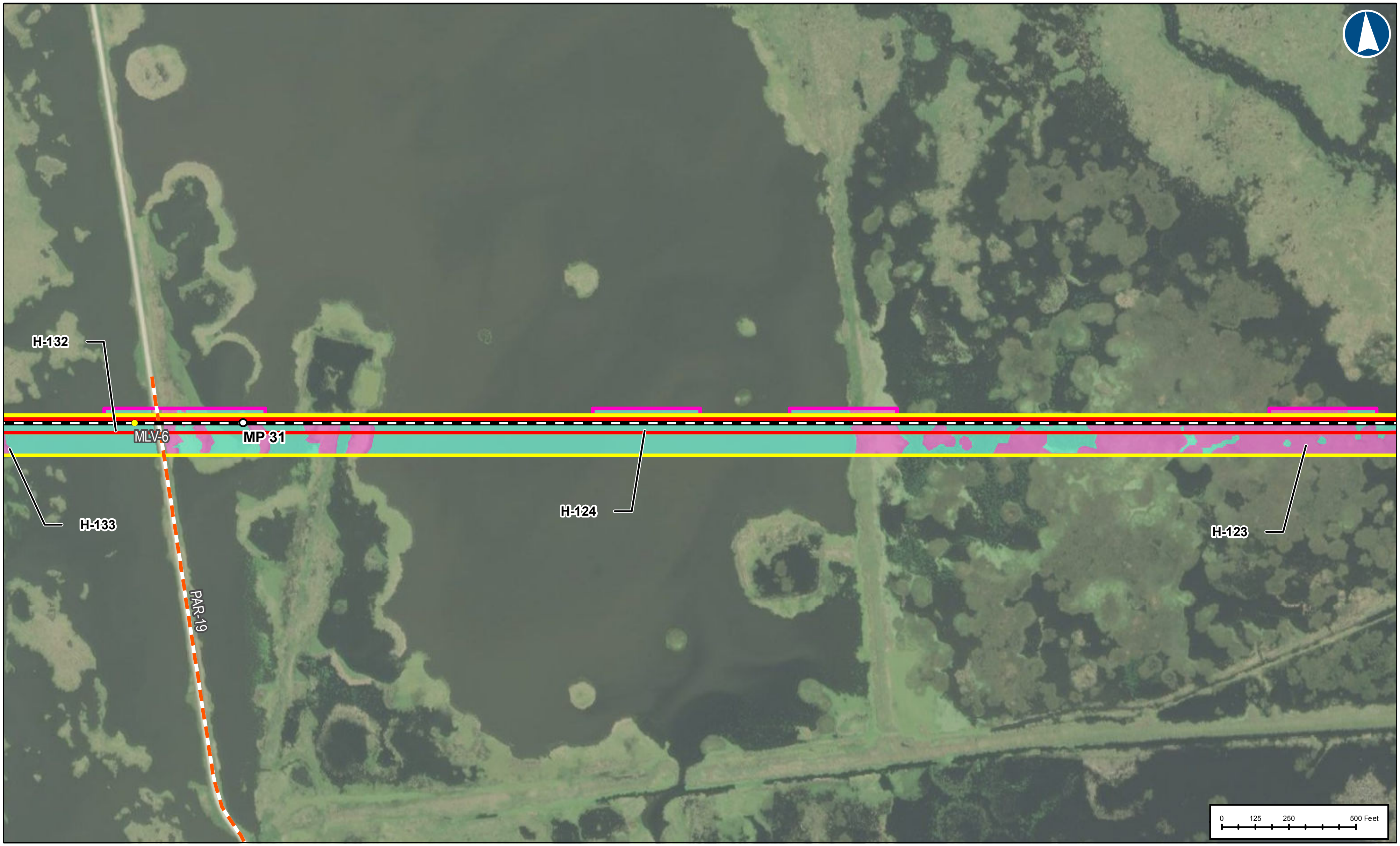
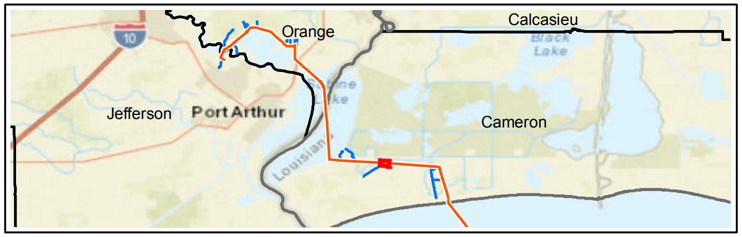
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	34 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○	Proposed Onshore Pipeline Milepost	🟨	Temporay Easement
●	Valve Location	🟪	ATWS
▬	Proposed Onshore Pipeline CL	🟩	Estuarine, unvegetated subtidal
▬	Project Access Road	🟪	Estuarine, vegetated intertidal (salt marsh)
🟥	Permanent Easement		

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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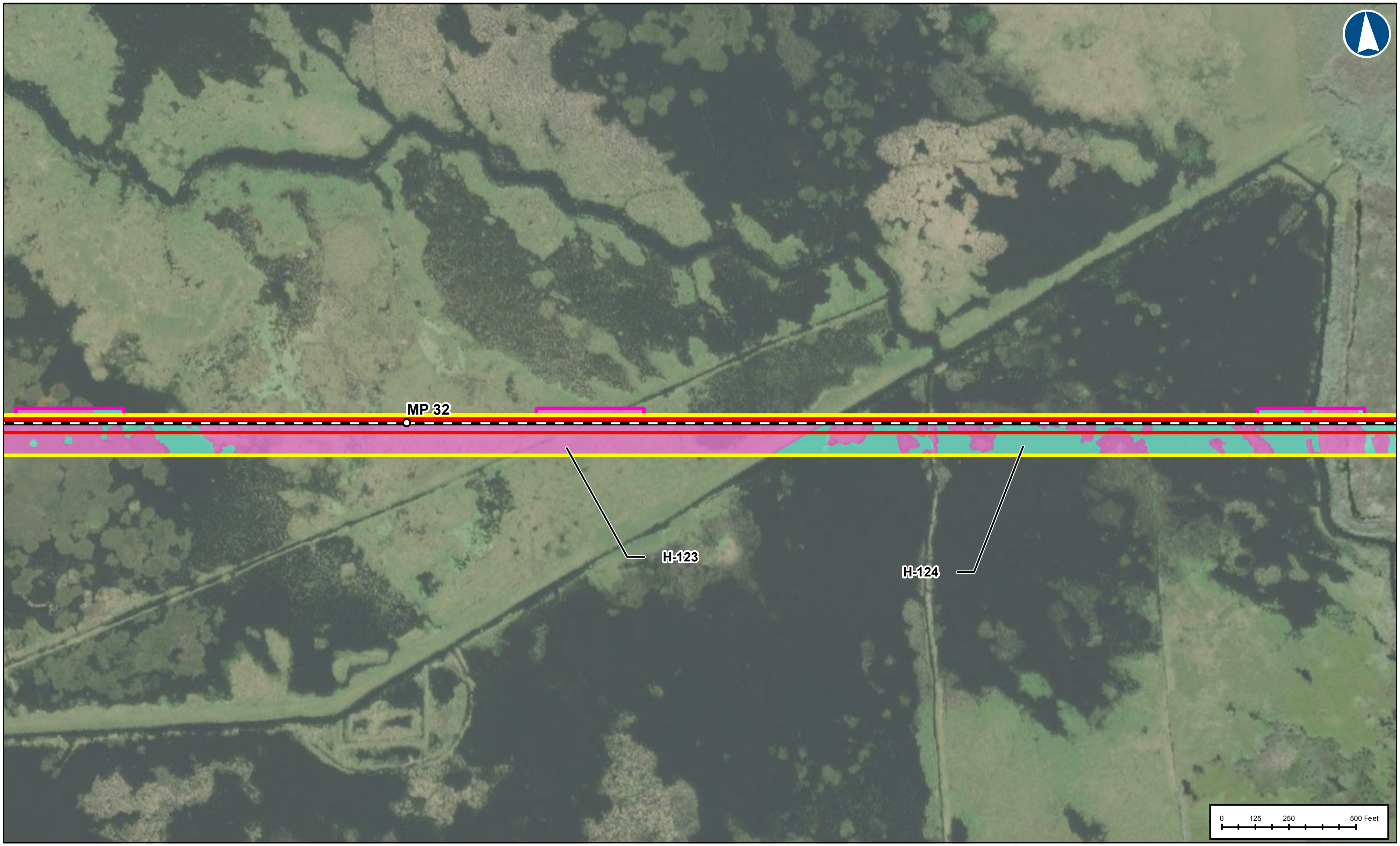
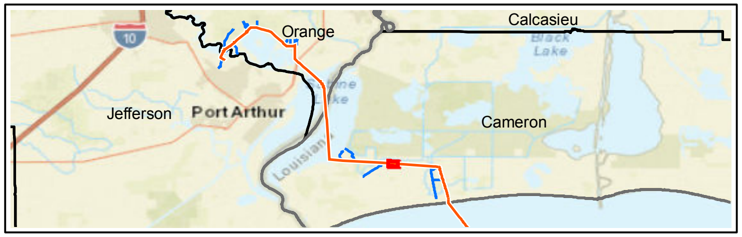
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	35 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
━ Proposed Onshore Pipeline CL
🟥 Permanent Easement
🟨 Temporay Easement
▭ ATWS
🟦 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	**DRAWN BY:**	CW
STATE:	LOUISIANA	**CHECKED BY:**	JZ

PREPARED BY

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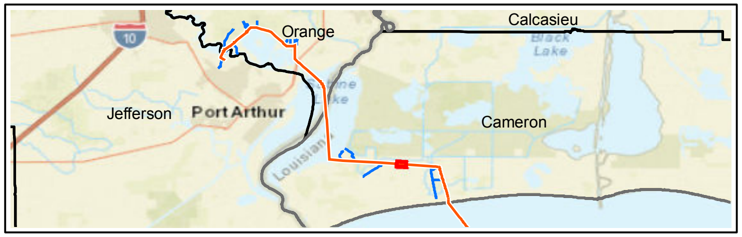
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE
PORT PROJECT

DATE:	2020-08-26	**PROJECTION:**	UTM 15 N
DWG:	0801-06-001	**SHEET:**	36 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost
━ Proposed Onshore Pipeline CL
🟥 Permanent Easement
🟨 Temporay Easement
🟪 ATWS
🟦 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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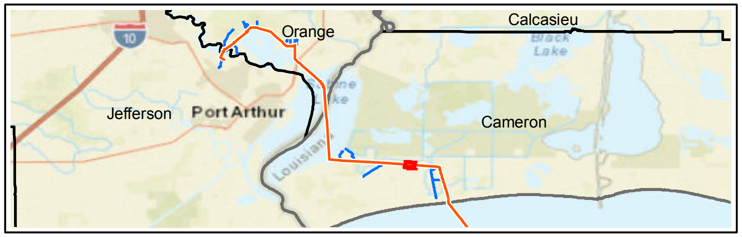
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	37 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ▭ ATWS
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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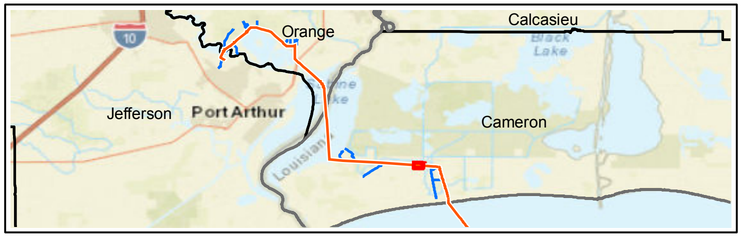
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	38 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ▨ ATWS
- ▨ Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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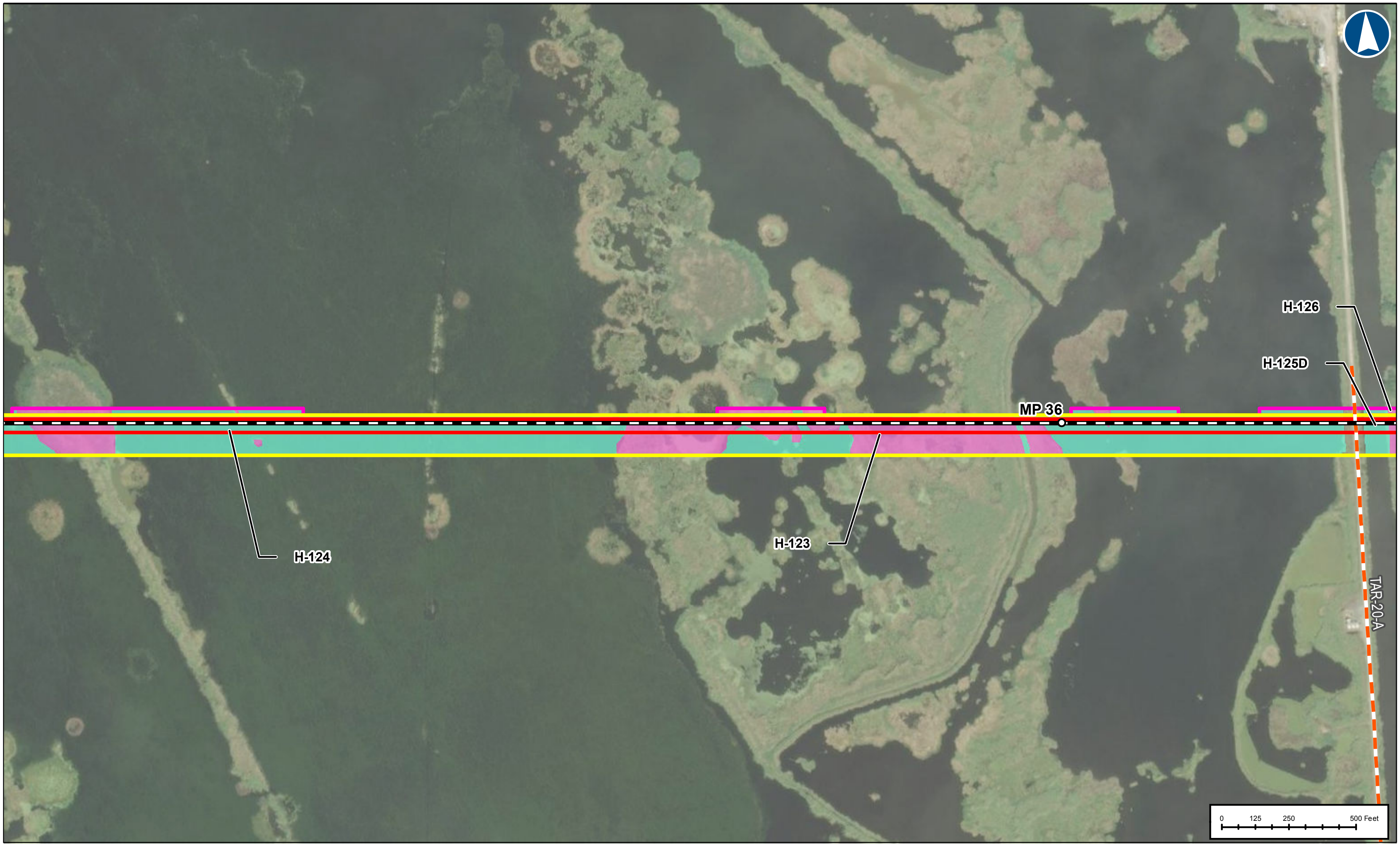
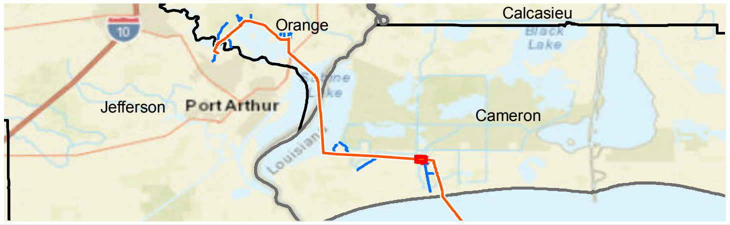
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	39 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Road
🟥 Permanent Easement
🟨 Temporay Easement
🟪 ATWS
🟩 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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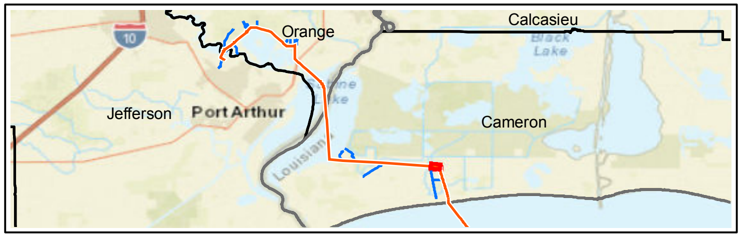
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	40 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost
● Existing Pipeline Milepost
● Valve Location
▬ Proposed Onshore Pipeline CL
▬ Existing Stingray Pipeline To Be Converted to Oil Service
▬ Project Access Road
▭ Existing Permanent Easement / Facility for Use
▭ Permanent Easement
▭ Temporay Easement
▭ ATWS
▨ Existing Permanent Easement (No Impact)
🟦 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	*DRAWN BY:*	CW
STATE:	LOUISIANA	*CHECKED BY:*	JZ
DATE:	2020-08-26	*PROJECTION:*	UTM 15 N

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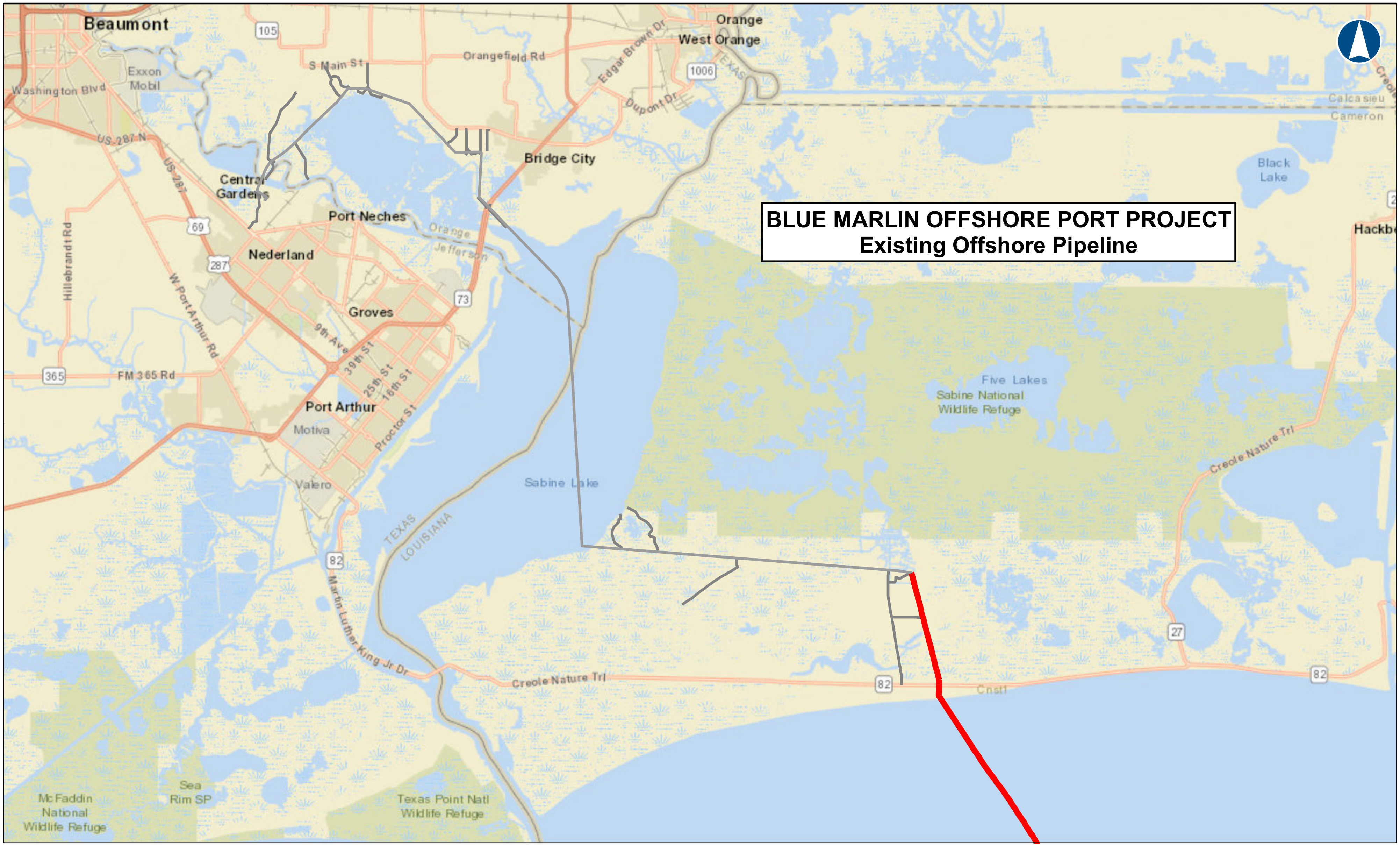
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	*SHEET:*	41 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Existing Offshore Pipeline

BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

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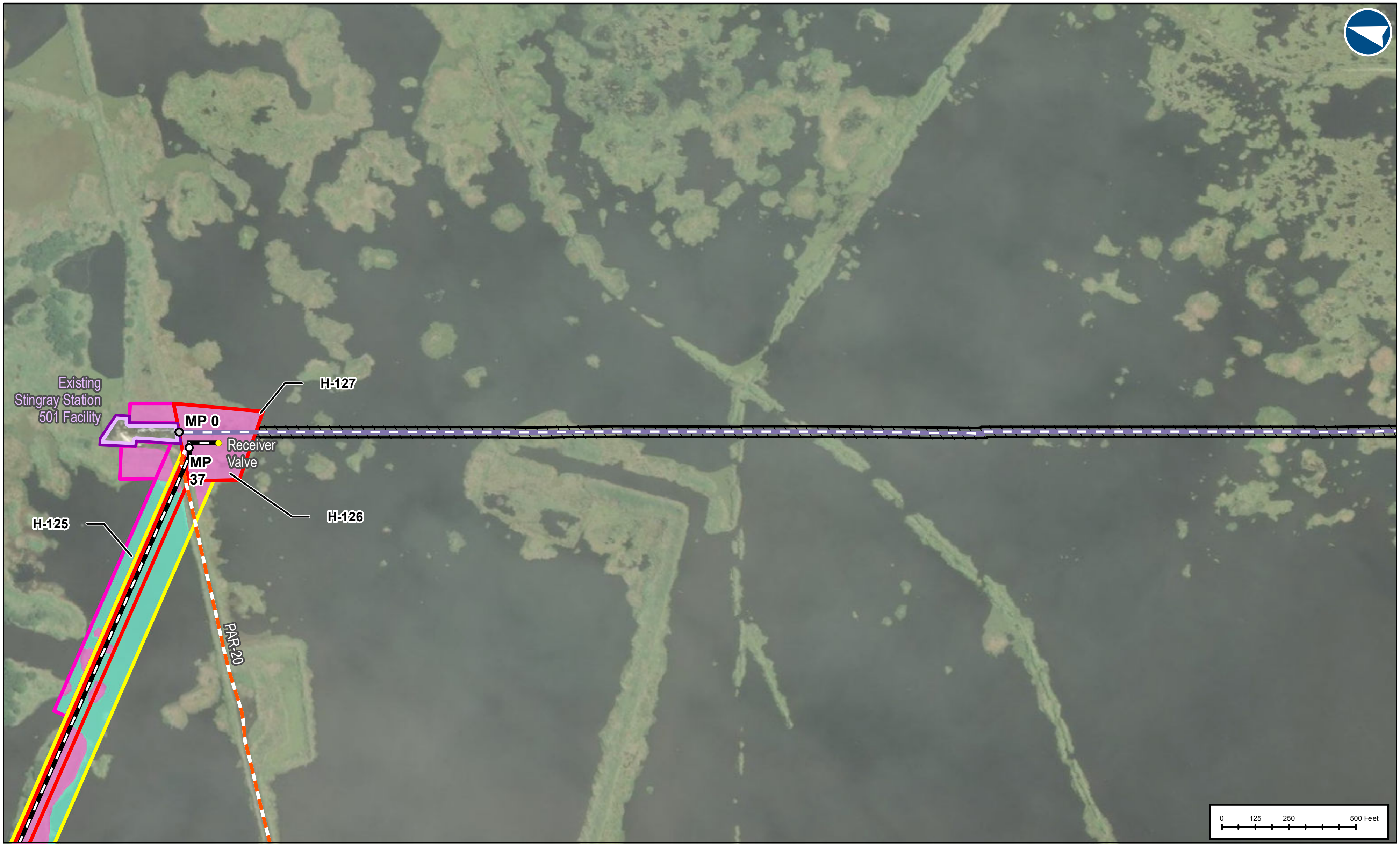
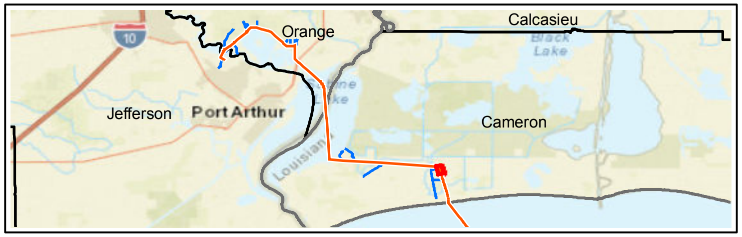
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○	Proposed Onshore Pipeline Milepost	🟥	Permanent Easement
●	Existing Pipeline Milepost	🟨	Temporay Easement
●	Valve Location	🟪	ATWS
▬	Proposed Onshore Pipeline CL	▨	Existing Permanent Easement (No Impact)
▬	Existing Stingray Pipeline To Be Converted to Oil Service	🟩	Estuarine, unvegetated subtidal
▬	Project Access Road	🟪	Estuarine, vegetated intertidal (salt marsh)
🟪	Existing Permanent Easement / Facility for Use		

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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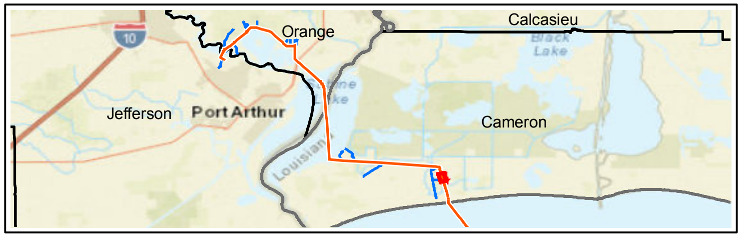
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	42 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Existing Pipeline Milepost
- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ▬ Project Access Road
- ▭ Existing Permanent Easement / Facility for Use
- ▭ ATWS
- ▨ Existing Permanent Easement (No Impact)
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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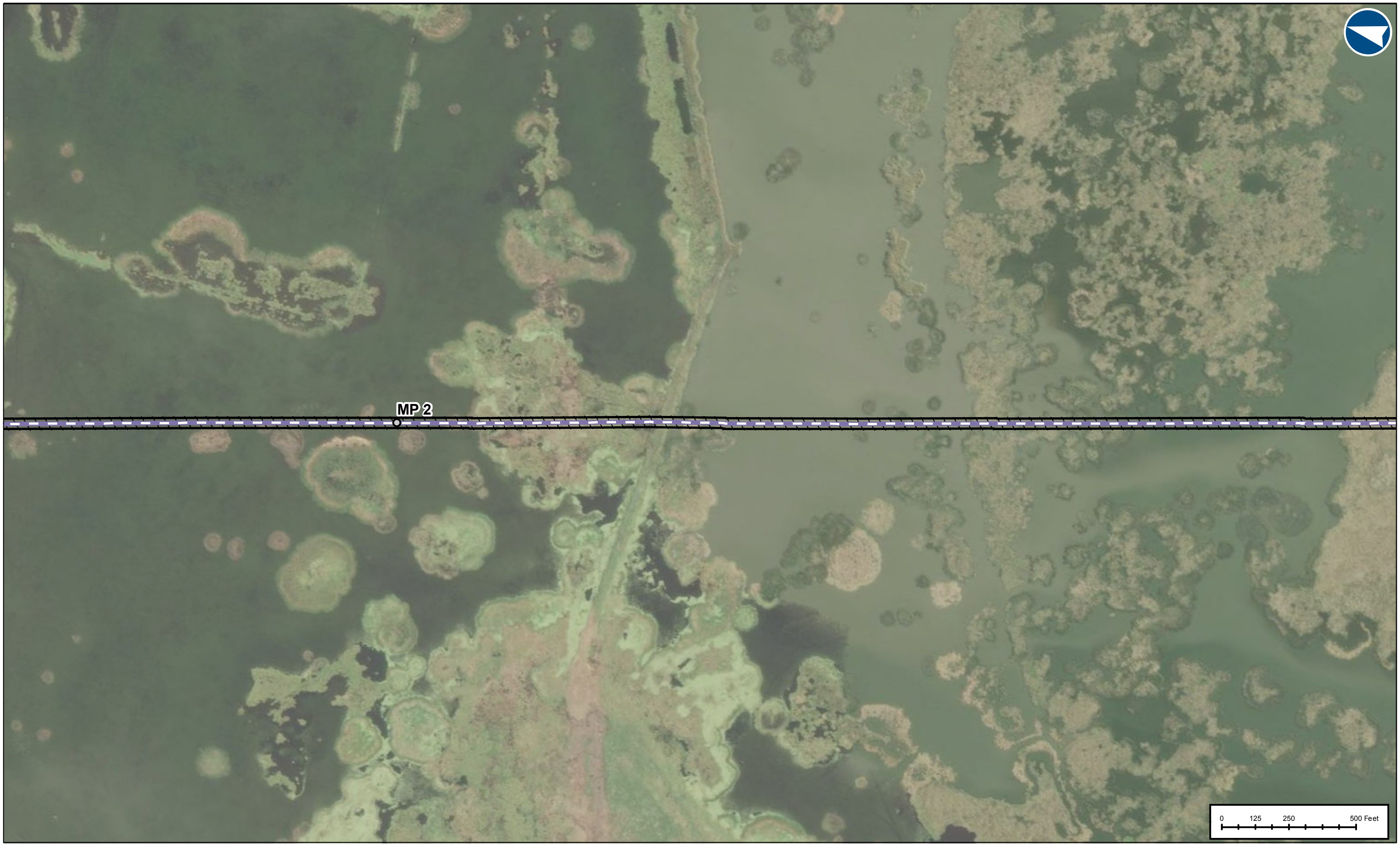
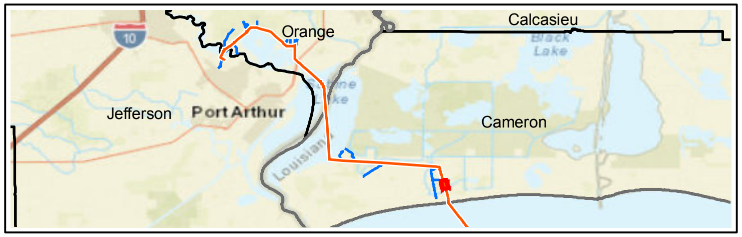
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	43 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Existing Pipeline Milepost

▬ Existing Stingray Pipeline To Be Converted to Oil Service

▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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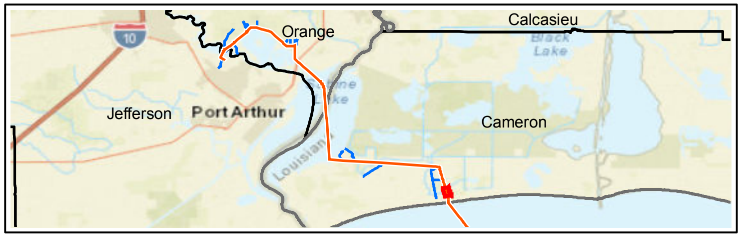
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	44 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Existing Pipeline Milepost
- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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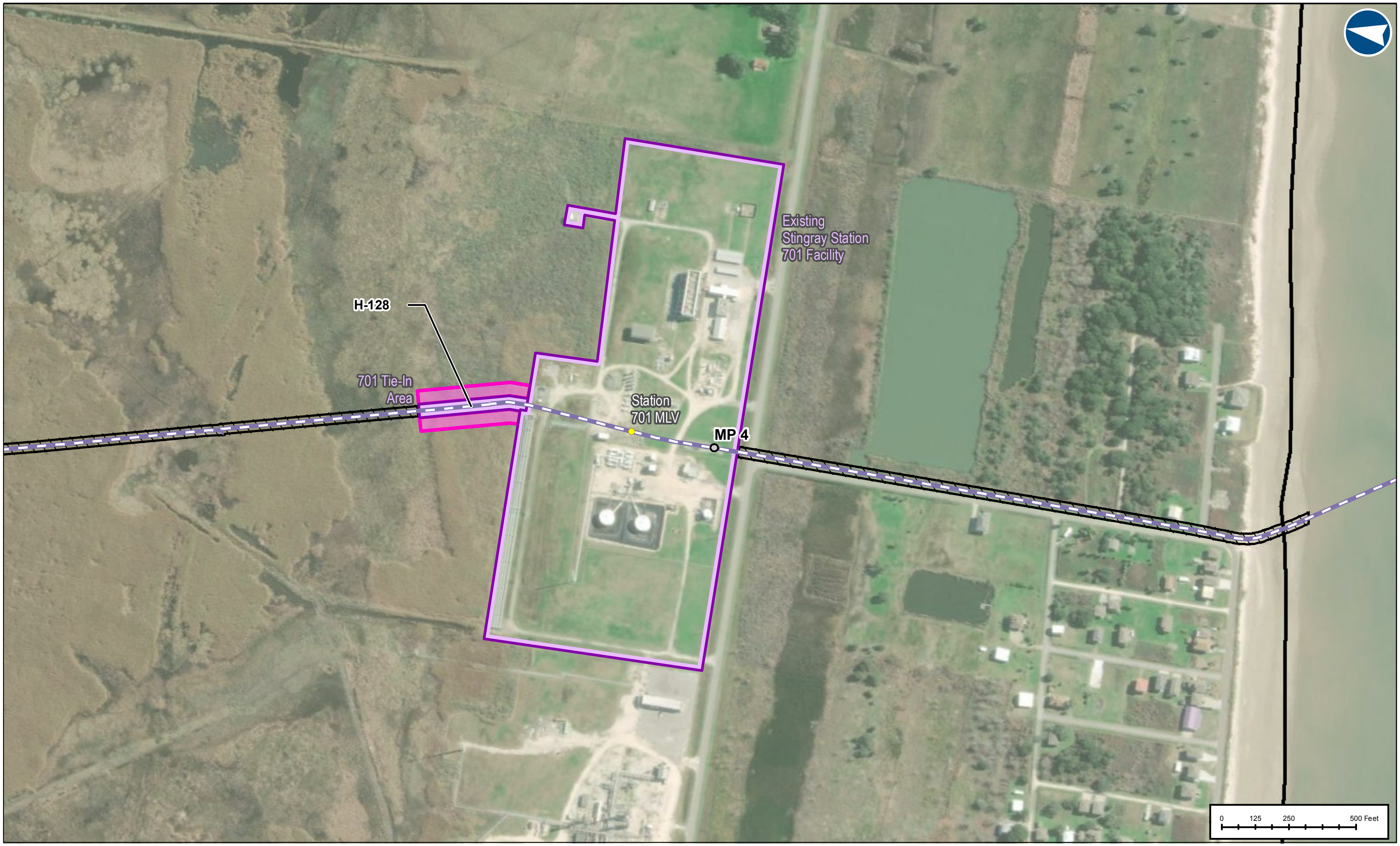
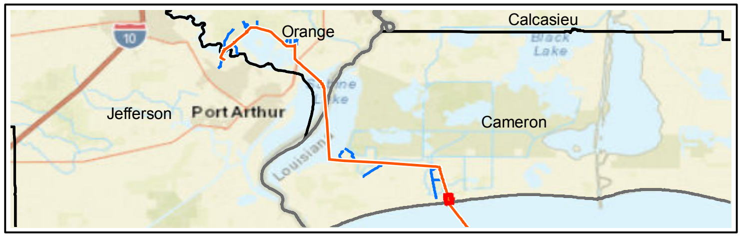
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	45 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Existing Pipeline Milepost
● Valve Location
▬ Existing Stingray Pipeline To Be Converted to Oil Service
▭ Existing Permanent Easement / Facility for Use
▭ ATWS
▨ Existing Permanent Easement (No Impact)
▬ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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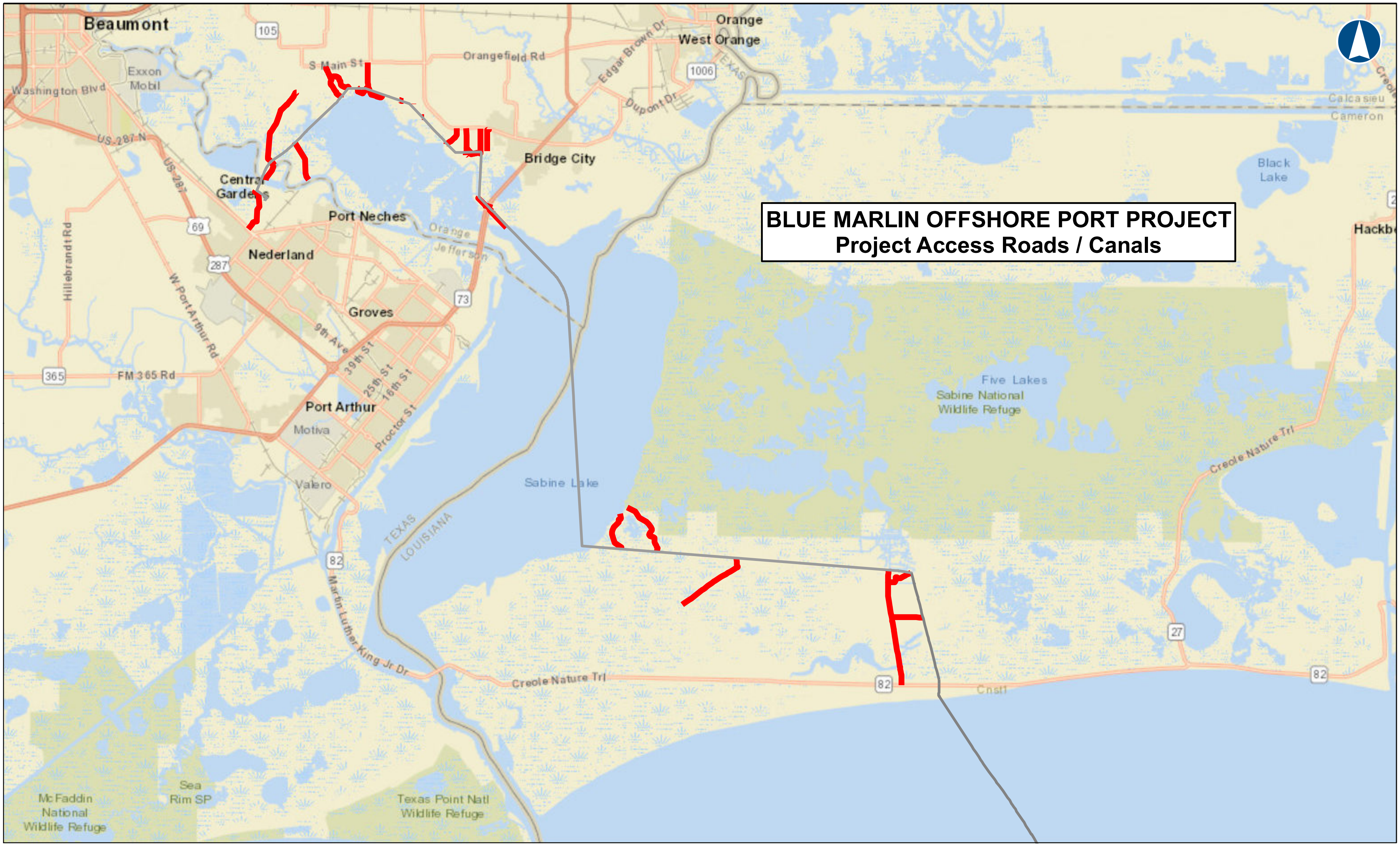
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	46 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Project Access Roads / Canals

BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

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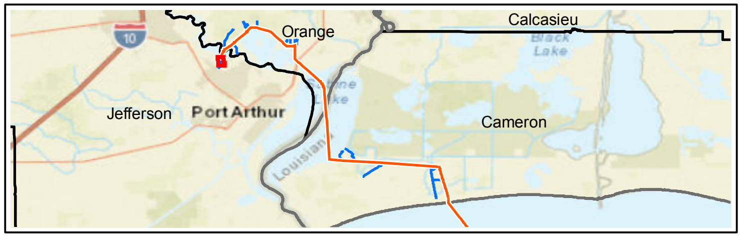
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ● Valve Location
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Road
- ☐ HDD Easement (Avoidance)
- ☐ Existing Permanent Easement / Facility for Use
- ☐ Permanent Easement
- ☐ Temporay Easement
- ☐ ATWS
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟪 PSS Wetland
- ☐ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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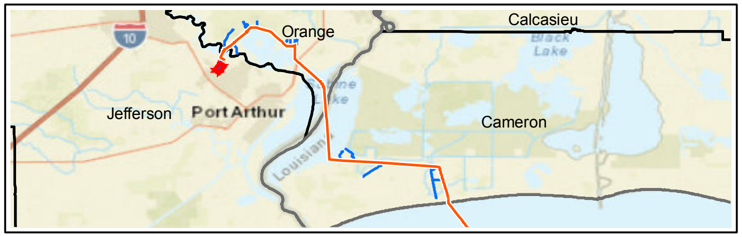
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	47 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ▬ Project Access Road
- ▭ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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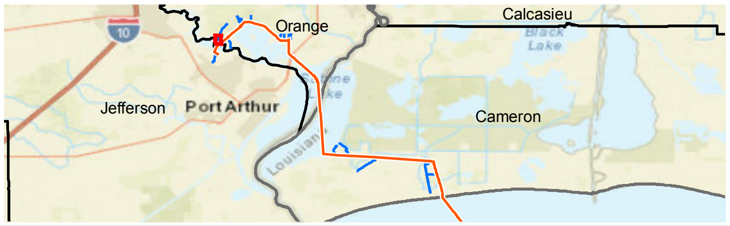
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	48 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- Proposed Onshore Pipeline CL
- Project Access Road
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- ⬜ Permanent Access Road Easement
- 🟩 PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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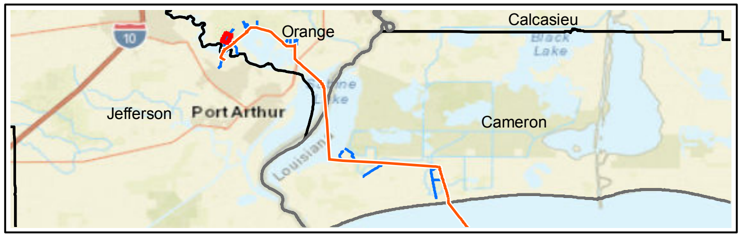
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	49 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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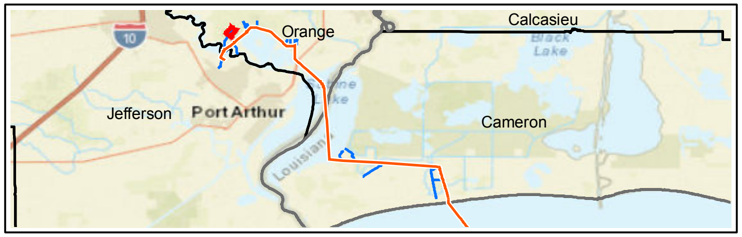
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	50 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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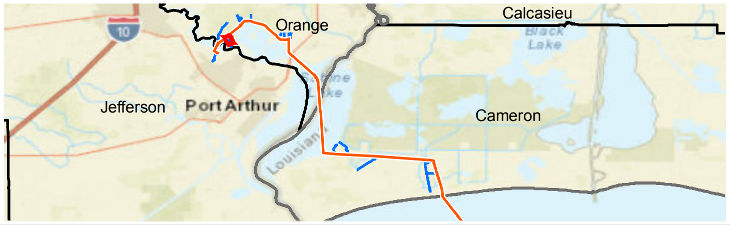
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	51 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost
━ Proposed Onshore Pipeline CL
╍ Project Access Canal
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporay Easement
▢ ATWS
▨ Estuarine, unvegetated subtidal
▨ Estuarine, vegetated intertidal (salt marsh)
🟩 PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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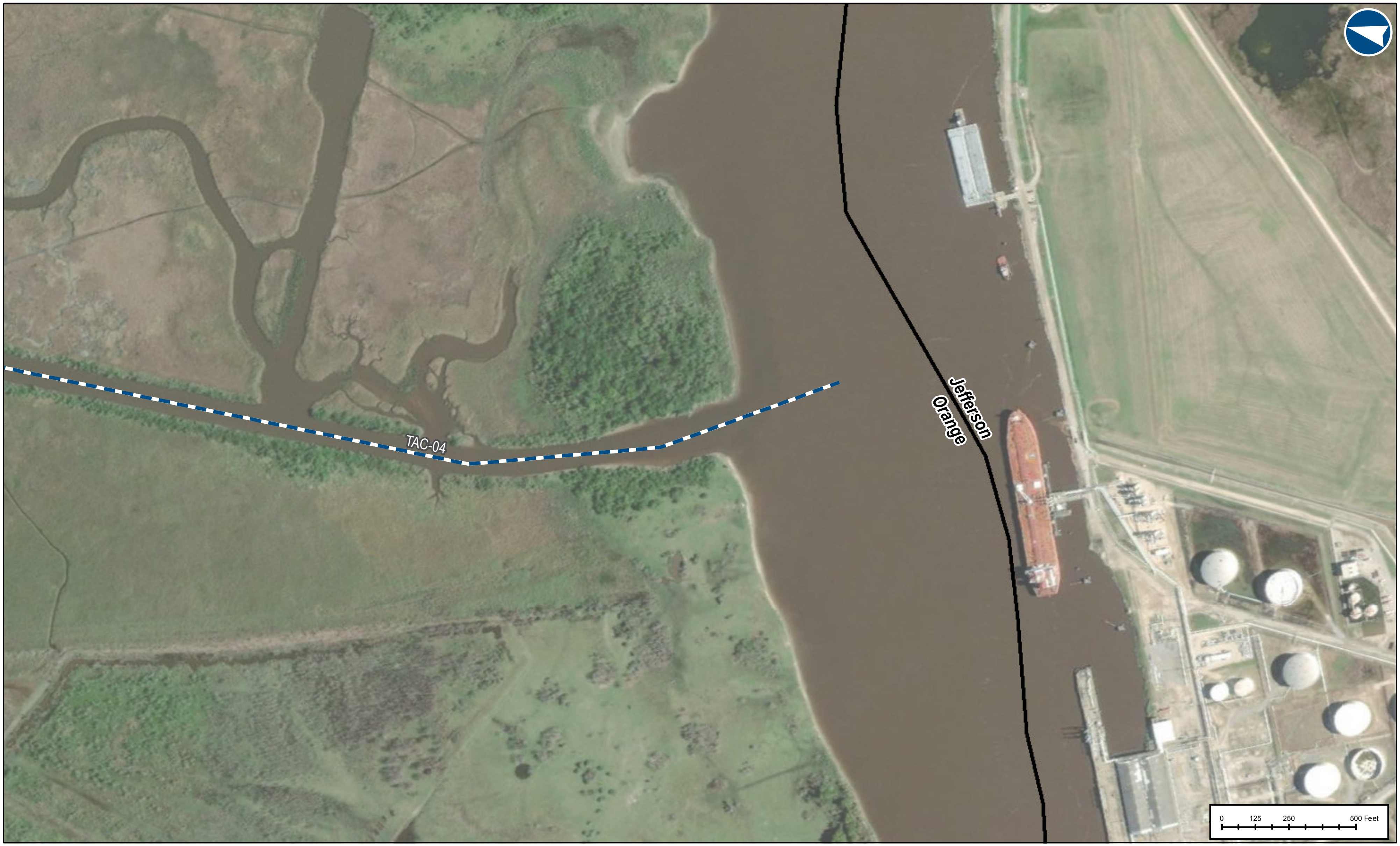
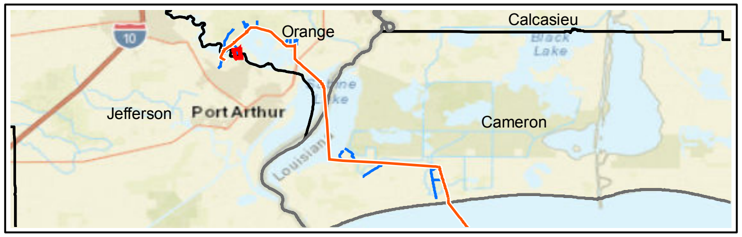
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	52 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- - - Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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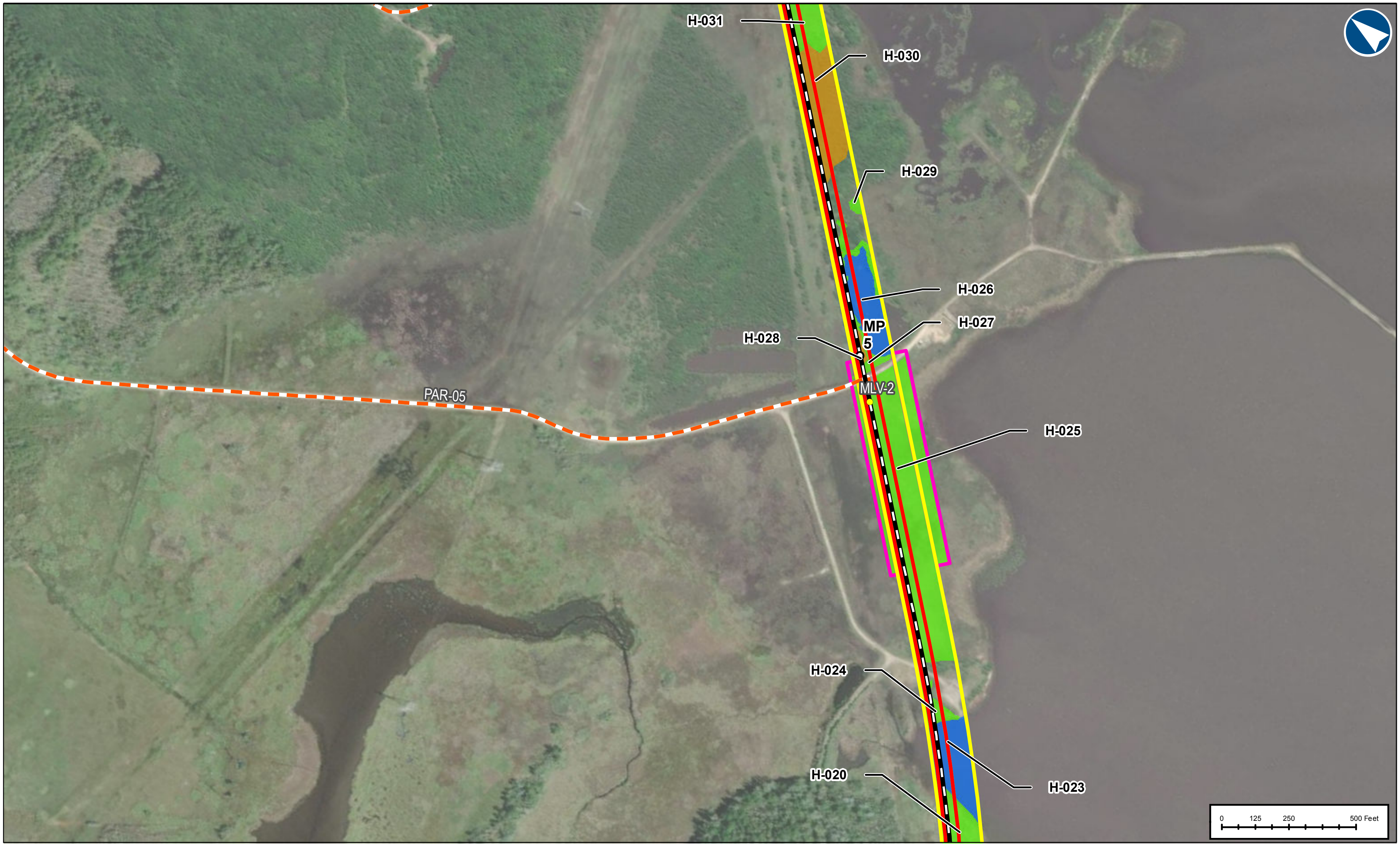
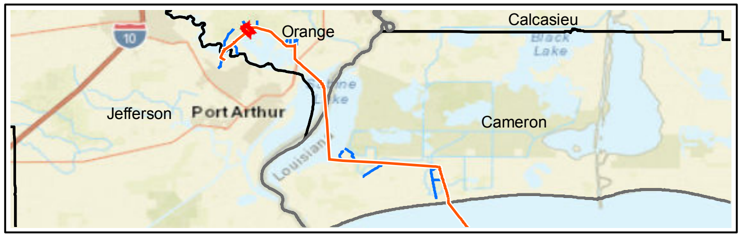
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	53 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost

● Valve Location

▬ Proposed Onshore Pipeline CL

▬ Project Access Road

🟥 Permanent Easement

🟨 Temporay Easement

▢ ATWS

▢ Permanent Access Road Easement

🟦 Waterbody

🟩 PEM Wetland

🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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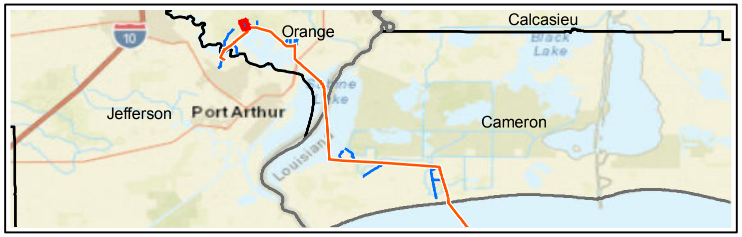
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	54 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- - - Project Access Road

▭ ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH: ORANGE	DRAWN BY: CW
STATE: TEXAS	CHECKED BY: JZ

DATE: 2020-08-26 **PROJECTION:** UTM 15 N

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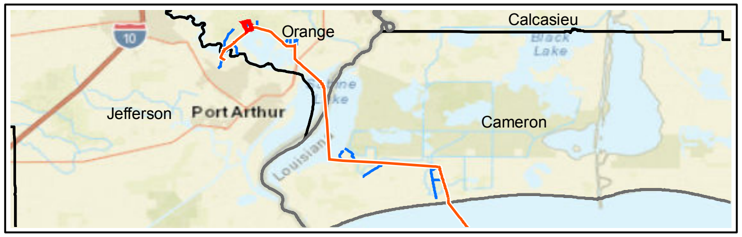
BLUE MARLIN OFFSHORE PORT PROJECT

DWG: 0801-06-001 **SHEET:** 55 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



▬	Proposed Onshore Pipeline CL	🟪	ATWS
▬	Project Access Road	🟦	Waterbody
🟥	Permanent Easement	🟩	PEM Wetland
🟨	Temporay Easement	🟧	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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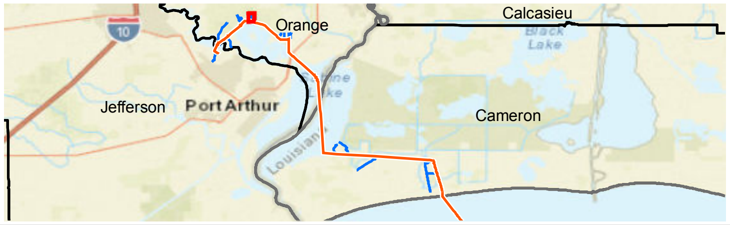
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	56 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



○ Proposed Onshore Pipeline Milepost
━ Proposed Onshore Pipeline CL
╍ Project Access Road
🟥 Permanent Easement
🟨 Temporay Easement
▭ ATWS
🟦 Waterbody
🟩 PEM Wetland
🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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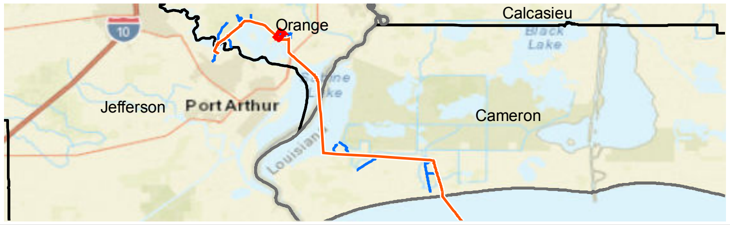
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	57 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



▬	Proposed Onshore Pipeline CL
▬	Project Access Road
☐	HDD Easement (Avoidance)
🟥	Permanent Easement
🟨	Temporay Easement
🟪	ATWS
🟦	Waterbody
🟩	PEM Wetland
🟧	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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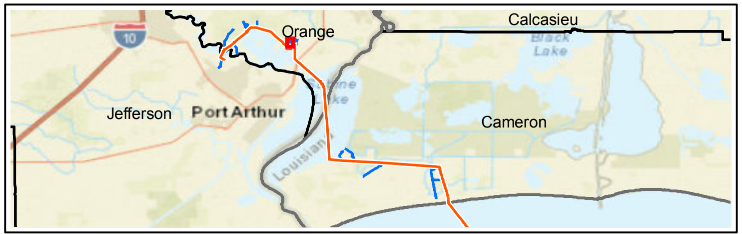
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	58 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Road
- ☐ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ☐ ATWS
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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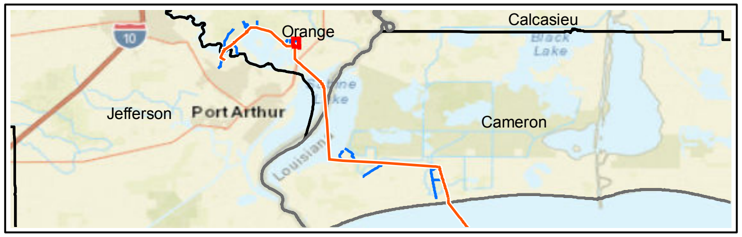
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	59 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ATWS
- Permanent Access Road Easement
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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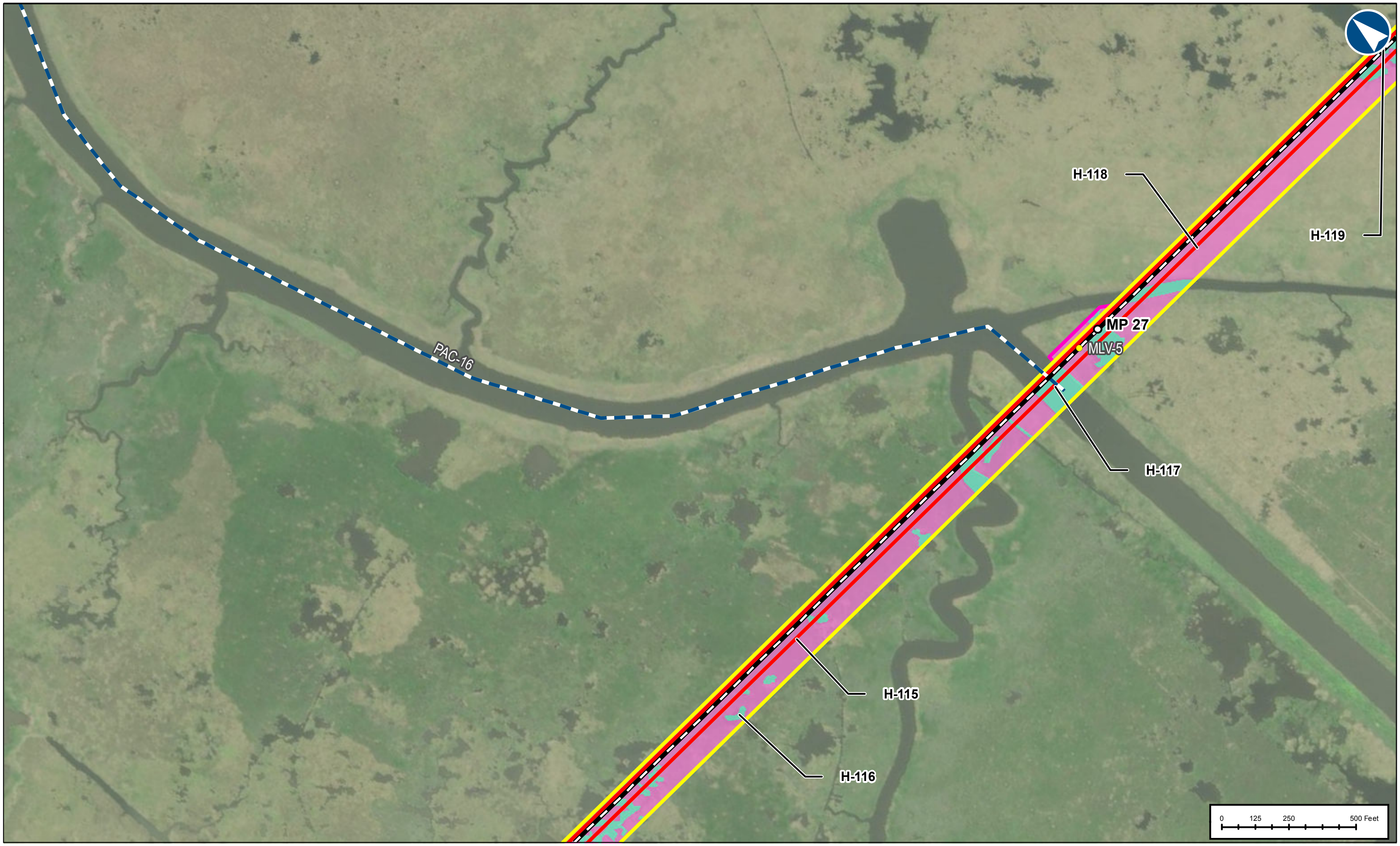
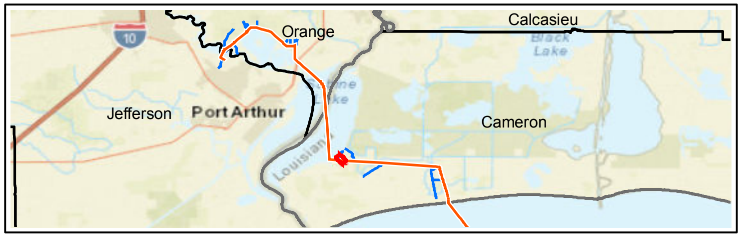
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	60 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost	🟨 Temporay Easement
● Valve Location	▢ ATWS
━ Proposed Onshore Pipeline CL	🟩 Estuarine, unvegetated subtidal
╌ Project Access Canal	🟪 Estuarine, vegetated intertidal (salt marsh)
🟥 Permanent Easement	

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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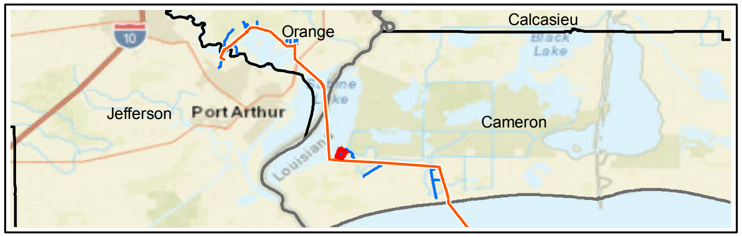
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	61 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- - - Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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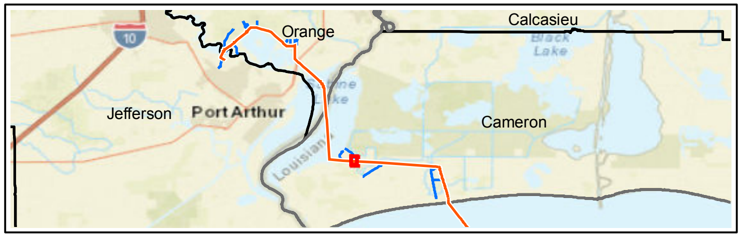
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	62 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Canal
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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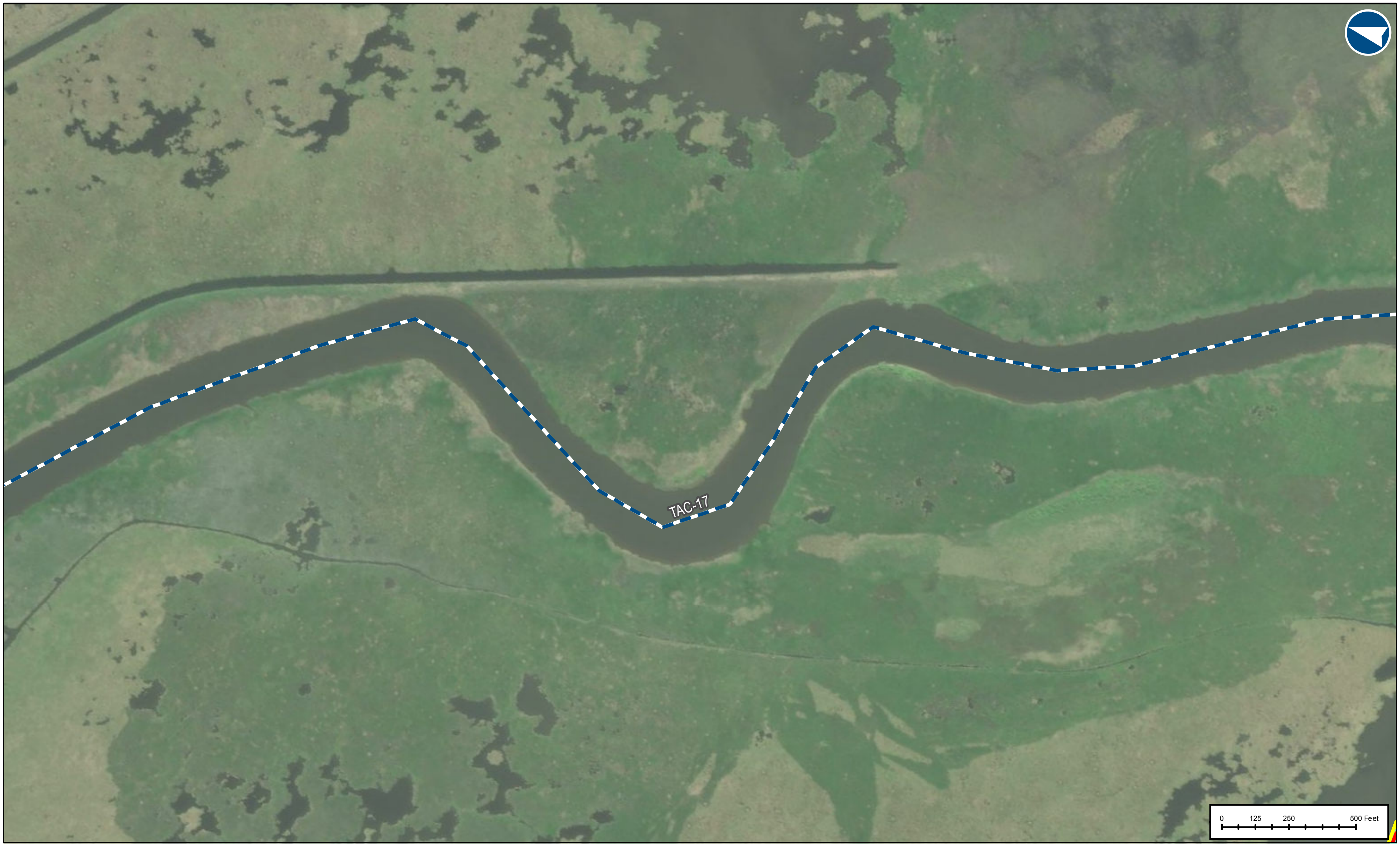
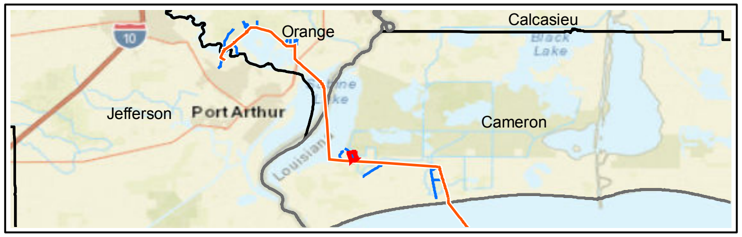
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	63 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- ▬ ▬ Project Access Canal
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟦 Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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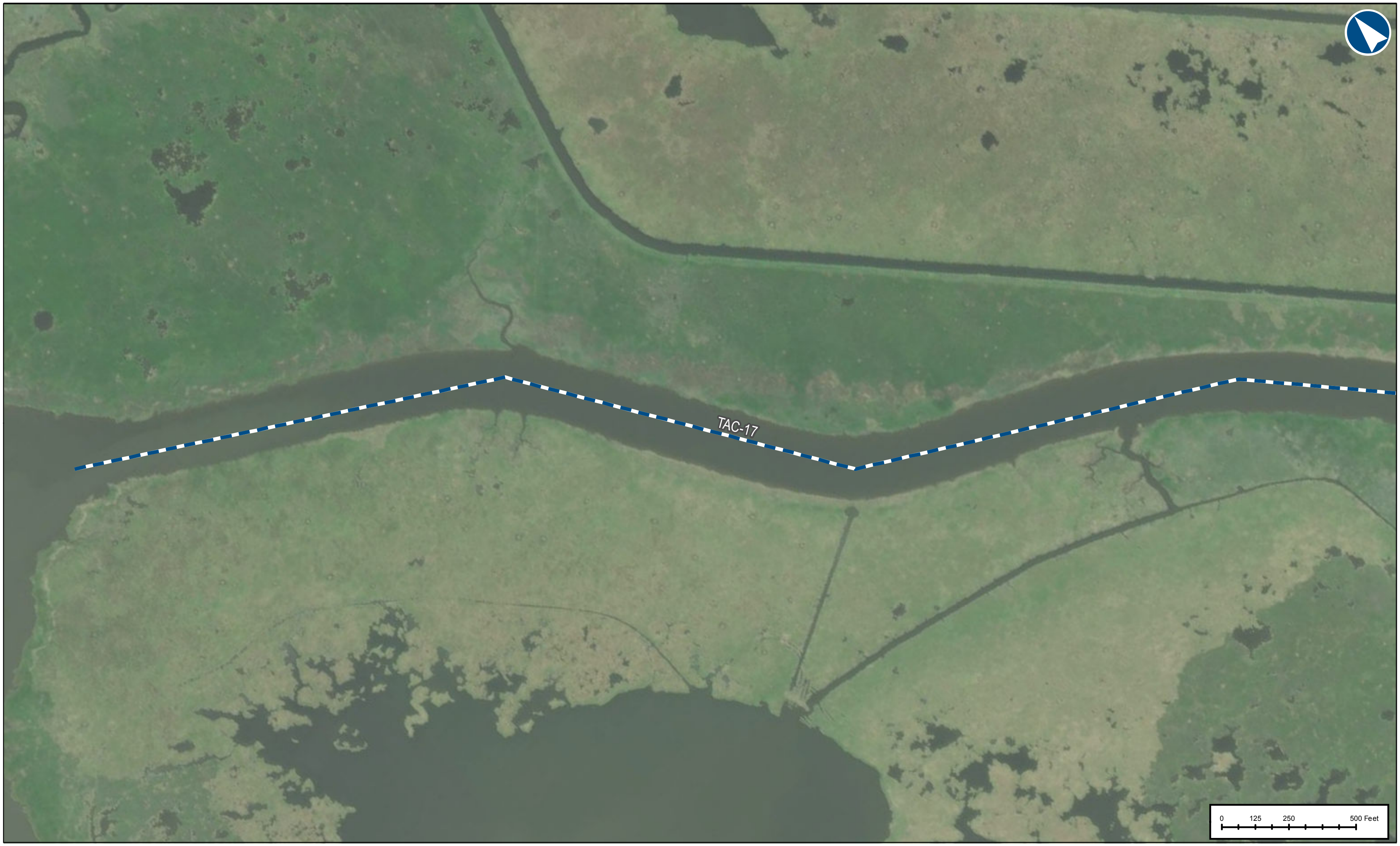
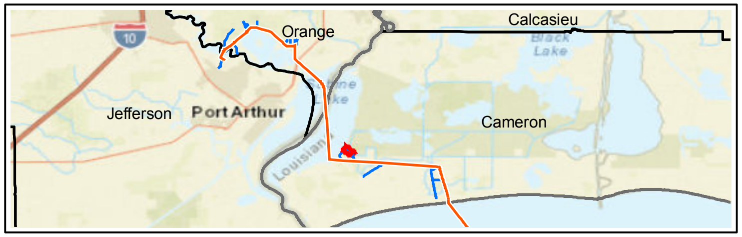
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	64 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- - - Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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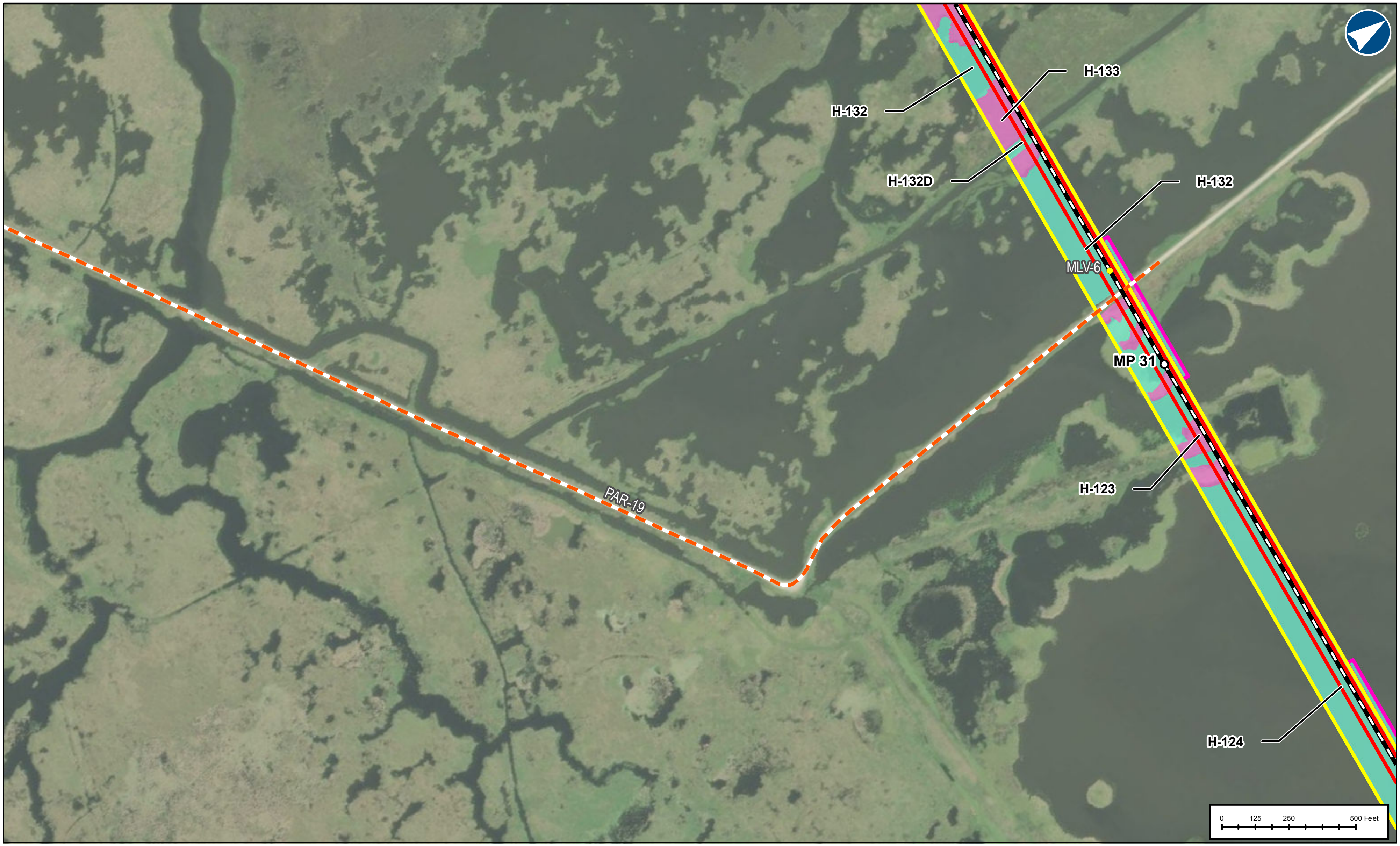
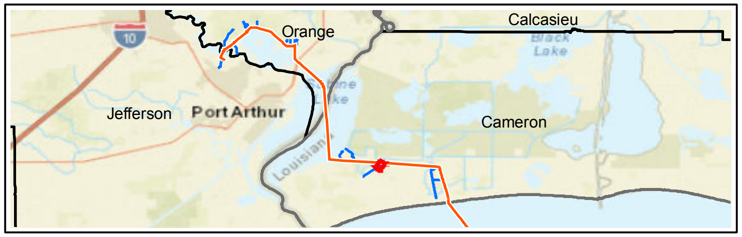
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	65 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Road
▭ Permanent Easement
▭ Temporay Easement
▭ ATWS
🟩 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	*DRAWN BY:*	CW
STATE:	LOUISIANA	*CHECKED BY:*	JZ
DATE:	2020-08-26	*PROJECTION:*	UTM 15 N

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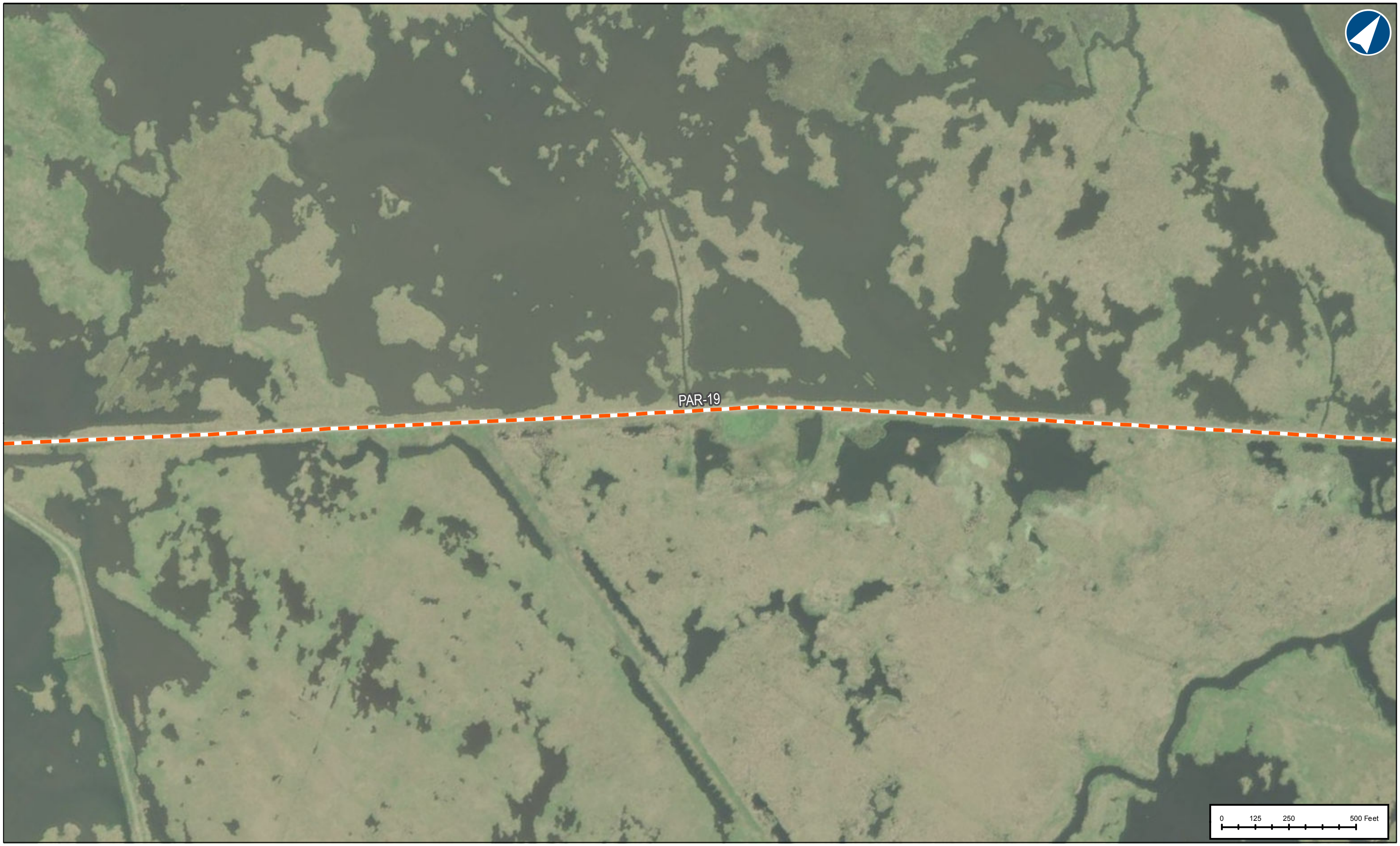
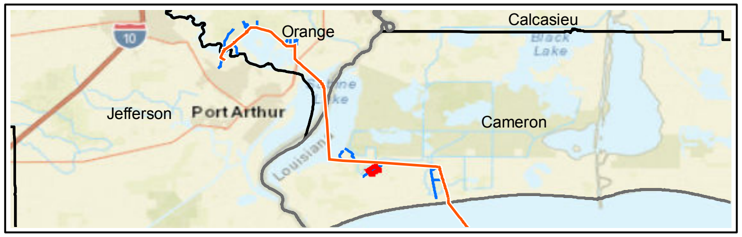
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	*SHEET:*	66 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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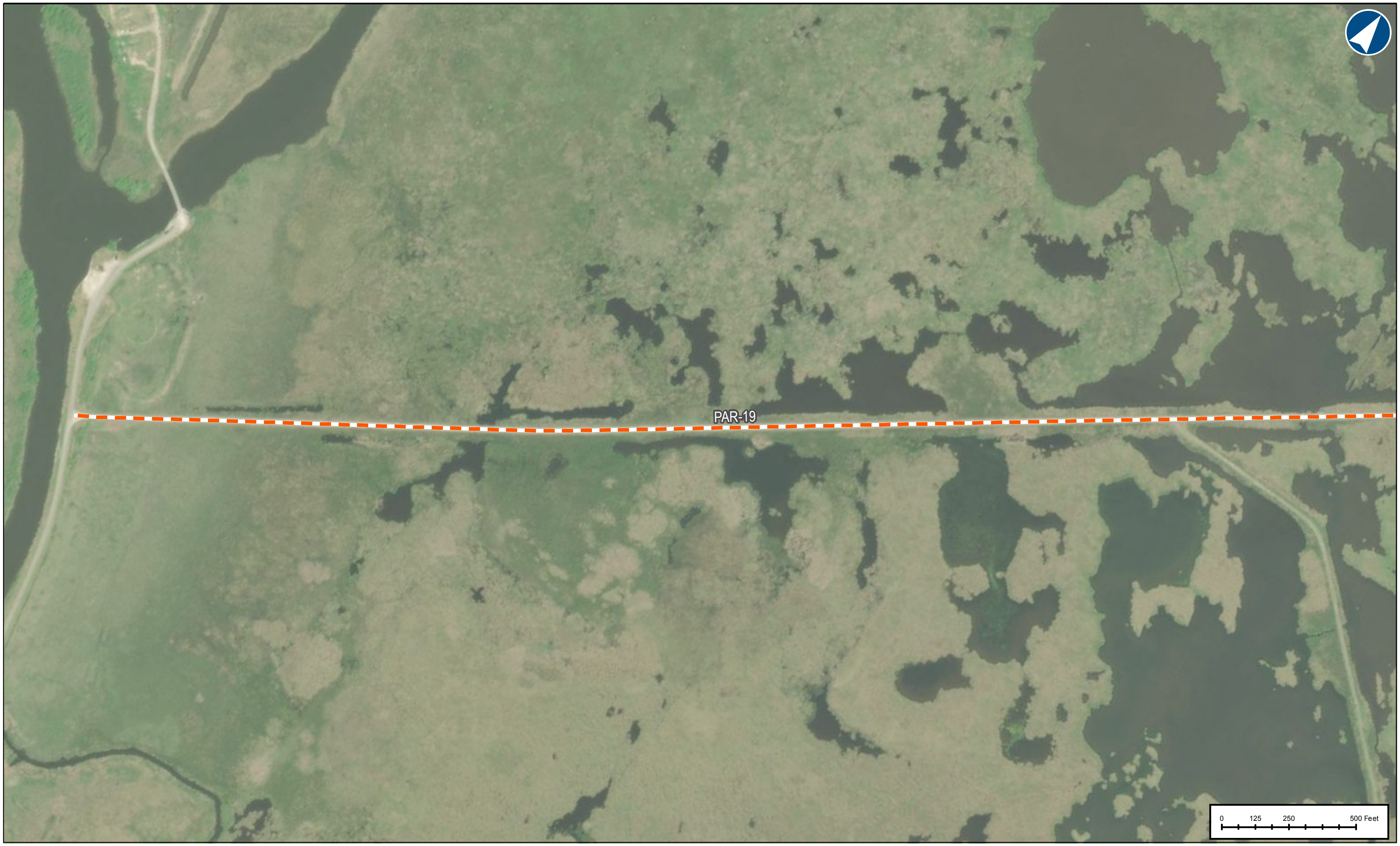
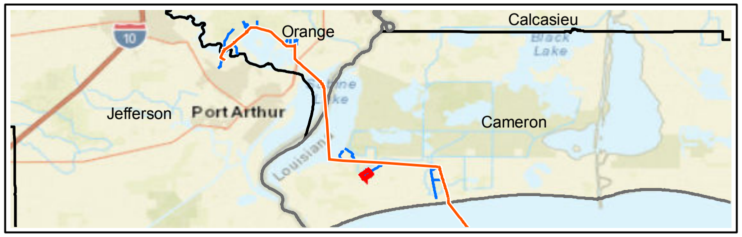
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	67 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT			
AERIAL MAP			
COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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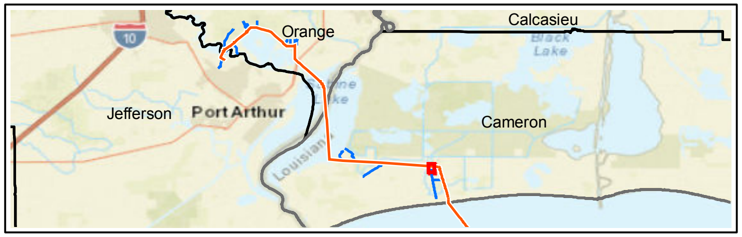
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	68 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ▭ ATWS
- 🟩 Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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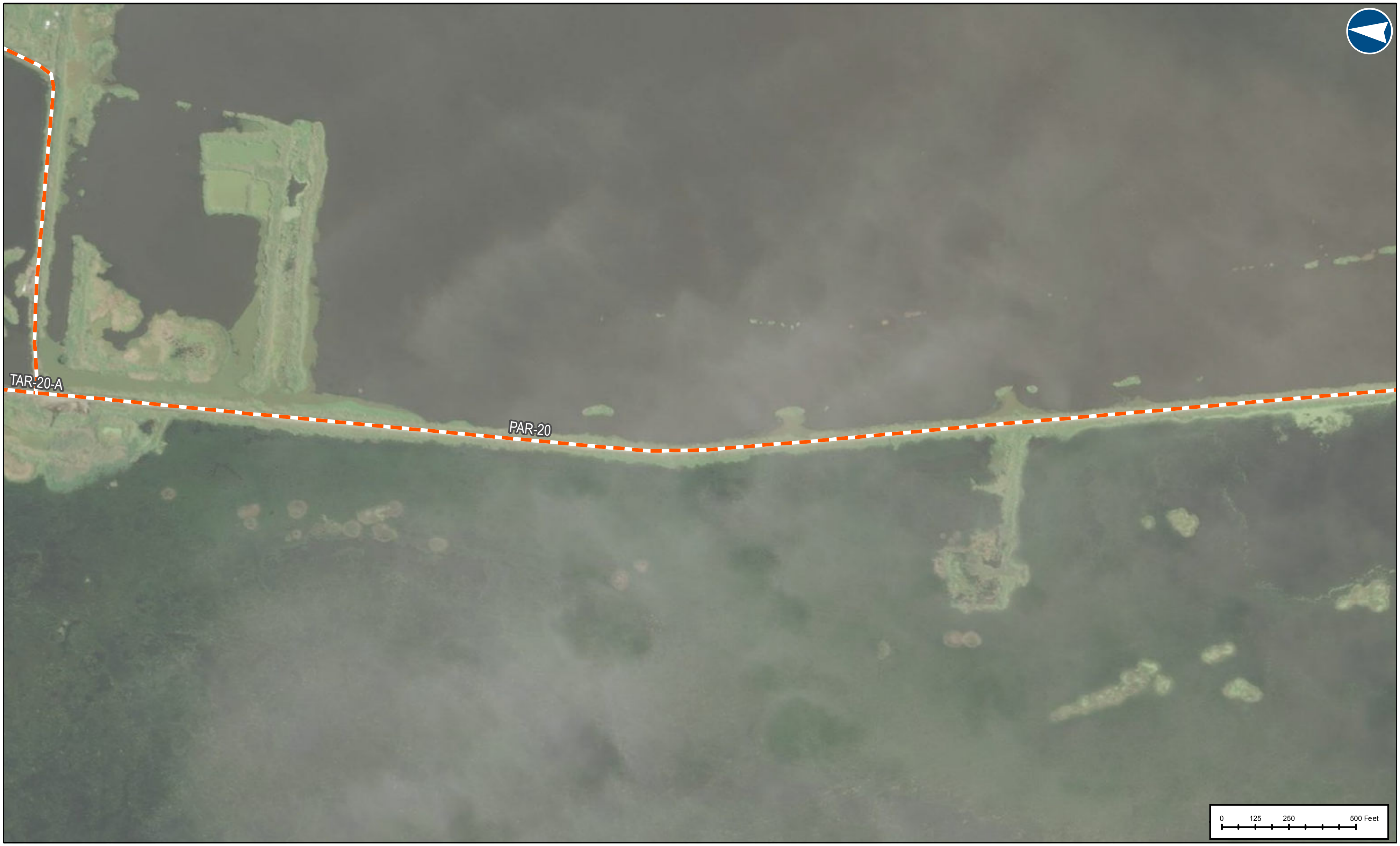
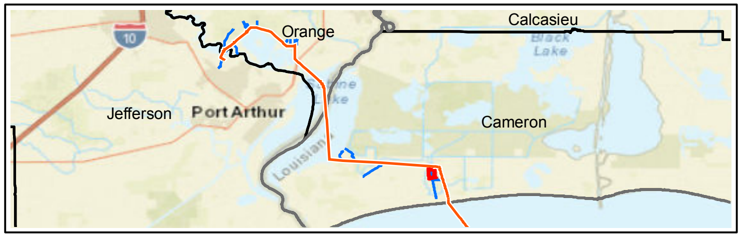
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	69 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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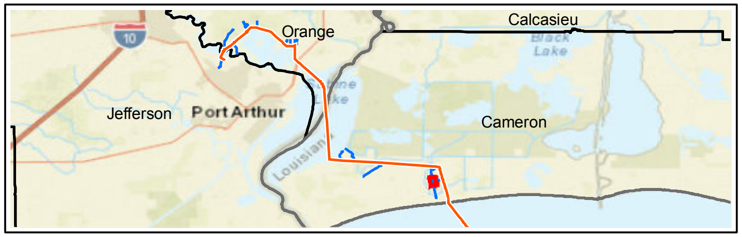
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	70 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



▬ ▬ Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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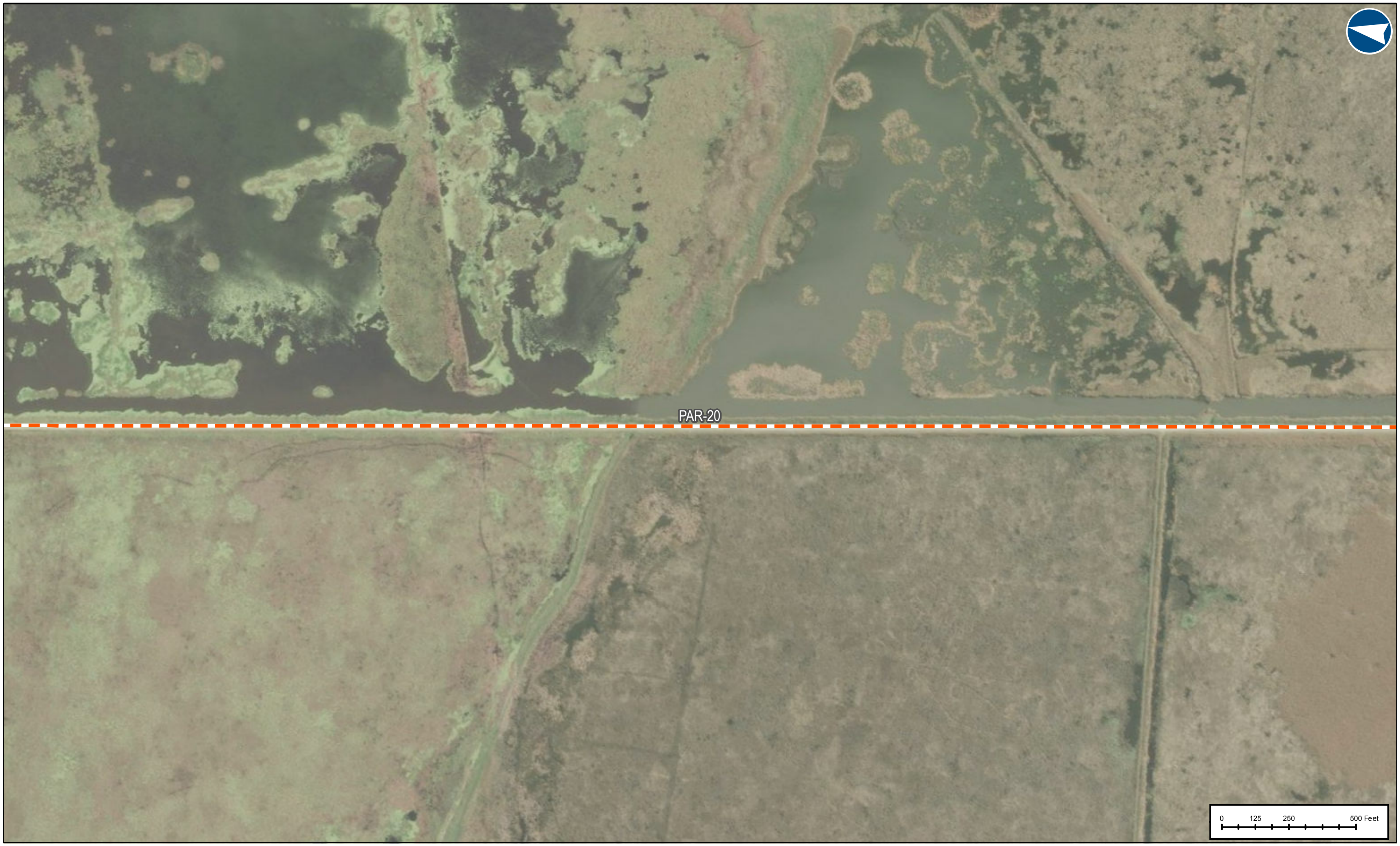
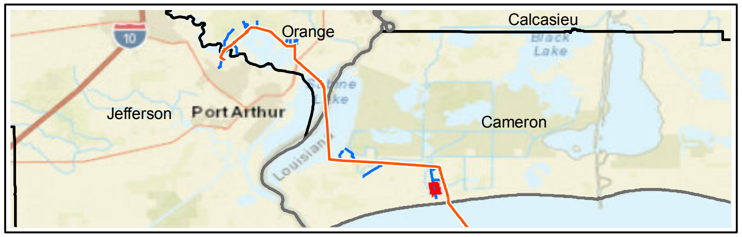
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	71 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





🟧 Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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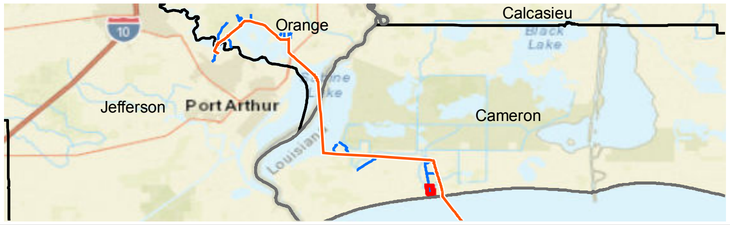
BLUE MARLIN OFFSHORE
PORT PROJECT

DWG:	0801-06-001	SHEET:	72 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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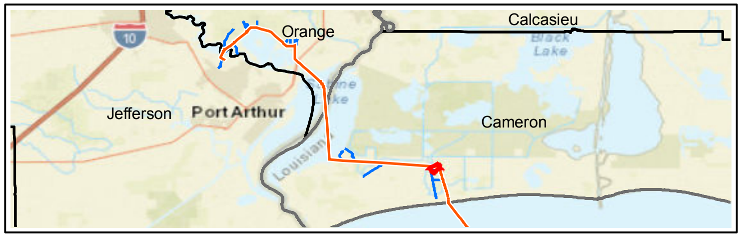
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	73 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ○ Proposed Onshore Pipeline Milepost
- ● Existing Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Existing Stingray Pipeline To Be Converted to Oil Service
- Project Access Road
- Existing Permanent Easement / Facility for Use
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- ▨ Existing Permanent Easement (No Impact)
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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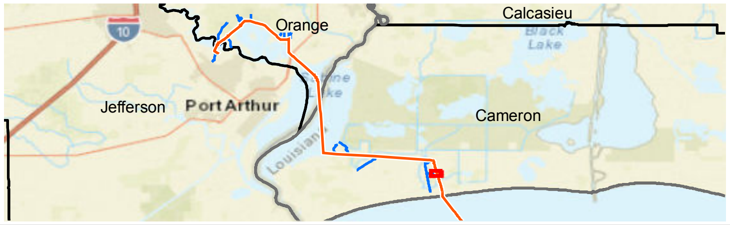
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	74 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP



- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ▬ Project Access Road
- ▭ Existing Permanent Easement / Facility for Use
- ▭ ATWS
- ▨ Existing Permanent Easement (No Impact)
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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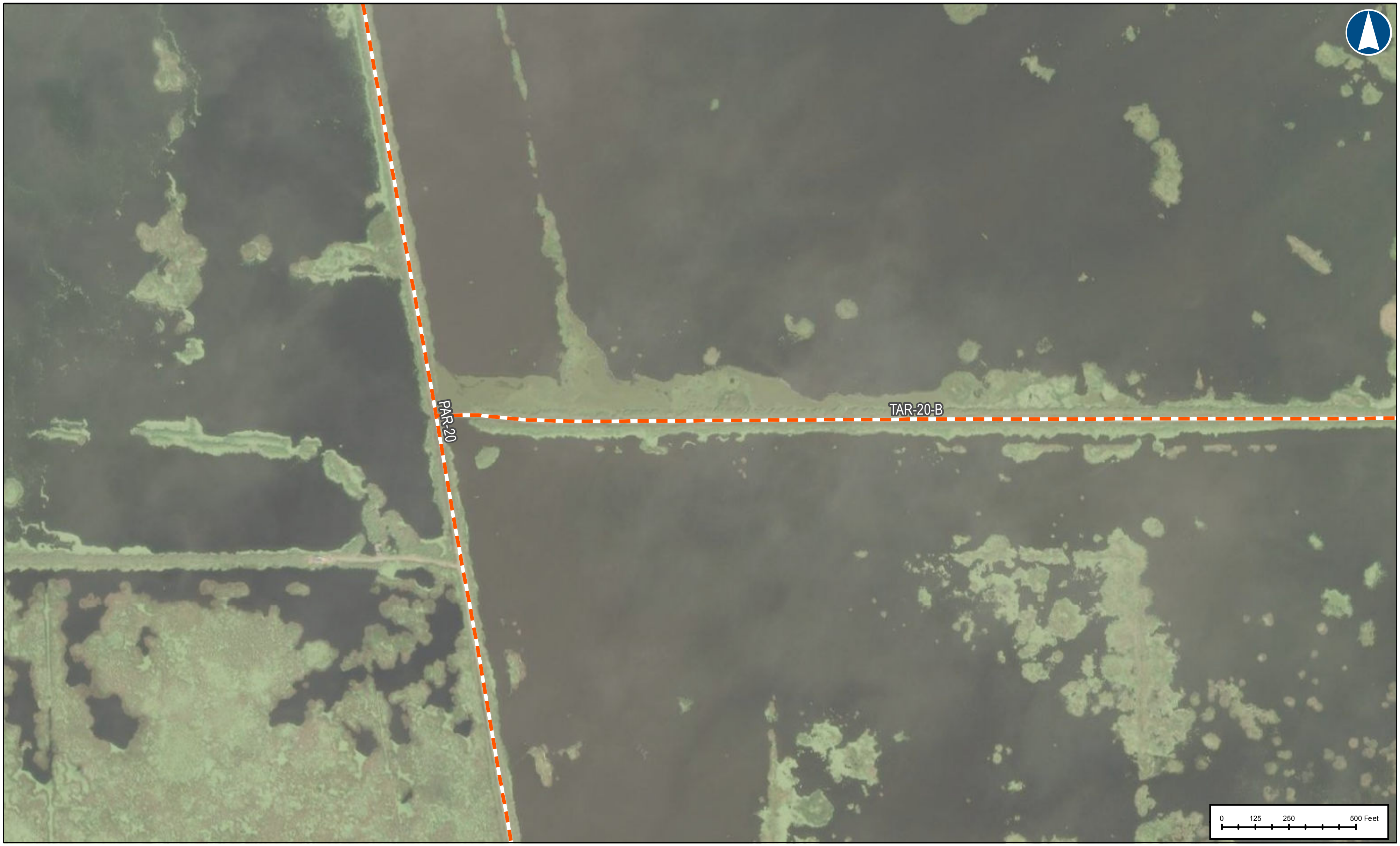
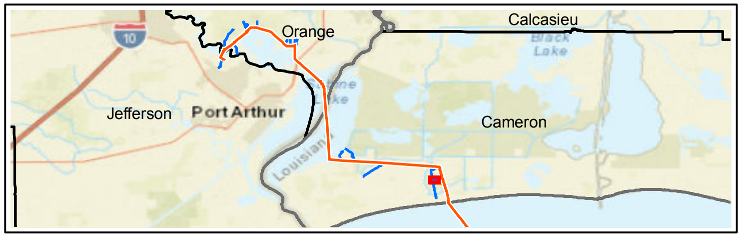
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	75 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-1 AERIAL MAP





🟧 Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

AERIAL MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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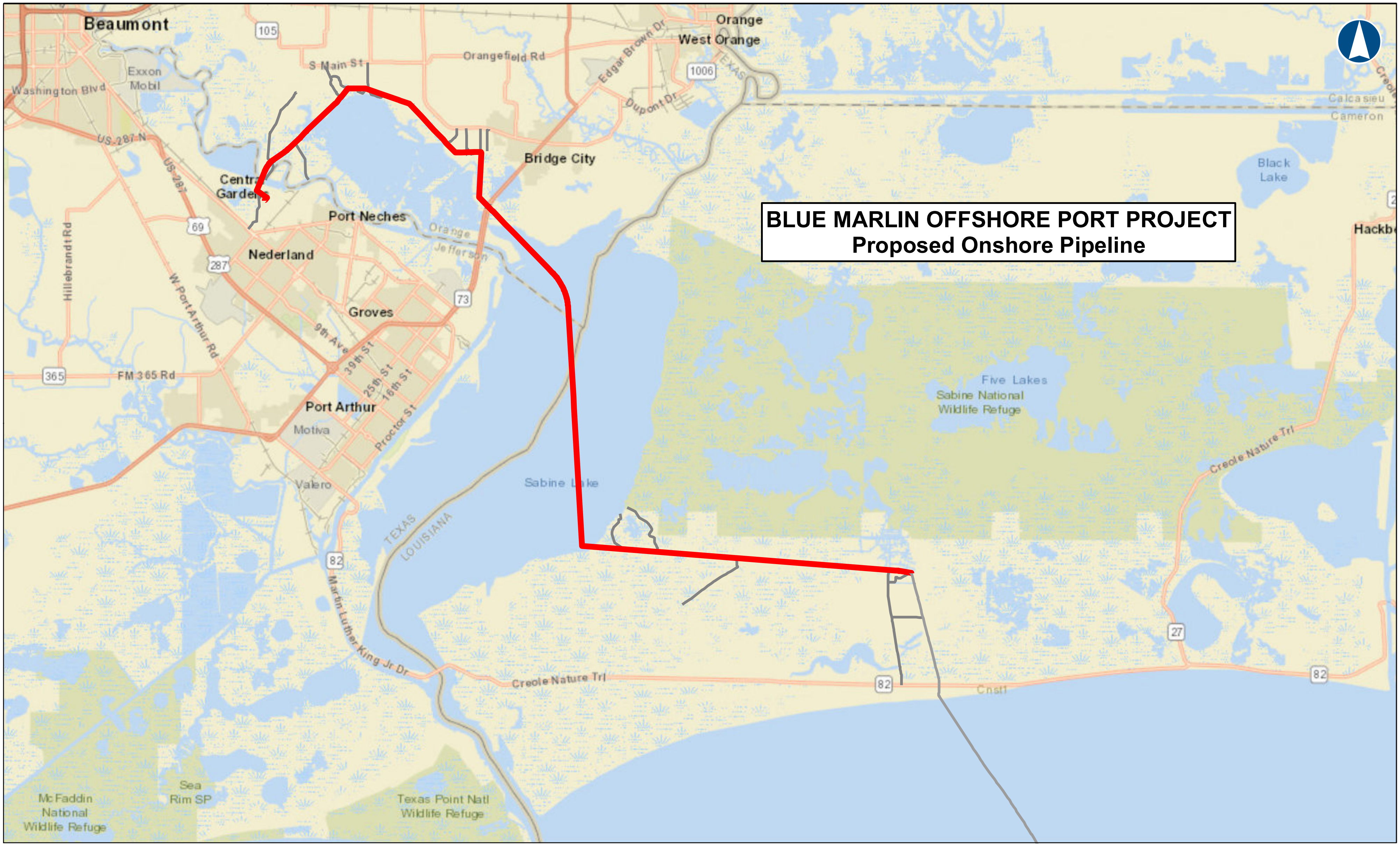
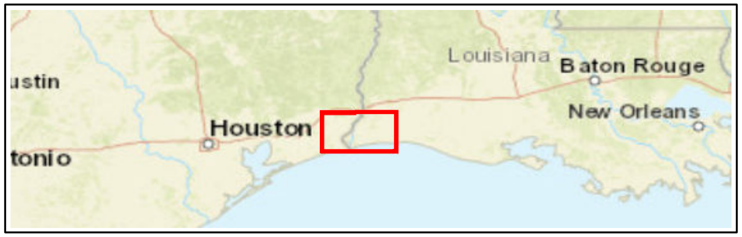
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	76 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Proposed Onshore Pipeline



BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	***DRAWN BY:***	CW
STATE:	N/A	***CHECKED BY:***	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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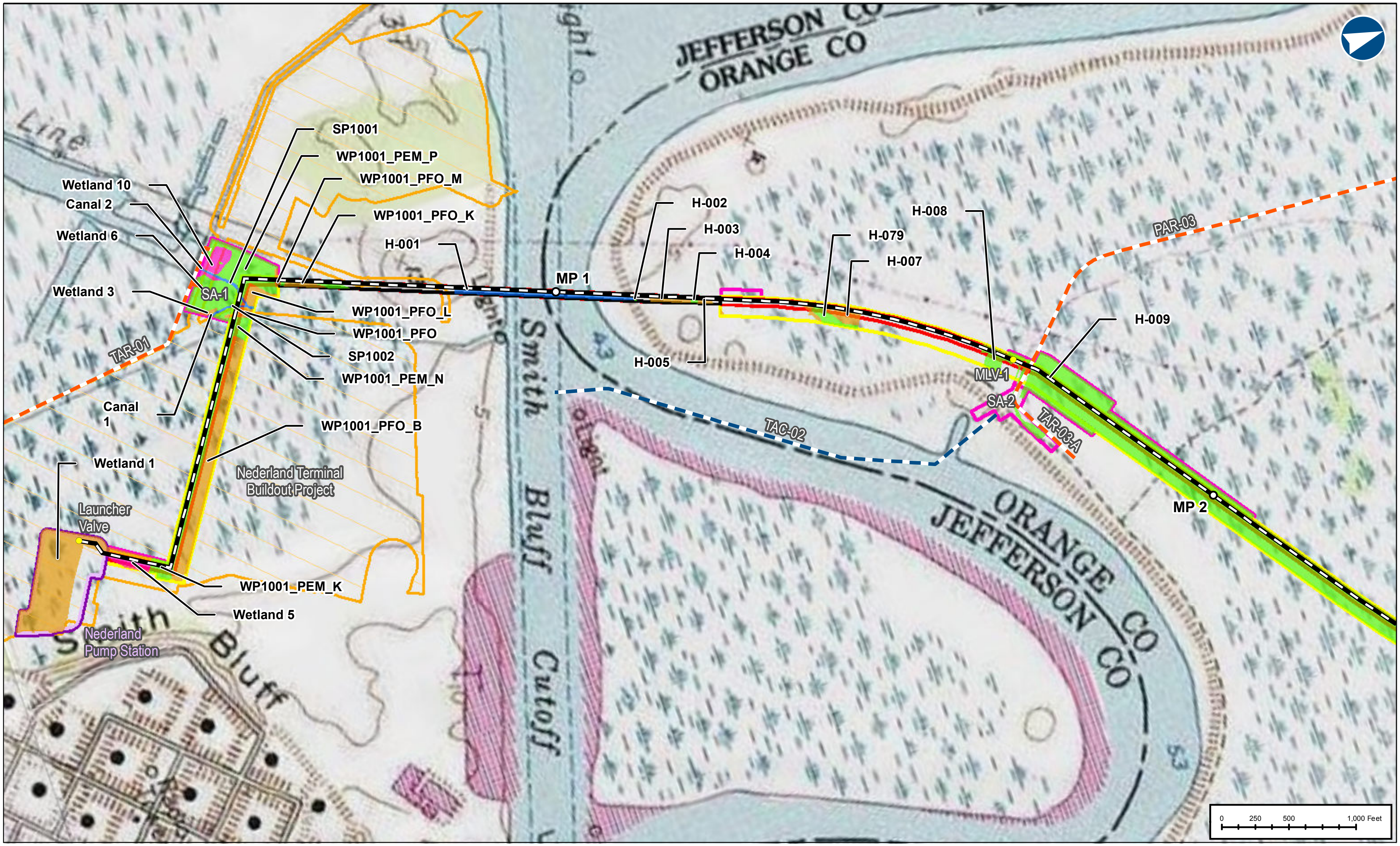
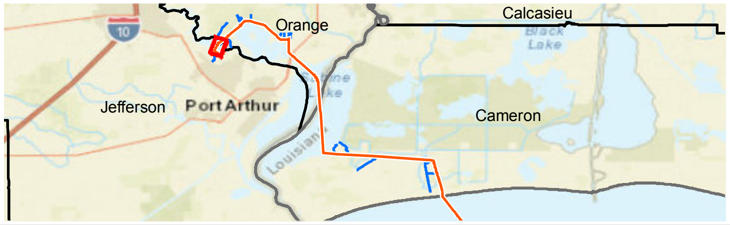
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- ▬ Proposed Onshore Pipeline CL
- ▬ Project Access Canal
- ▬ Project Access Road
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟪 PSS Wetland
- ☐ HDD Easement (Avoidance)
- ☐ Existing Permanent Easement / Facility for Use
- 🟥 Permanent Easement
- 🟨 Temporary Easement
- ☐ ATWS
- ☐ Permanent Access Road Easement
- ☐ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	JEFFERSON / ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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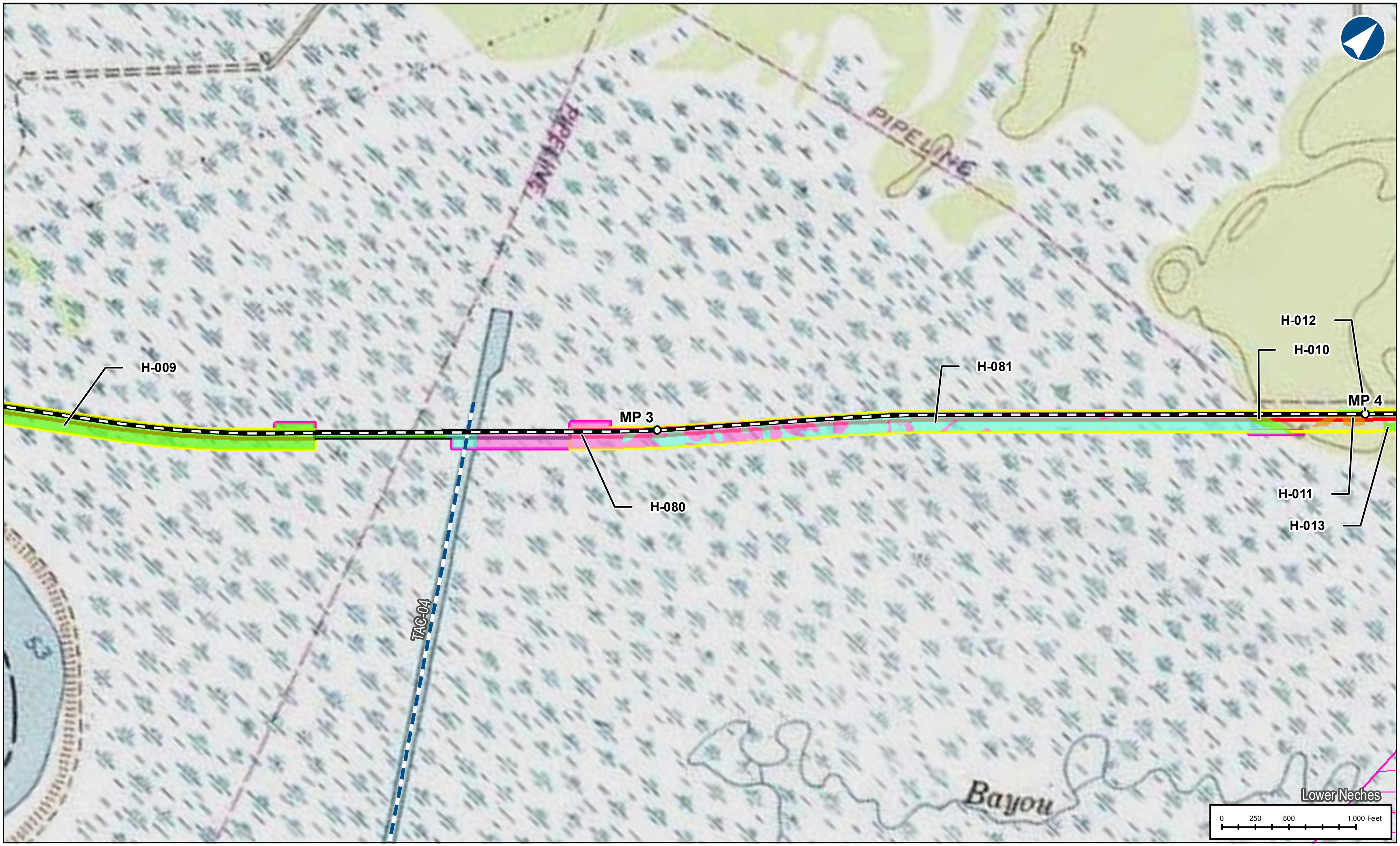
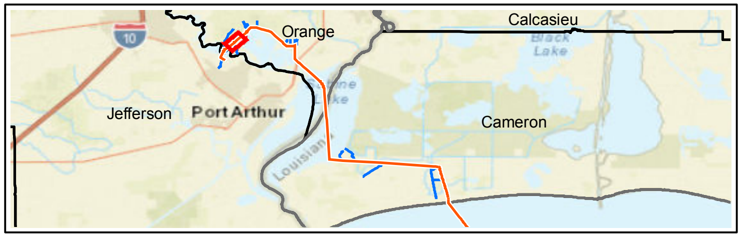
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
▬ Proposed Onshore Pipeline CL
▬ Project Access Canal
🟦 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)
🟩 PEM Wetland
🟧 PFO Wetland
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporay Easement
☐ ATWS
☐ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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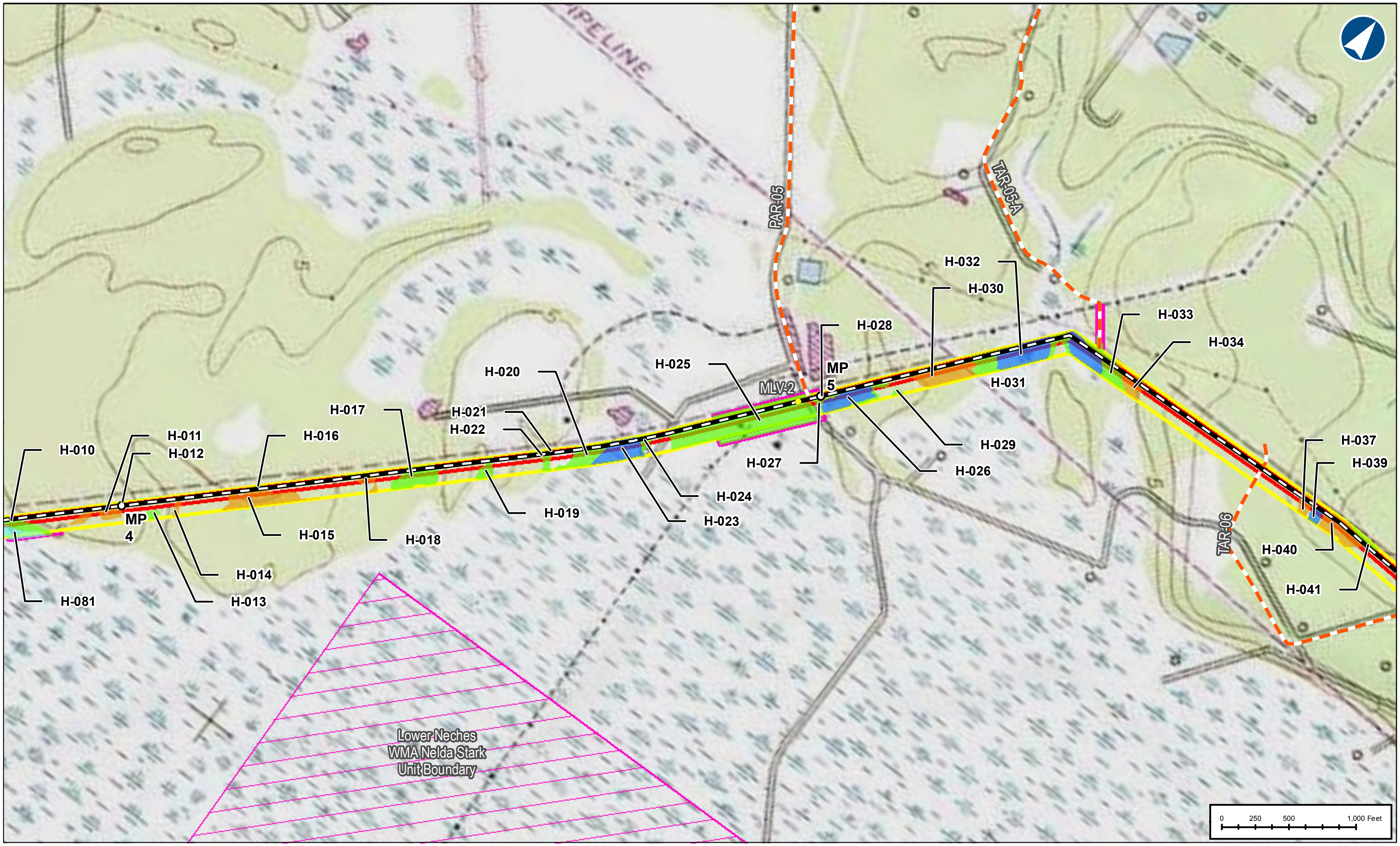
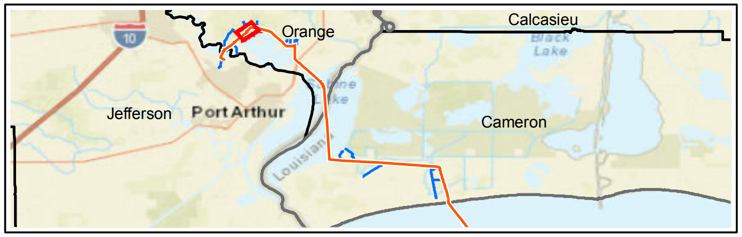
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	2 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
▬ Proposed Onshore Pipeline CL
▬ Project Access Road
🟦 Waterbody
▨ Estuarine, unvegetated subtidal
🟩 PEM Wetland
🟧 PFO Wetland
🟥 Permanent Easement
🟨 Temporary Easement
▭ ATWS
▭ Permanent Access Road Easement
▨ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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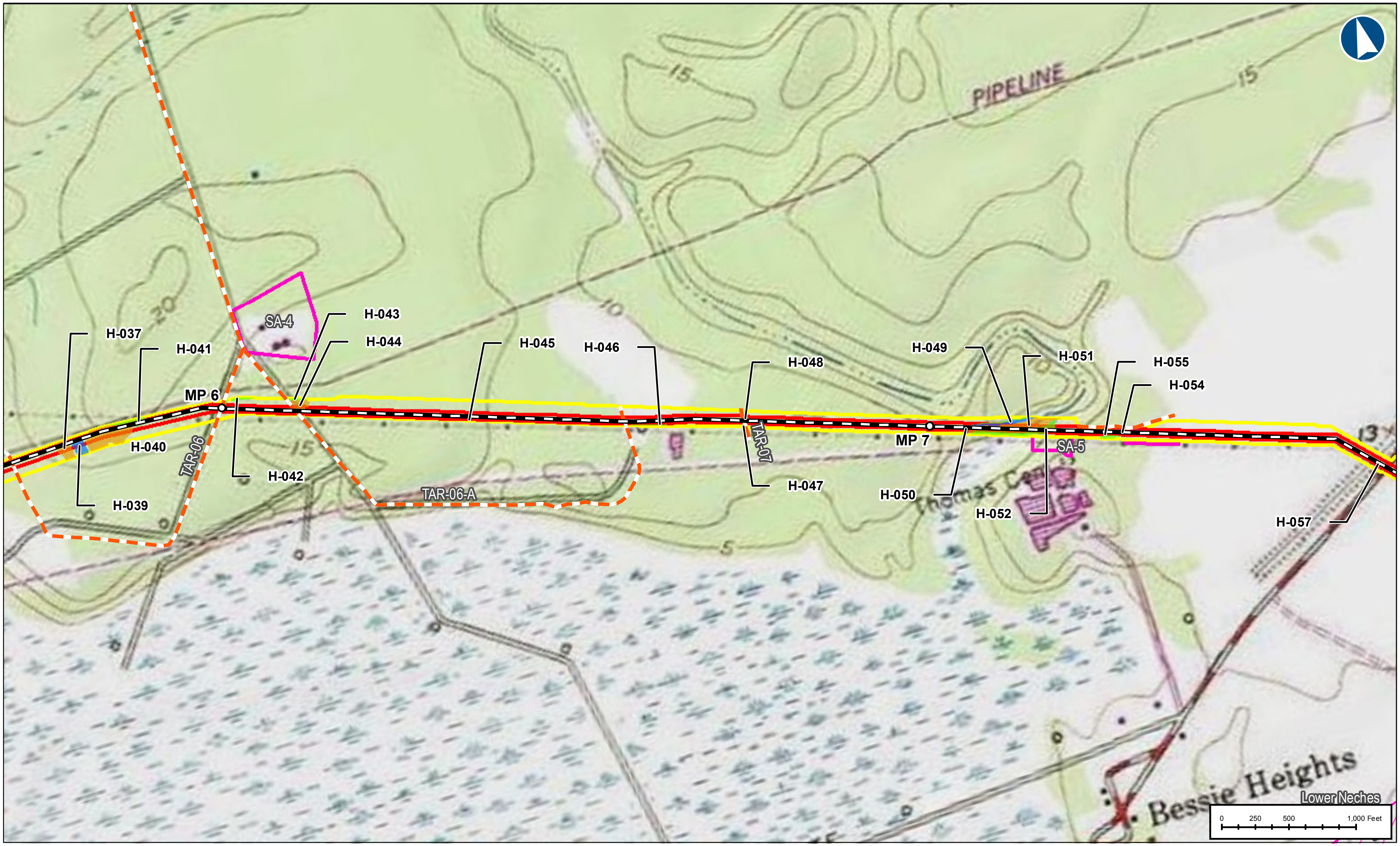
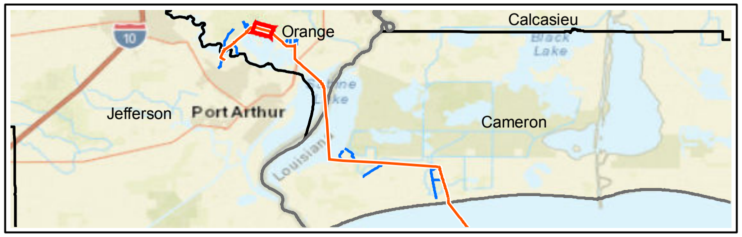
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	3 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟥 Permanent Easement
- 🟨 Temporary Easement
- ATWS
- Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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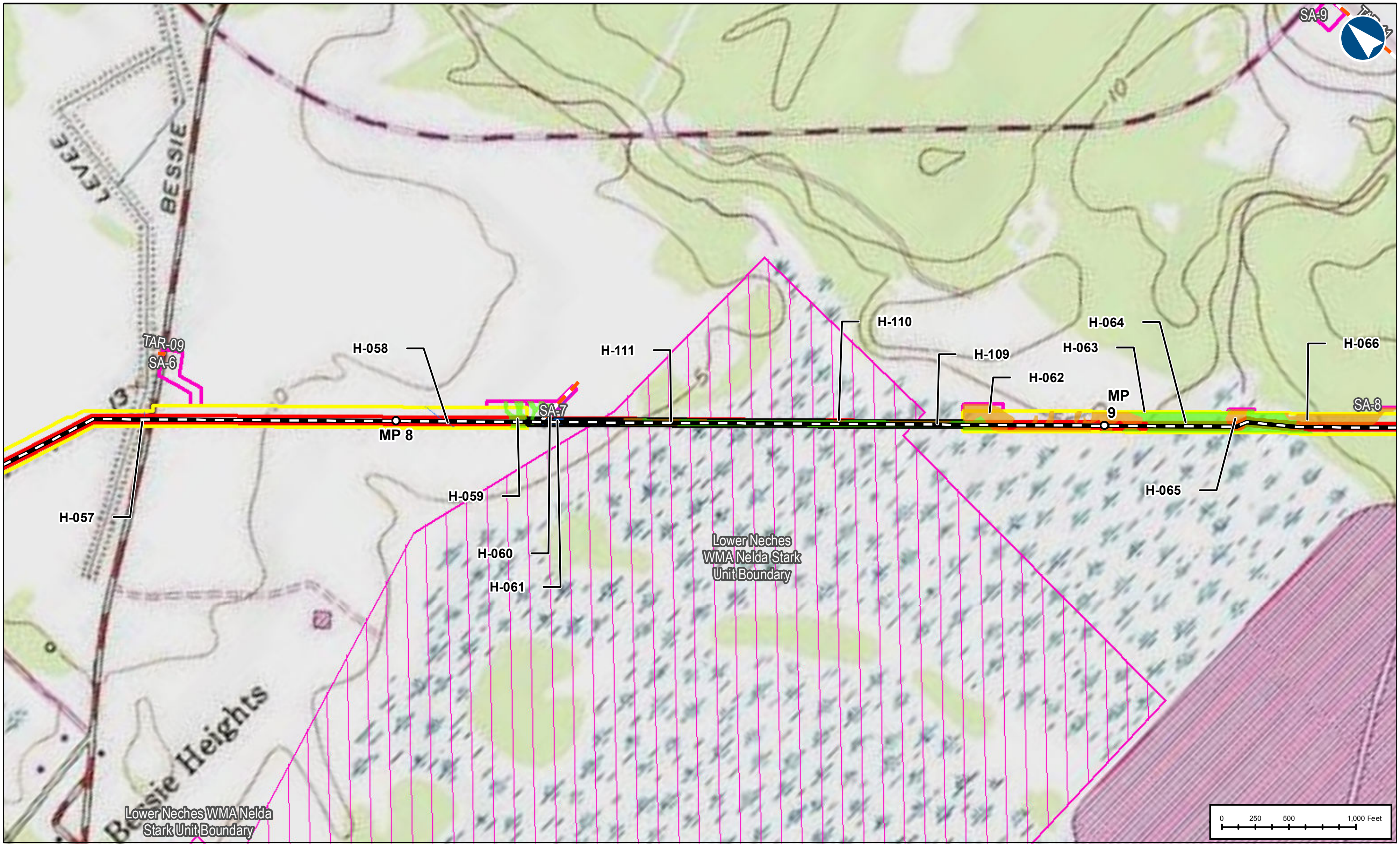
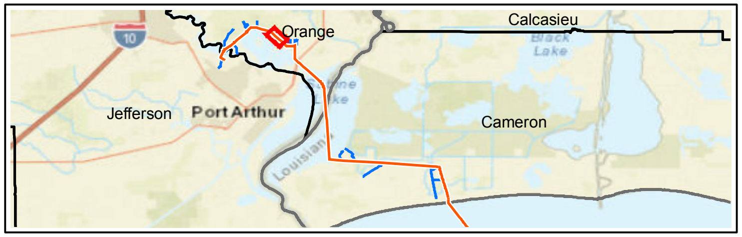
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	4 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Road
🟦 Waterbody
🟩 PEM Wetland
🟧 PFO Wetland
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporary Easement
☐ ATWS
▨ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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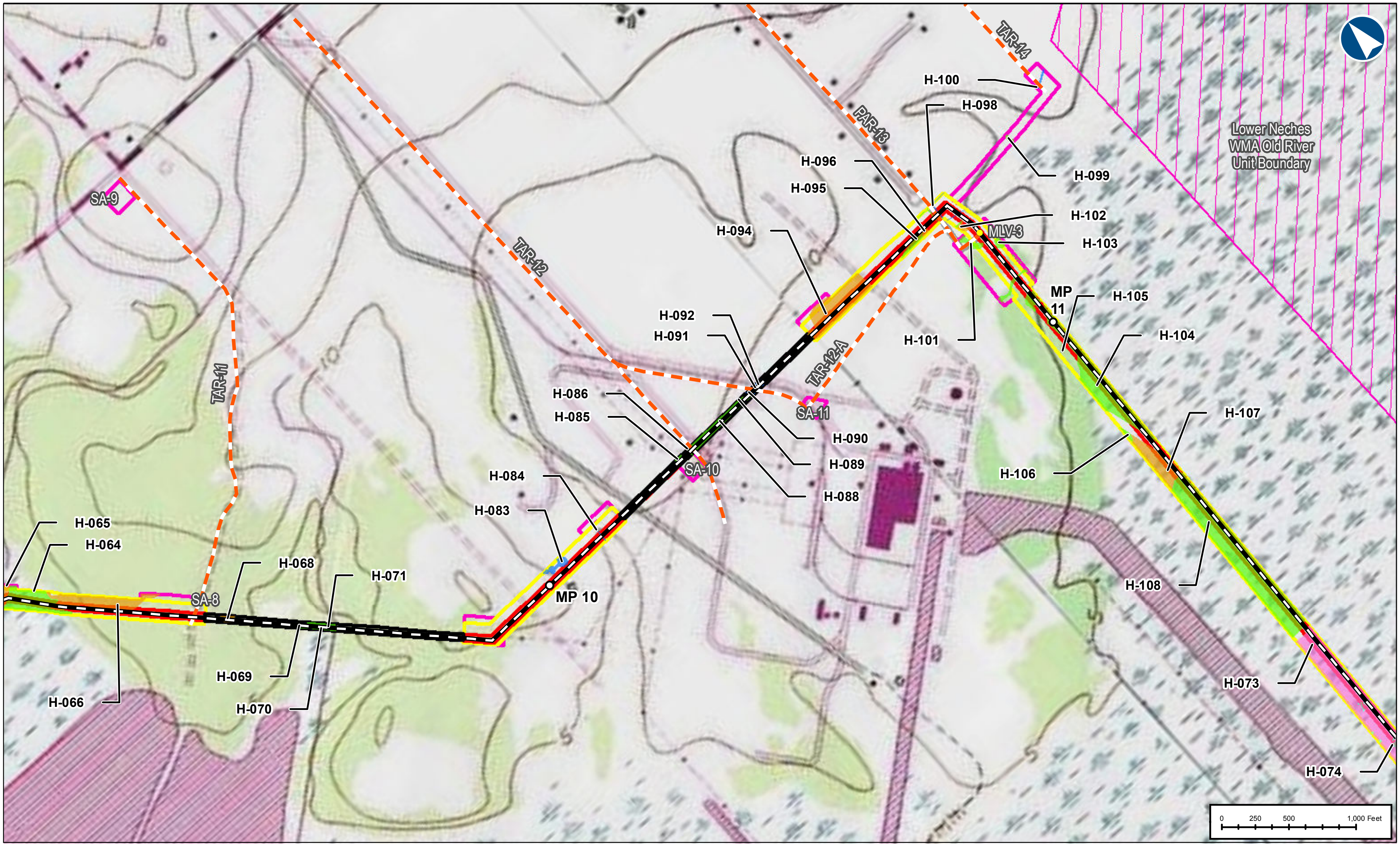
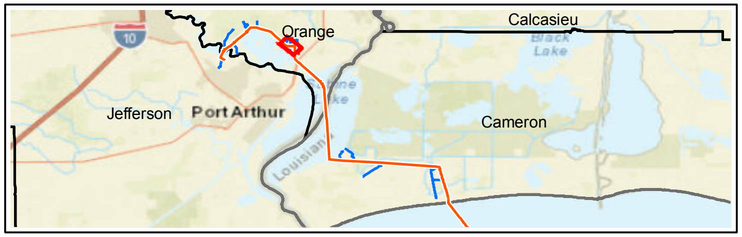
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	5 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟦 Waterbody
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- ⬛ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- ⬜ Permanent Access Road Easement
- ▨ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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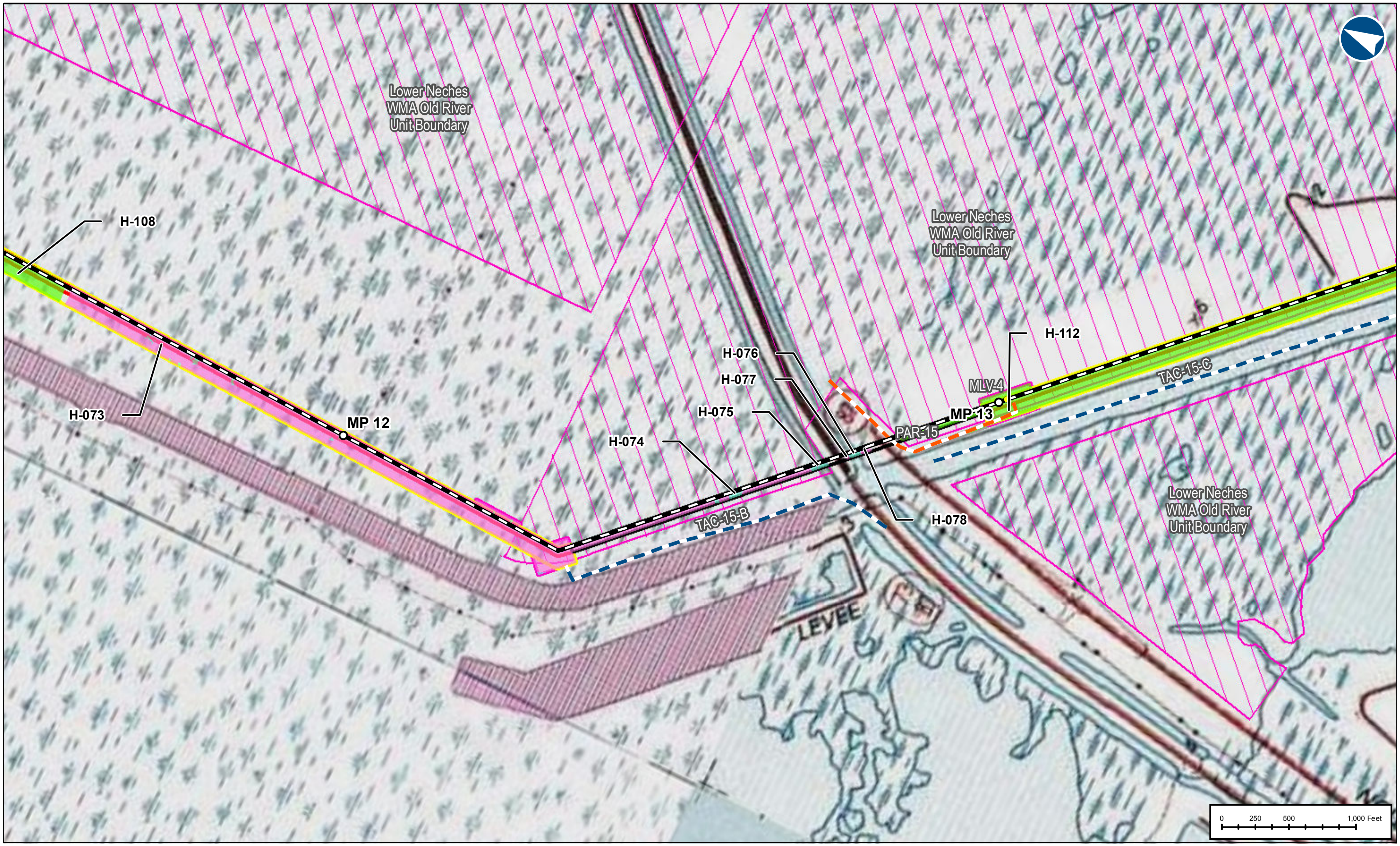
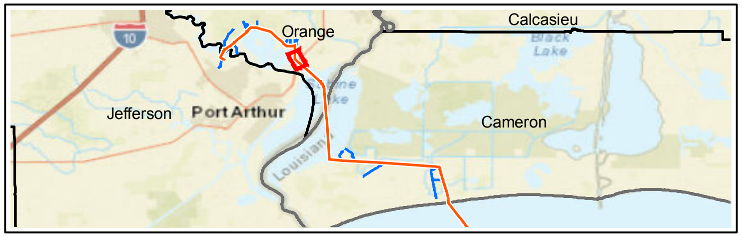
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	6 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Canal
- Project Access Road
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟩 PEM Wetland
- ☐ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ☐ ATWS
- ☐ Permanent Access Road Easement
- ▨ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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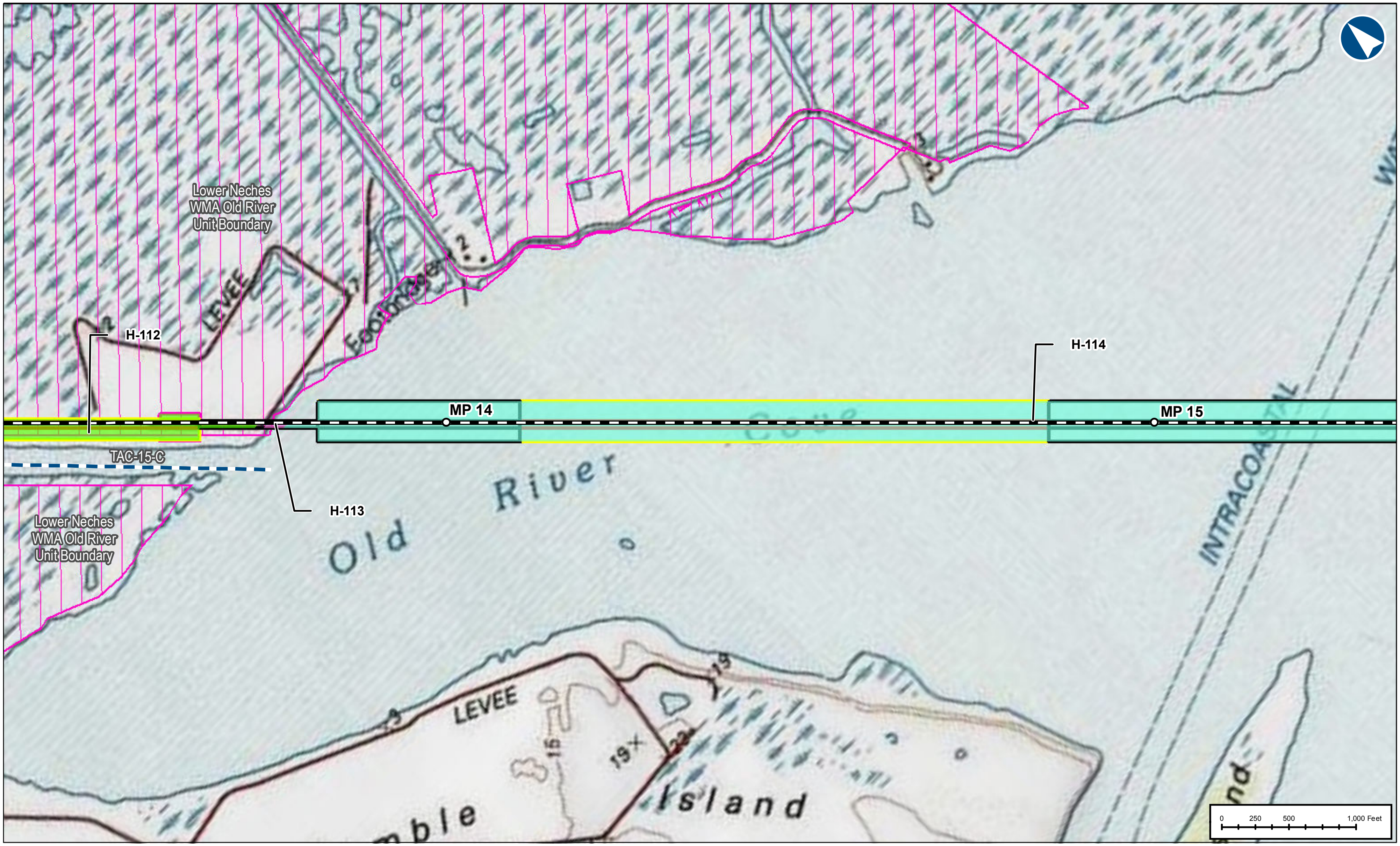
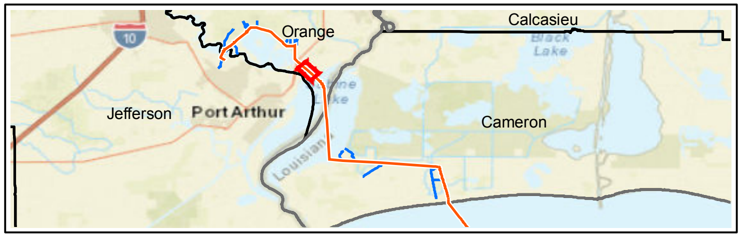
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	7 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Canal
🟦 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)
🟩 PEM Wetland
☐ HDD Easement (Avoidance)
🟥 Permanent Easement
🟨 Temporay Easement
ATWS
▨ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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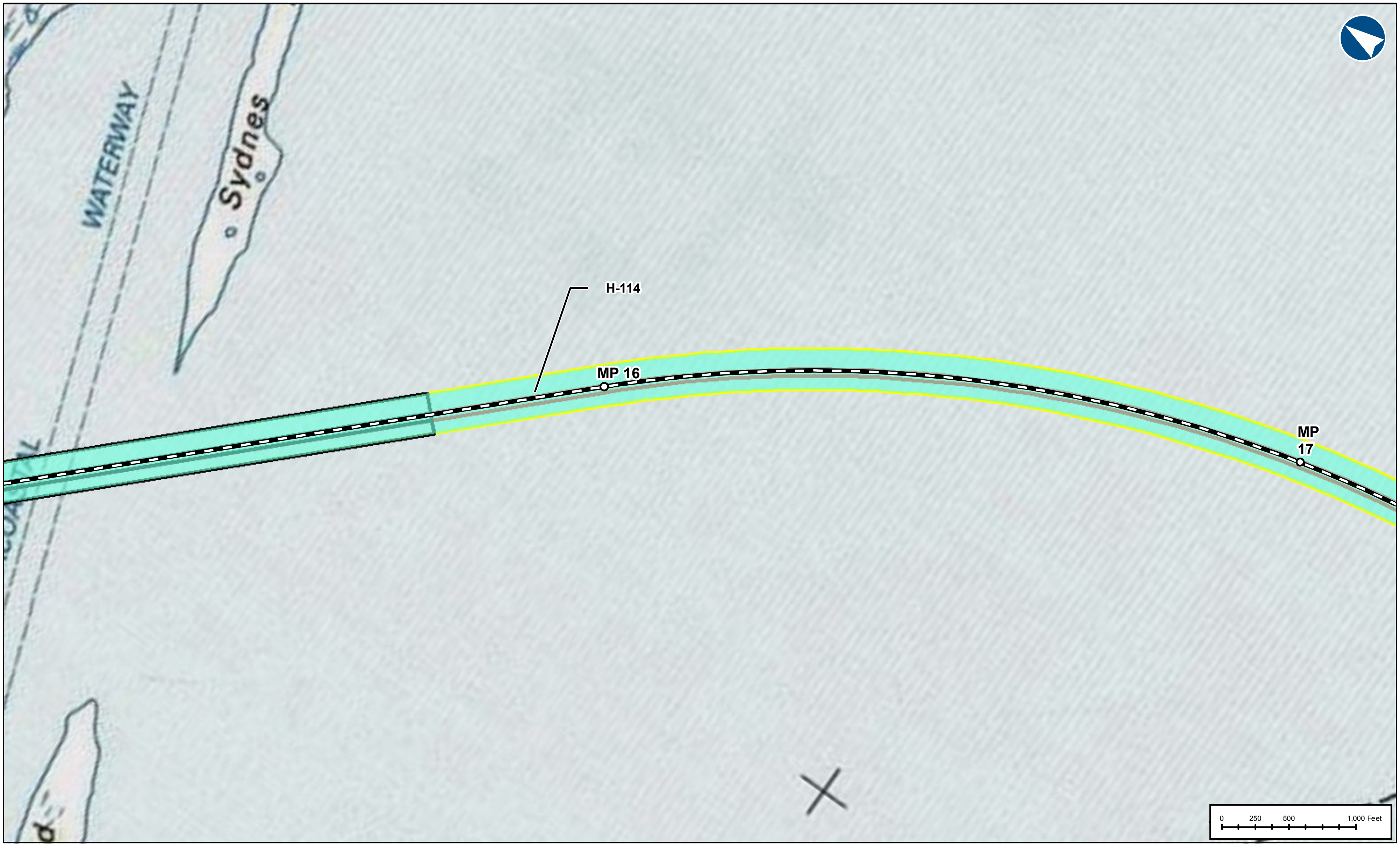
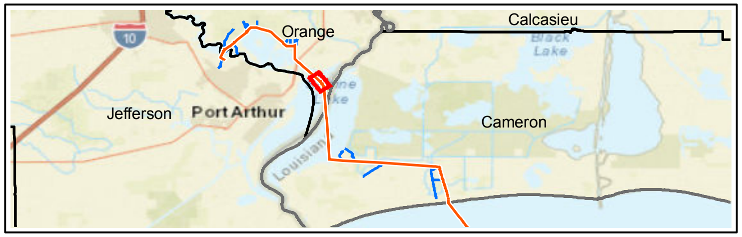
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	8 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

🟩 Estuarine, unvegetated subtidal

☐ HDD Easement (Avoidance)

🟥 Permanent Easement

🟨 Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ

DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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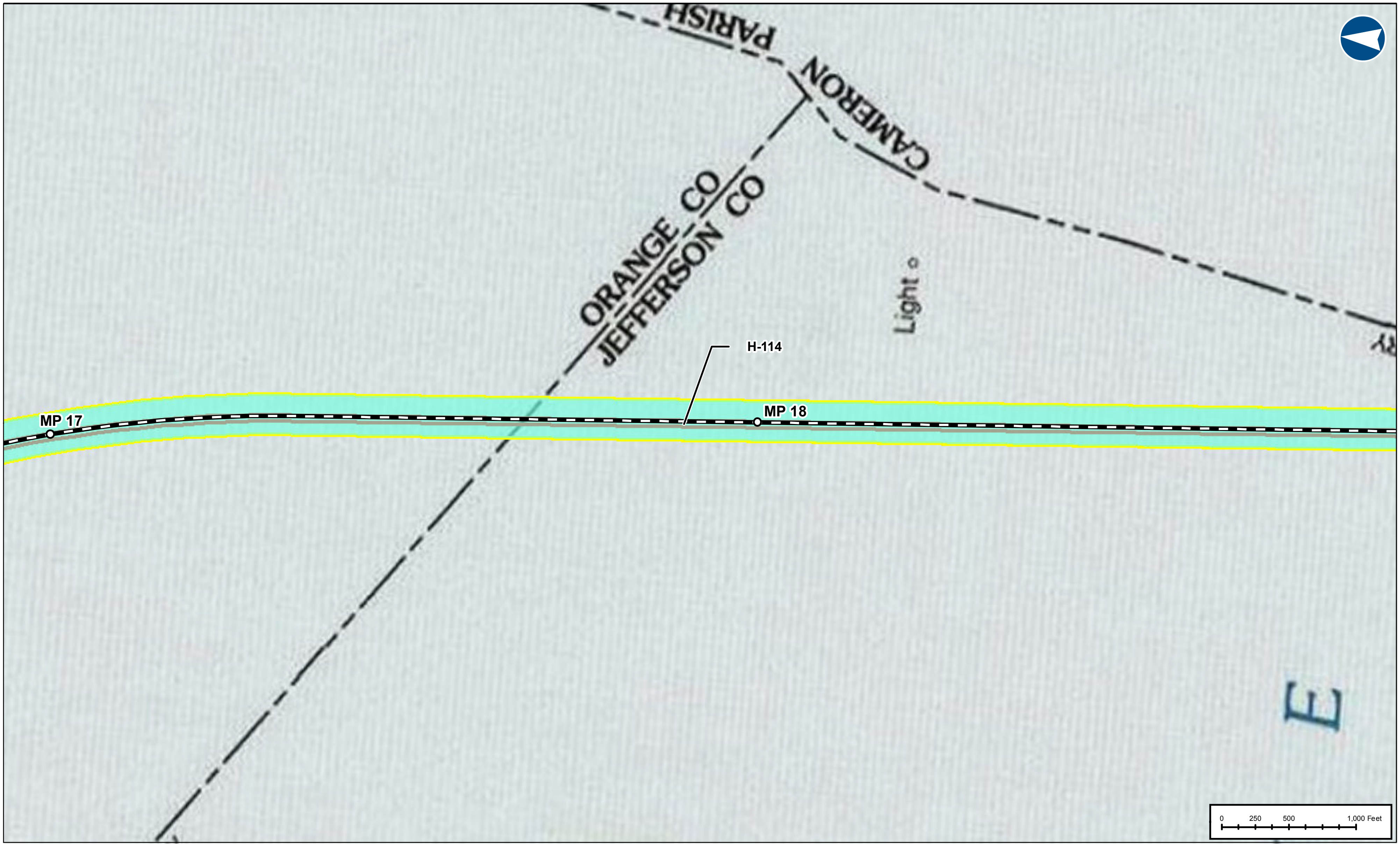
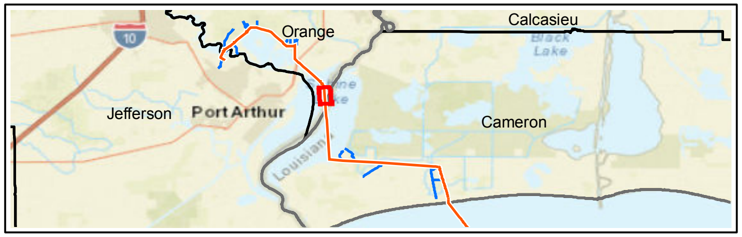
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	9 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟦 Estuarine, unvegetated subtidal
- 🟥 Permanent Easement
- 🟨 Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE / CAMERON	DRAWN BY:	CW
STATE:	TEXAS / LOUISIANA	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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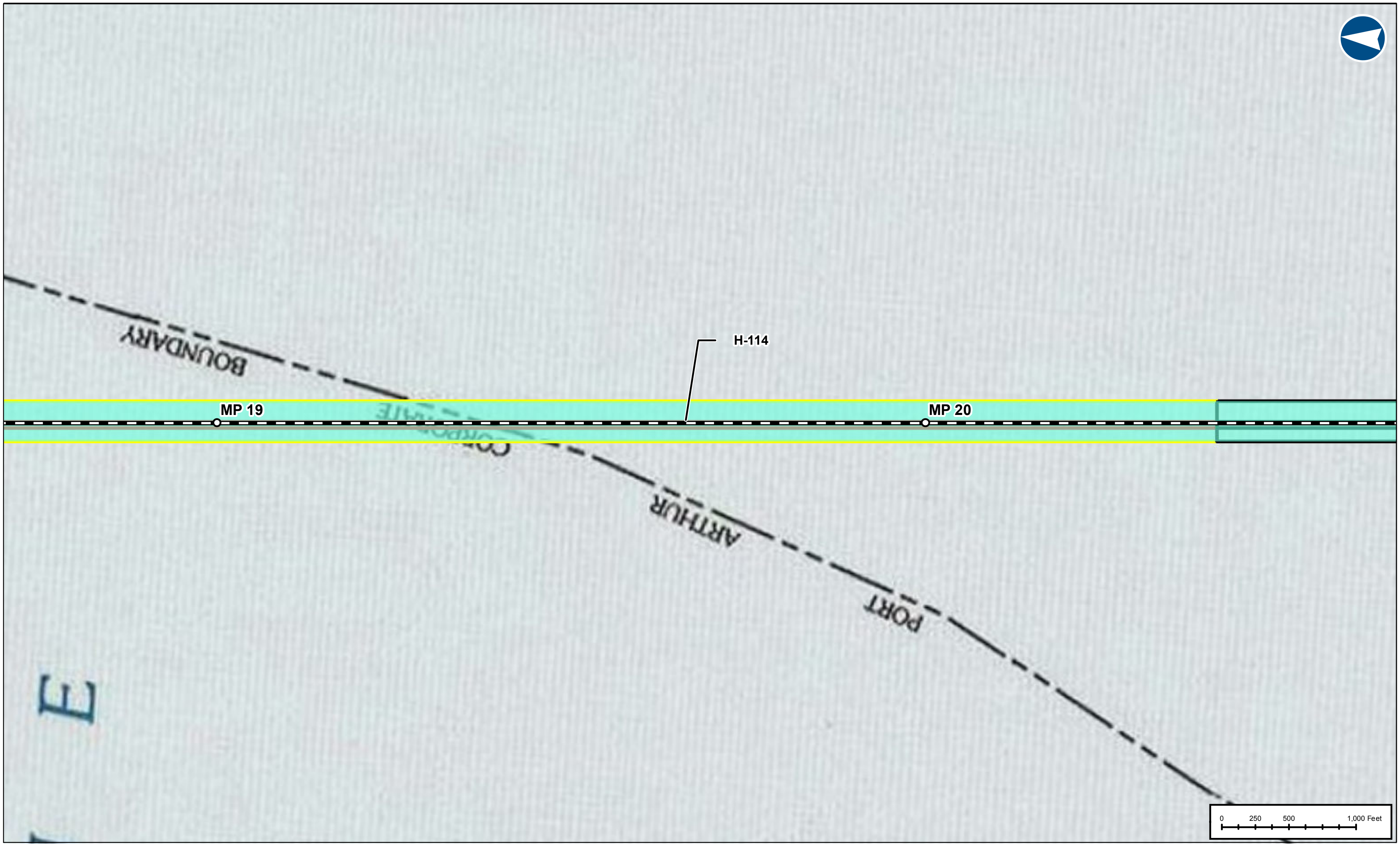
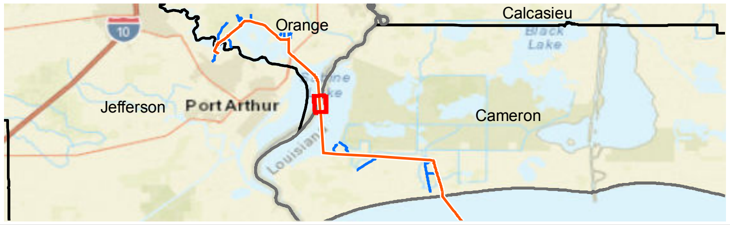
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	10 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- 🟦 Estuarine, unvegetated subtidal
- ☐ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE / CAMERON	DRAWN BY:	CW
STATE:	TEXAS / LOUISIANA	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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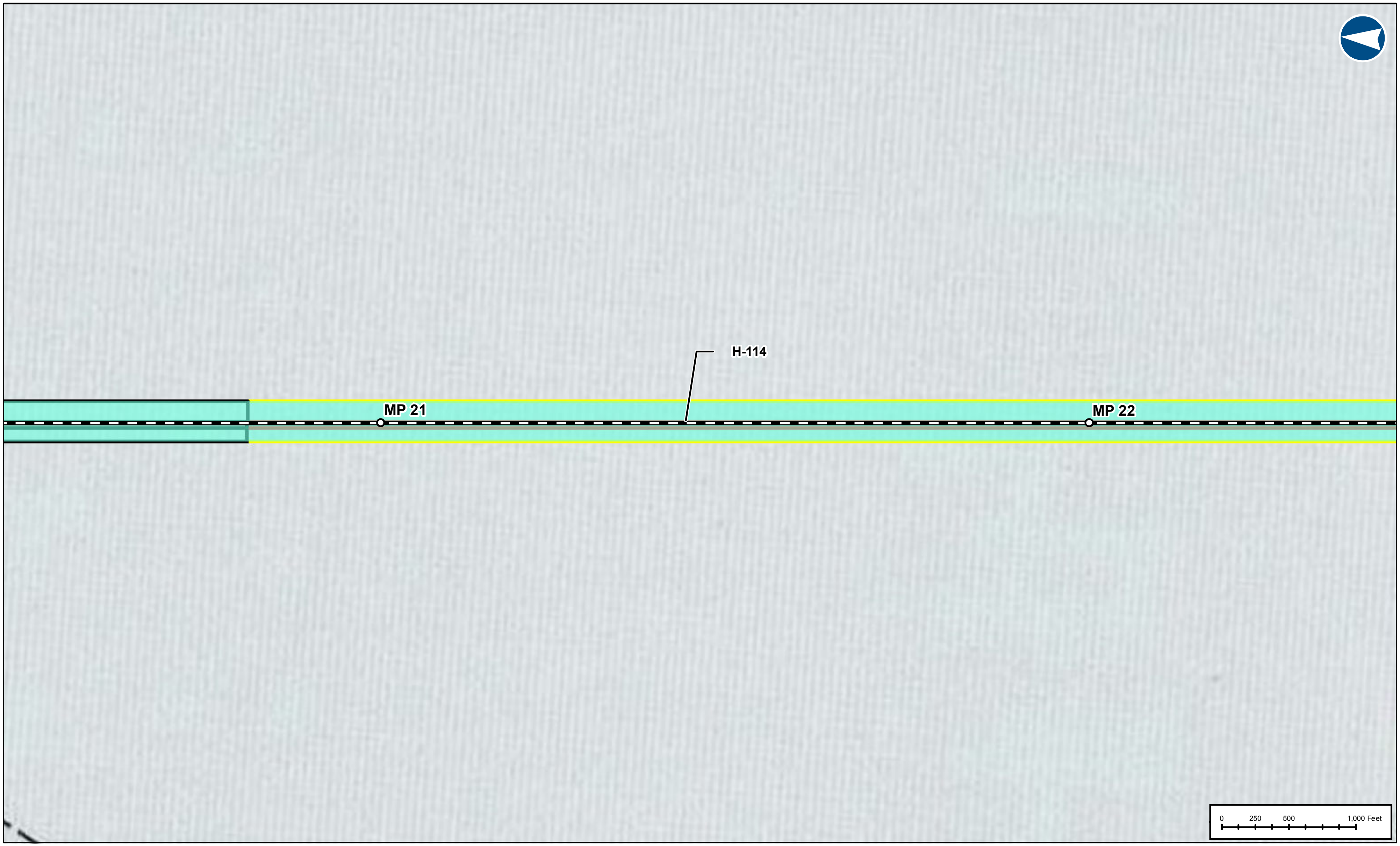
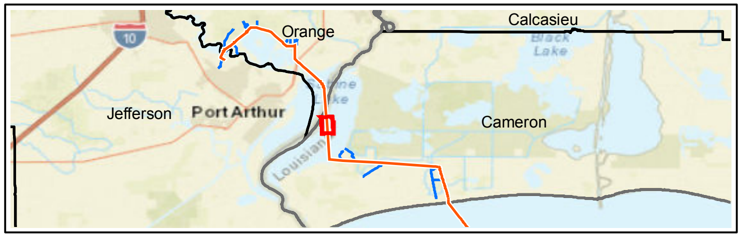
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	11 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○	Proposed Onshore Pipeline Milepost
━ ━	Proposed Onshore Pipeline CL
🟦	Estuarine, unvegetated subtidal
☐	HDD Easement (Avoidance)
🟥	Permanent Easement
🟨	Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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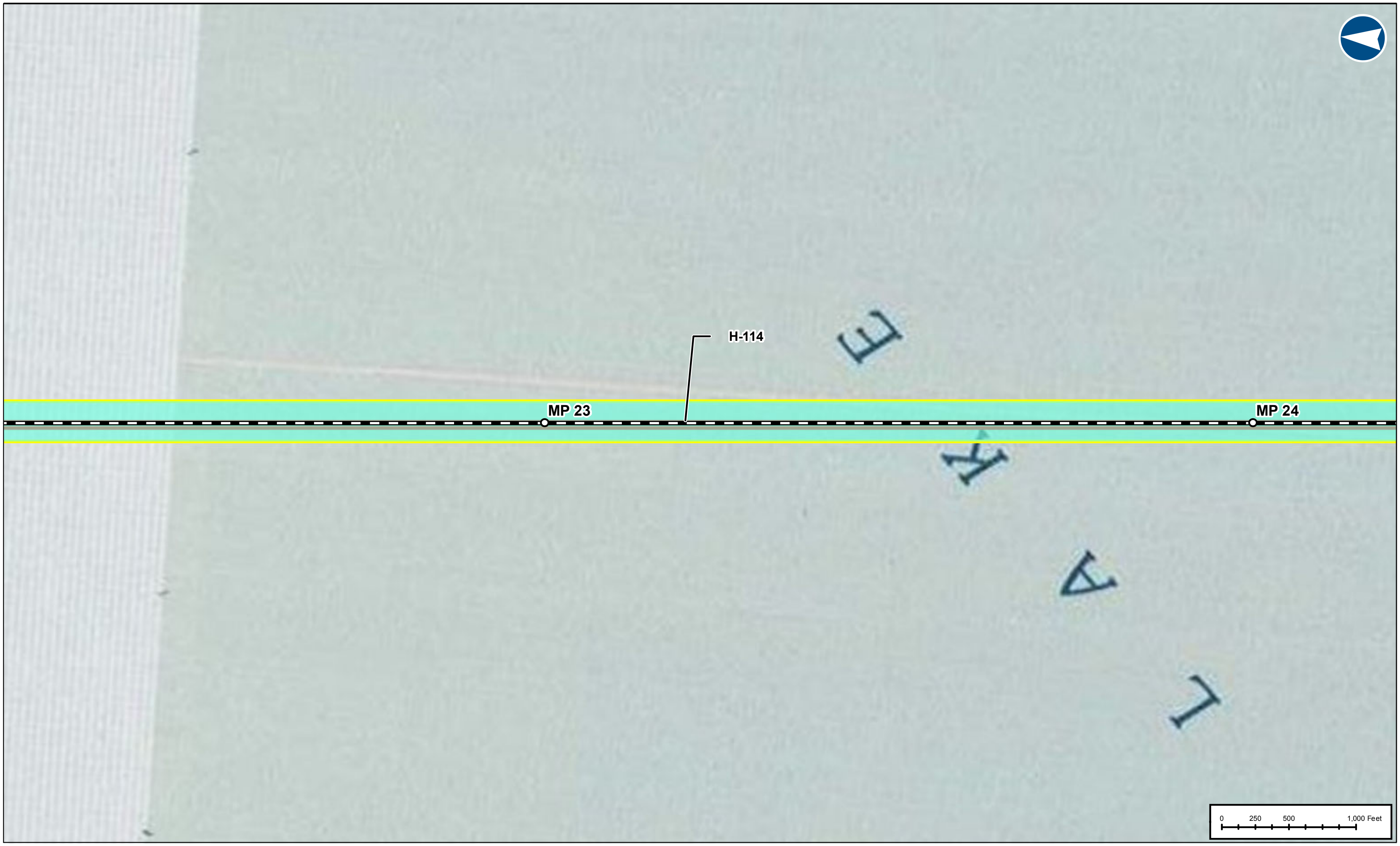
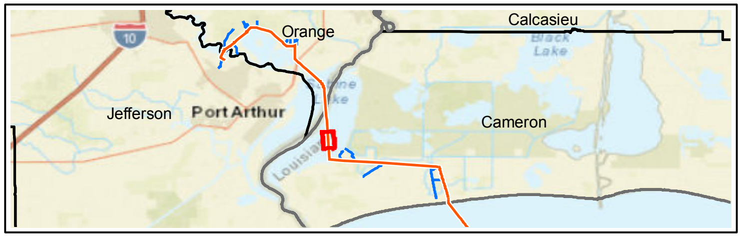
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	12 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○	Proposed Onshore Pipeline Milepost
━ ━	Proposed Onshore Pipeline CL
🟩	Estuarine, unvegetated subtidal
🟥	Permanent Easement
🟨	Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

exp Energy Services Inc.
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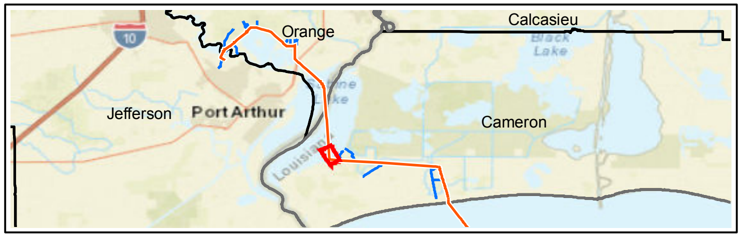
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	13 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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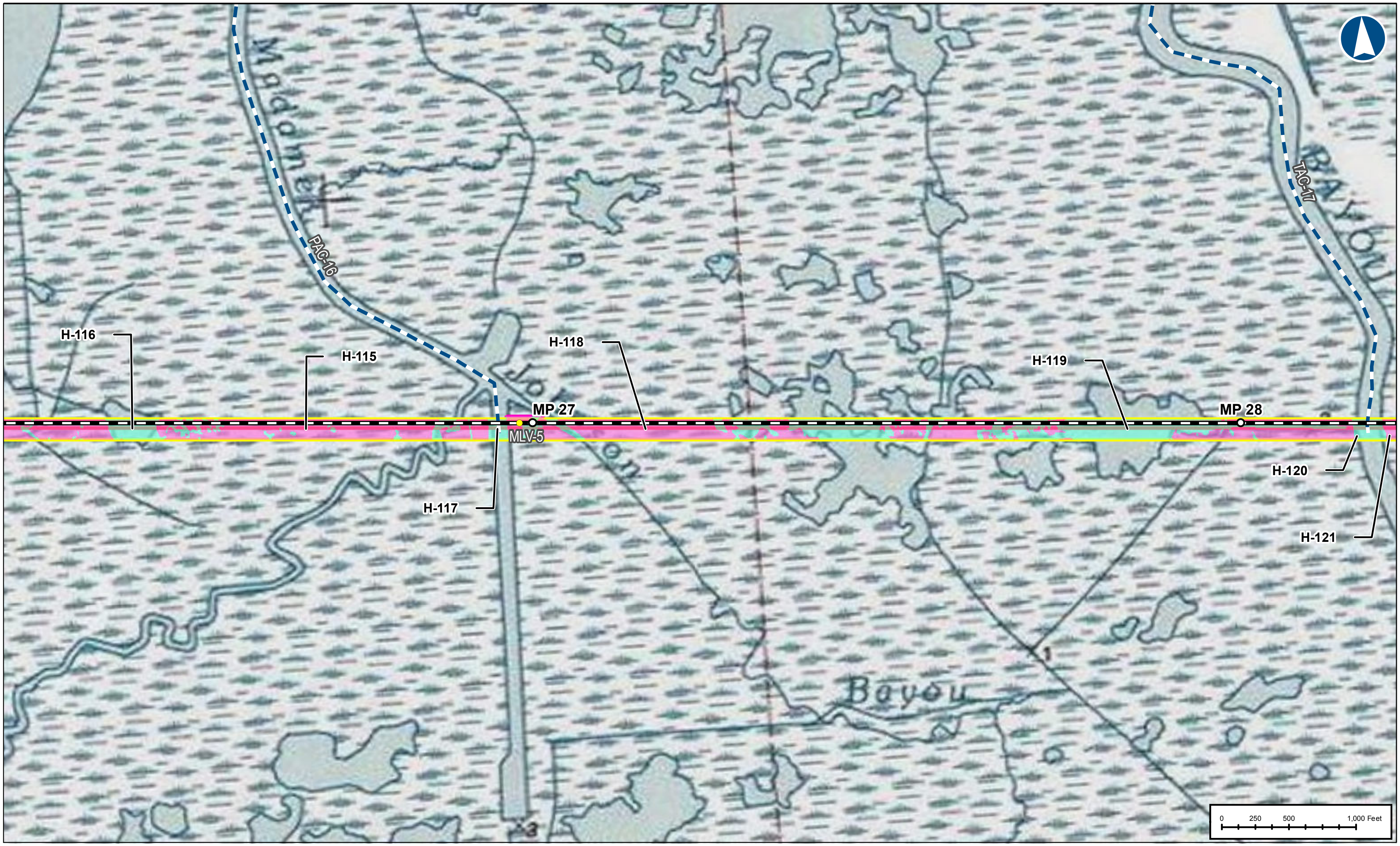
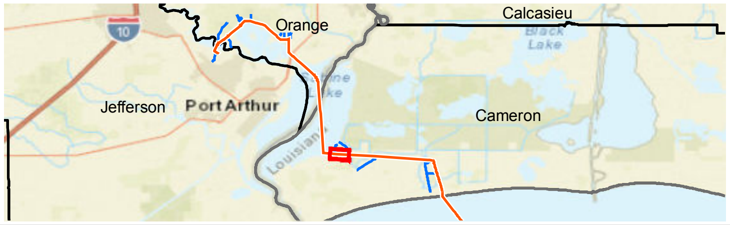
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	14 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Canal
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)
- ☐ Permanent Easement
- ☐ Temporay Easement
- ☐ ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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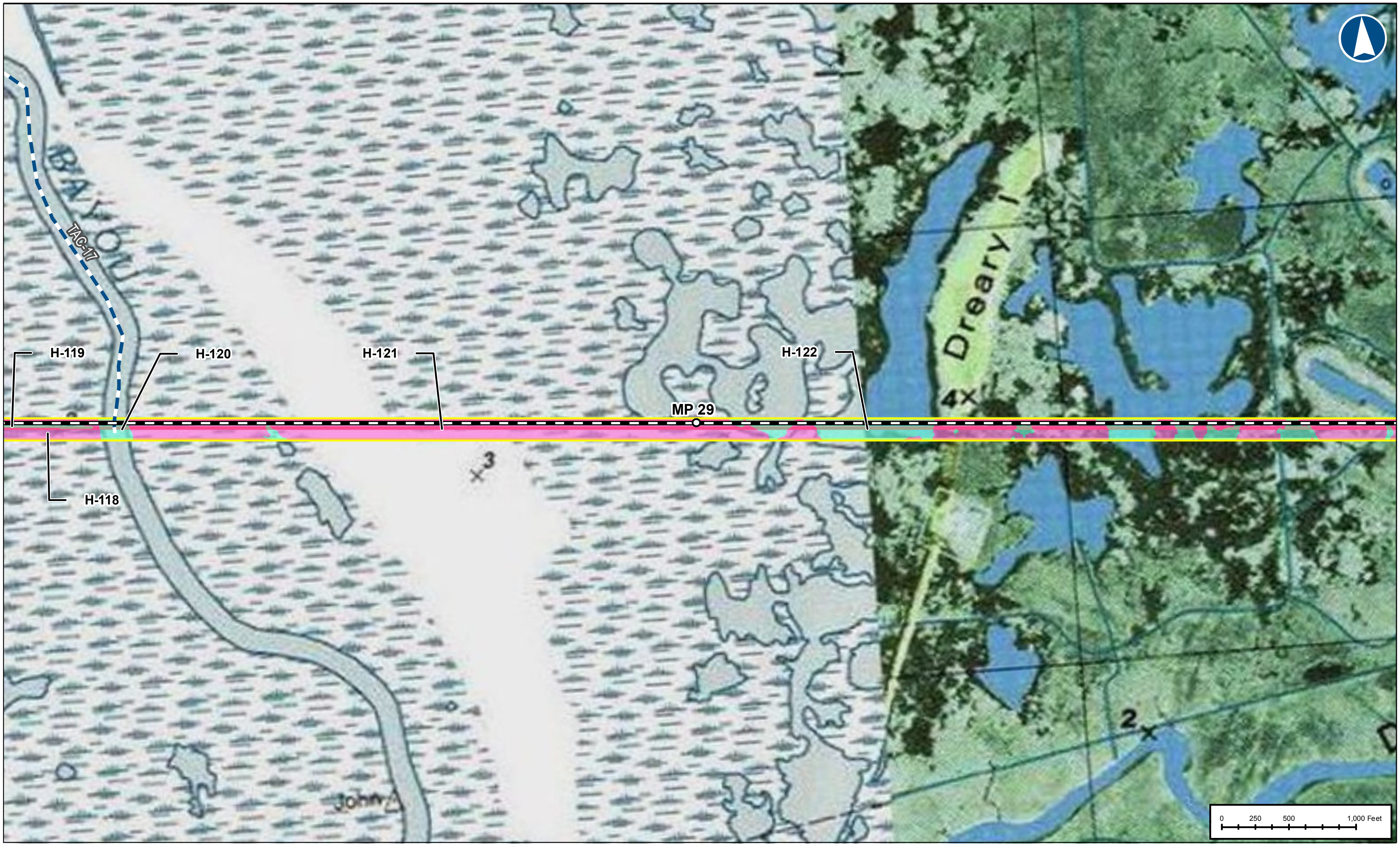
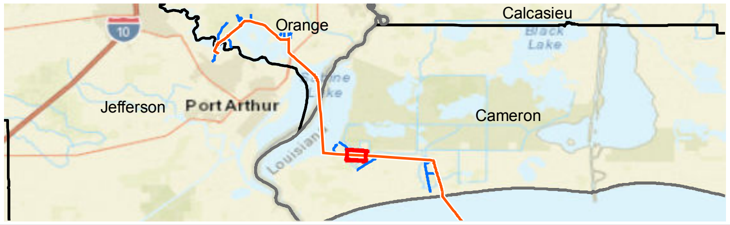
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	15 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟥 Permanent Easement
- 🟨 Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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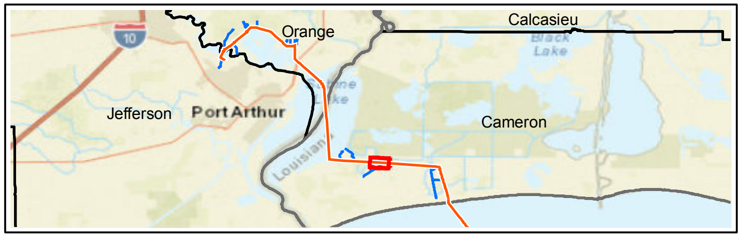
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	16 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
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DATE:	2020-08-26	PROJECTION:	UTM 15 N

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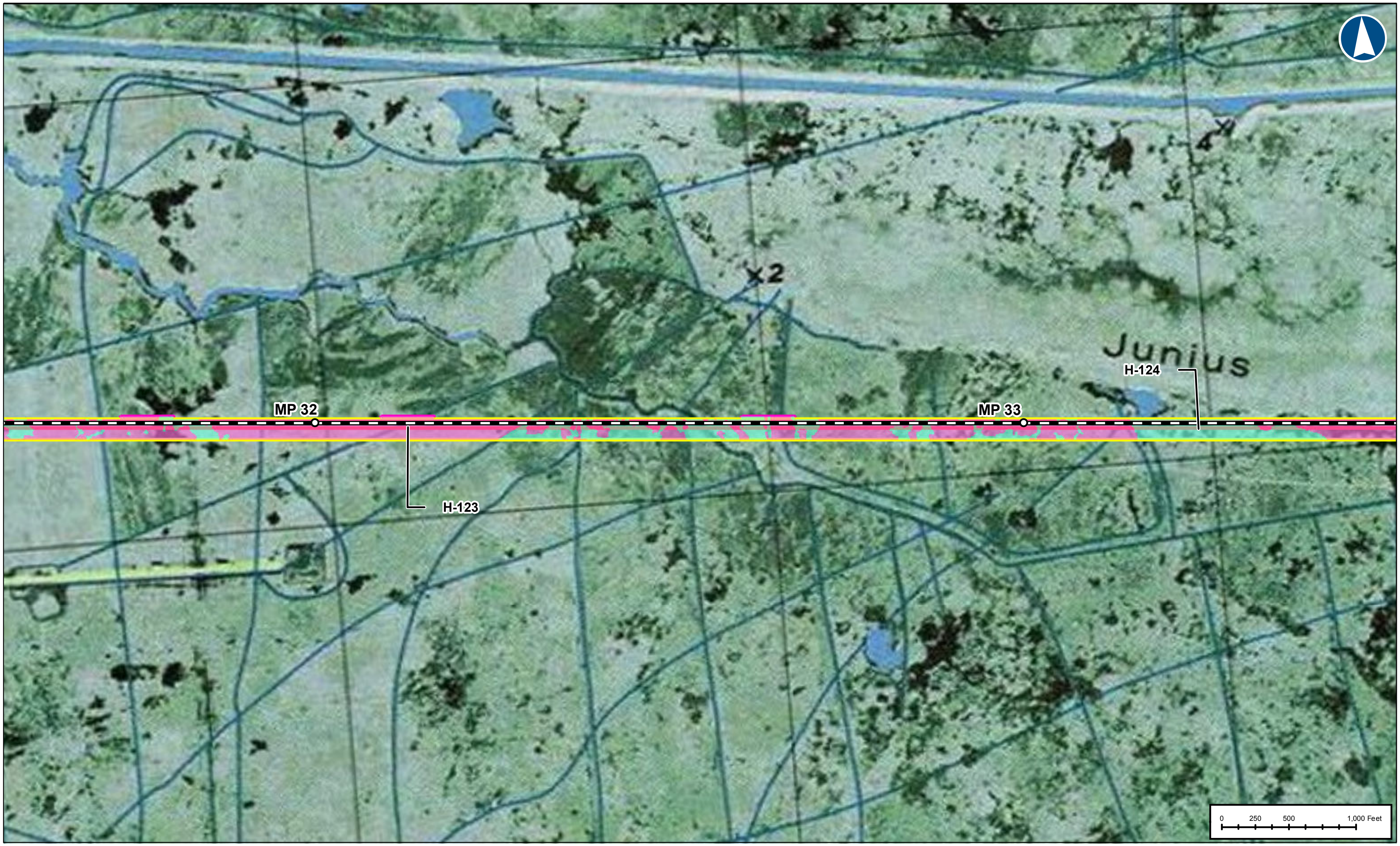
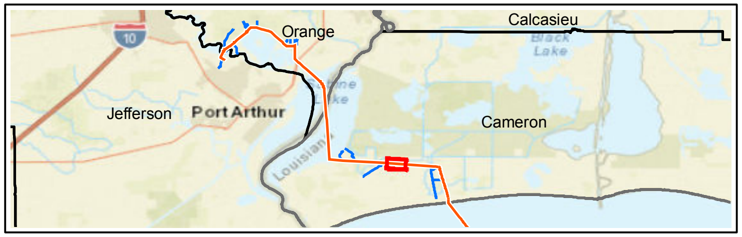
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	17 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○	Proposed Onshore Pipeline Milepost
━■━	Proposed Onshore Pipeline CL
🟦	Estuarine, unvegetated subtidal
🟪	Estuarine, vegetated intertidal (salt marsh)
🟥	Permanent Easement
🟨	Temporay Easement
🟪	ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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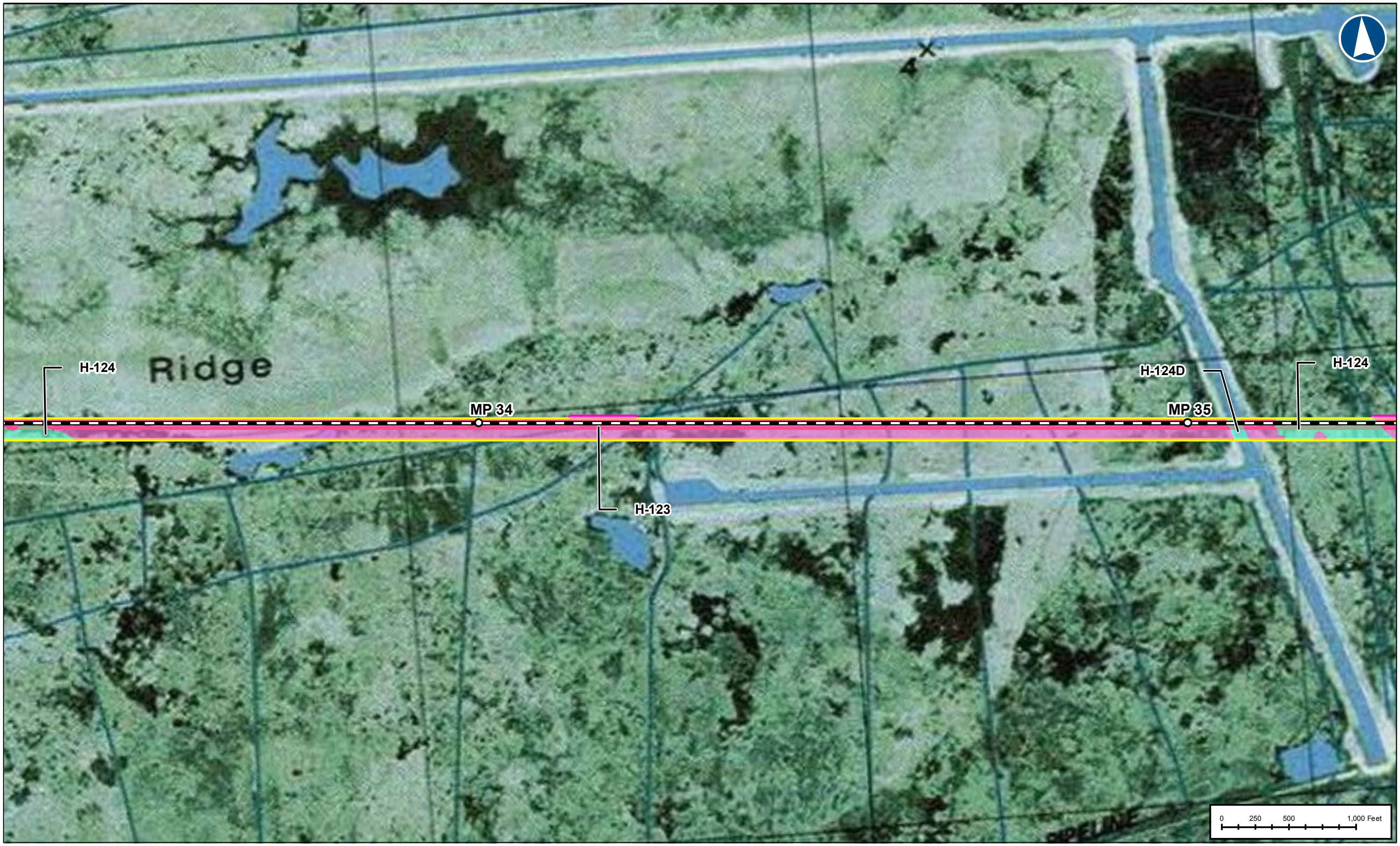
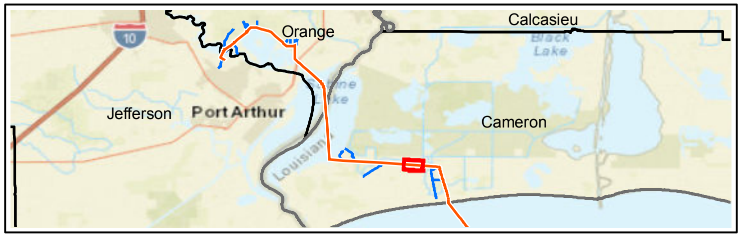
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	18 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
🟩 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)
🟥 Permanent Easement
🟨 Temporary Easement
🟪 ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
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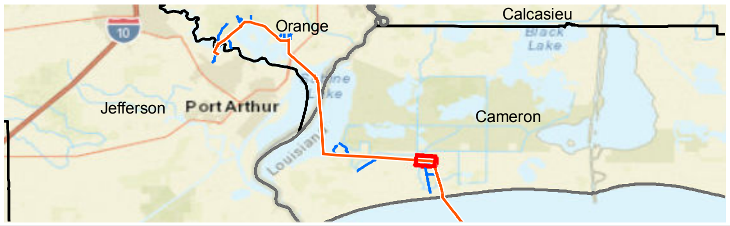
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	19 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Proposed Onshore Pipeline Milepost
- ○ Existing Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Existing Stingray Pipeline To Be Converted to Oil Service
- Project Access Road
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
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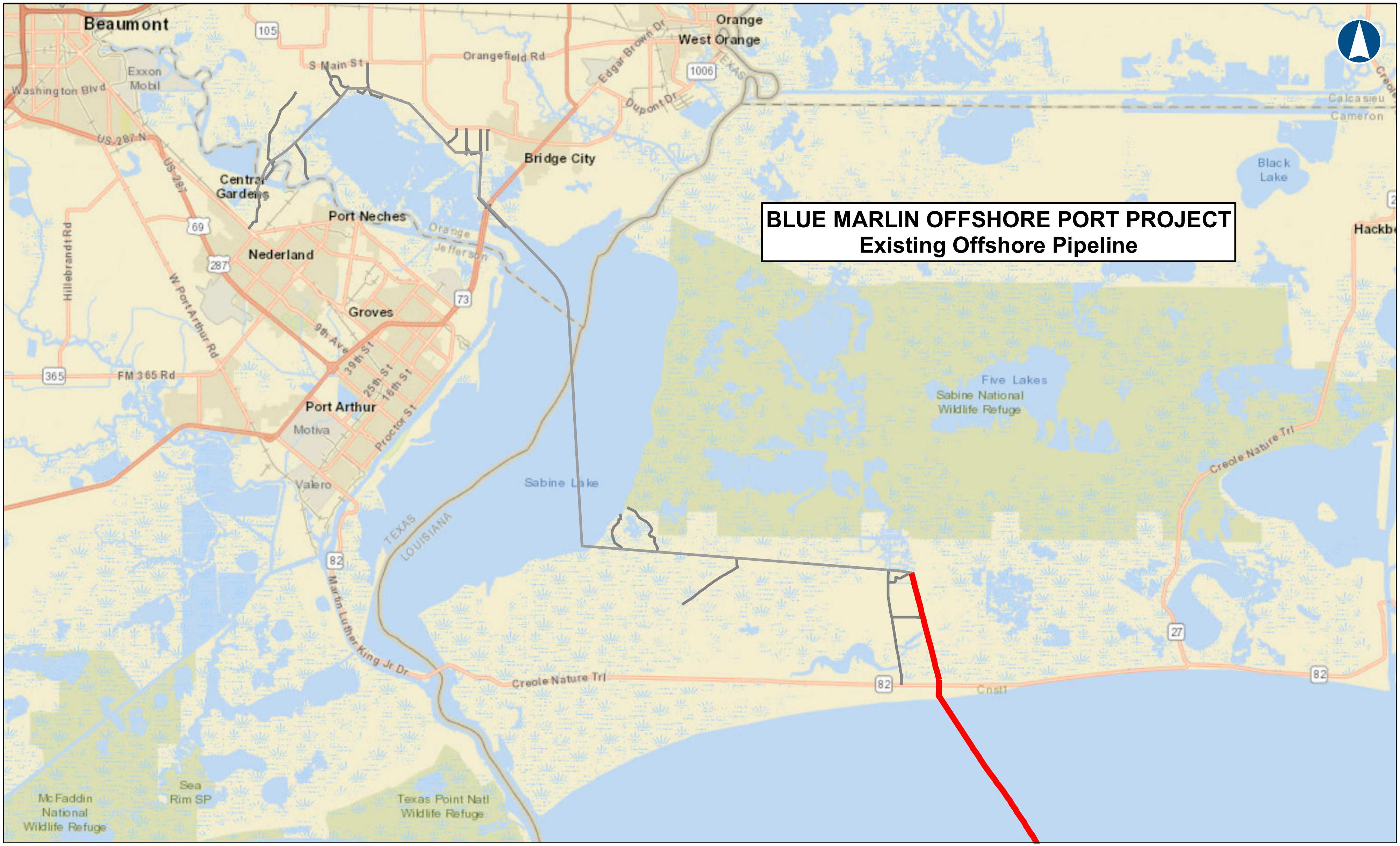
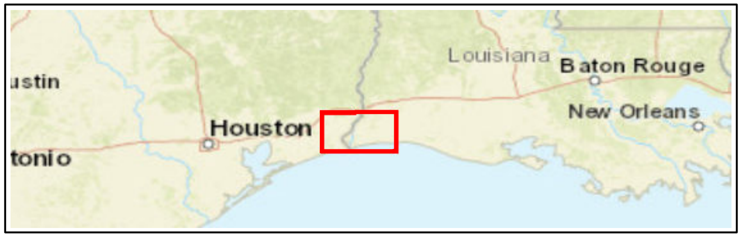
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	20 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT

BLUE MARLIN OFFSHORE PORT PROJECT
Existing Offshore Pipeline





BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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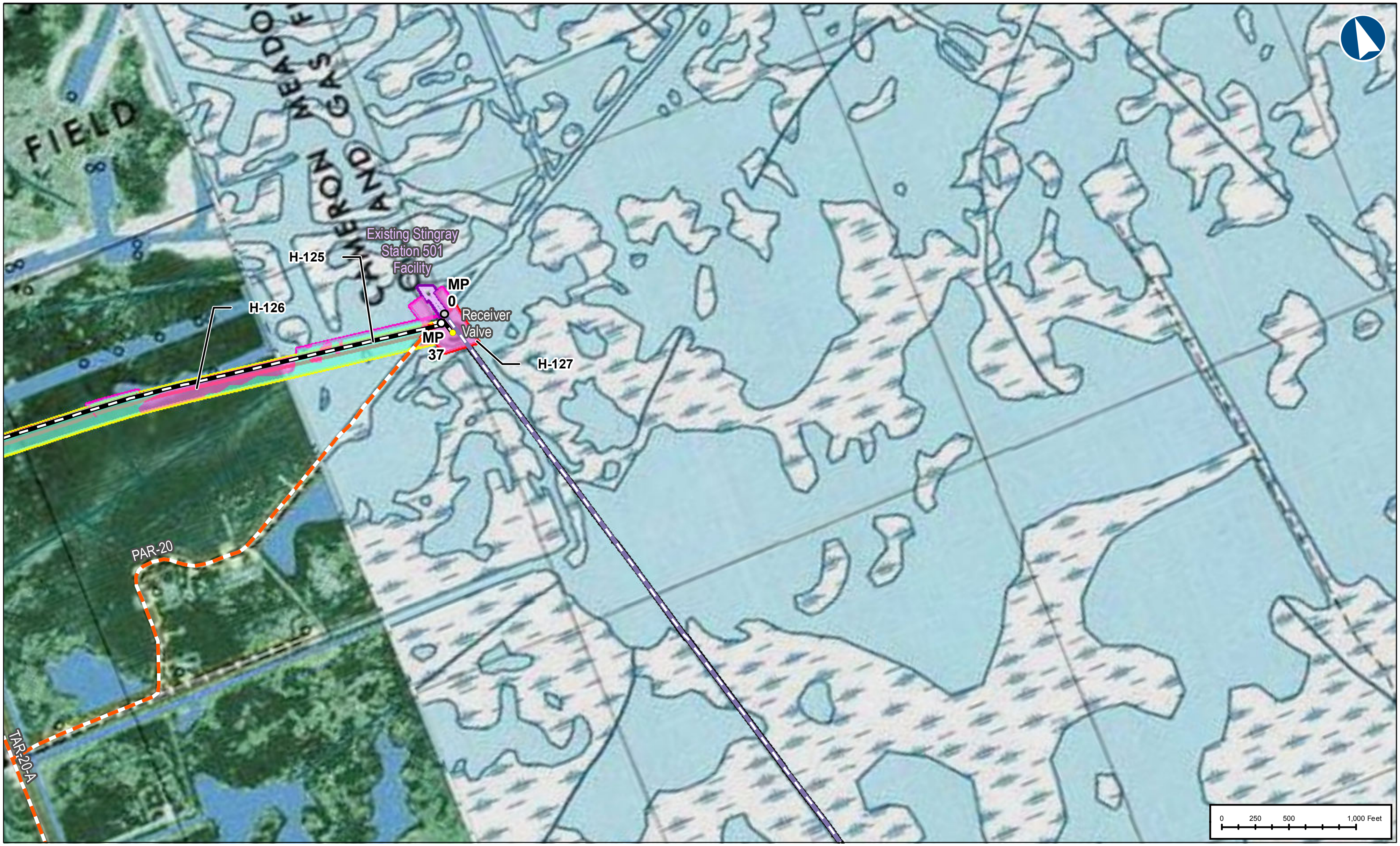
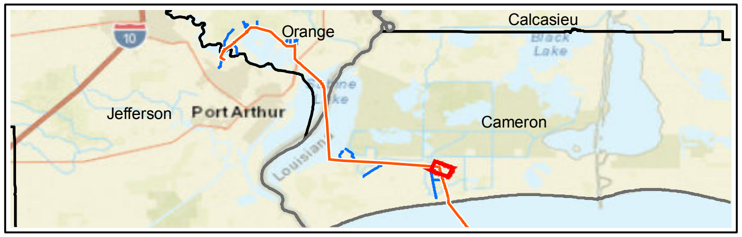
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost

◎ Existing Pipeline Milepost

● Valve Location

▬ Proposed Onshore Pipeline CL

▬ Existing Stingray Pipeline To Be Converted to Oil Service

▬ Project Access Road

🟦 Estuarine, unvegetated subtidal

🟪 Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
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DATE:	2020-08-26	PROJECTION:	UTM 15 N

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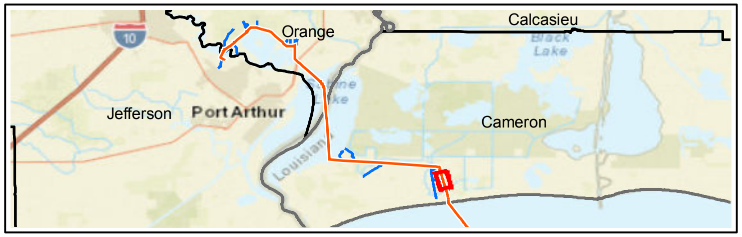
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	21 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



○	Existing Pipeline Milepost
▬	Existing Stingray Pipeline To Be Converted to Oil Service
▬	Project Access Road
🟩	Estuarine, unvegetated subtidal
🟪	Estuarine, vegetated intertidal (salt marsh)
☐	Existing Permanent Easement / Facility for Use
☐	ATWS
▨	Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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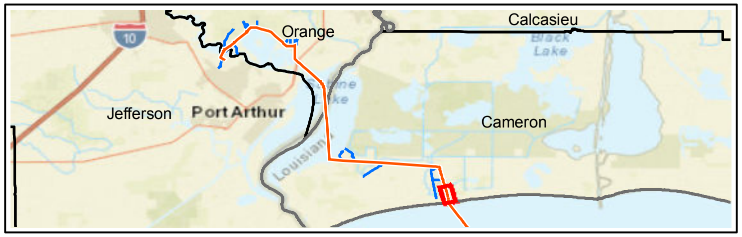
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	22 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Existing Pipeline Milepost
- ● Valve Location
- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ■ Estuarine, vegetated intertidal (salt marsh)
- ▭ Existing Permanent Easement / Facility for Use
- ▭ ATWS
- ▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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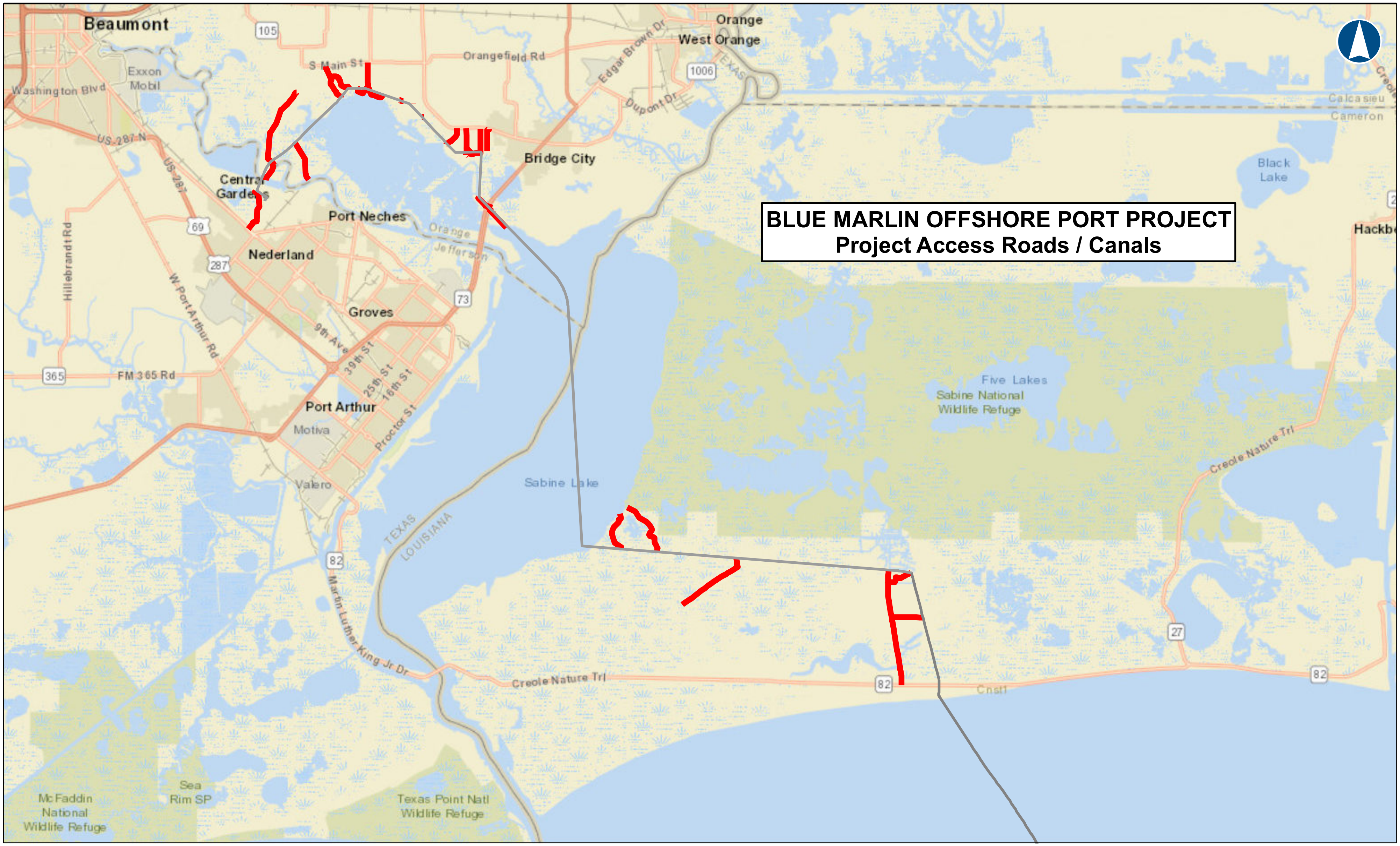
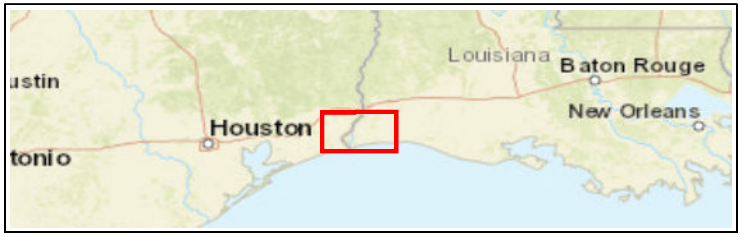
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	23 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Project Access Roads / Canals



BLUE MARLIN OFFSHORE PORT PROJECT

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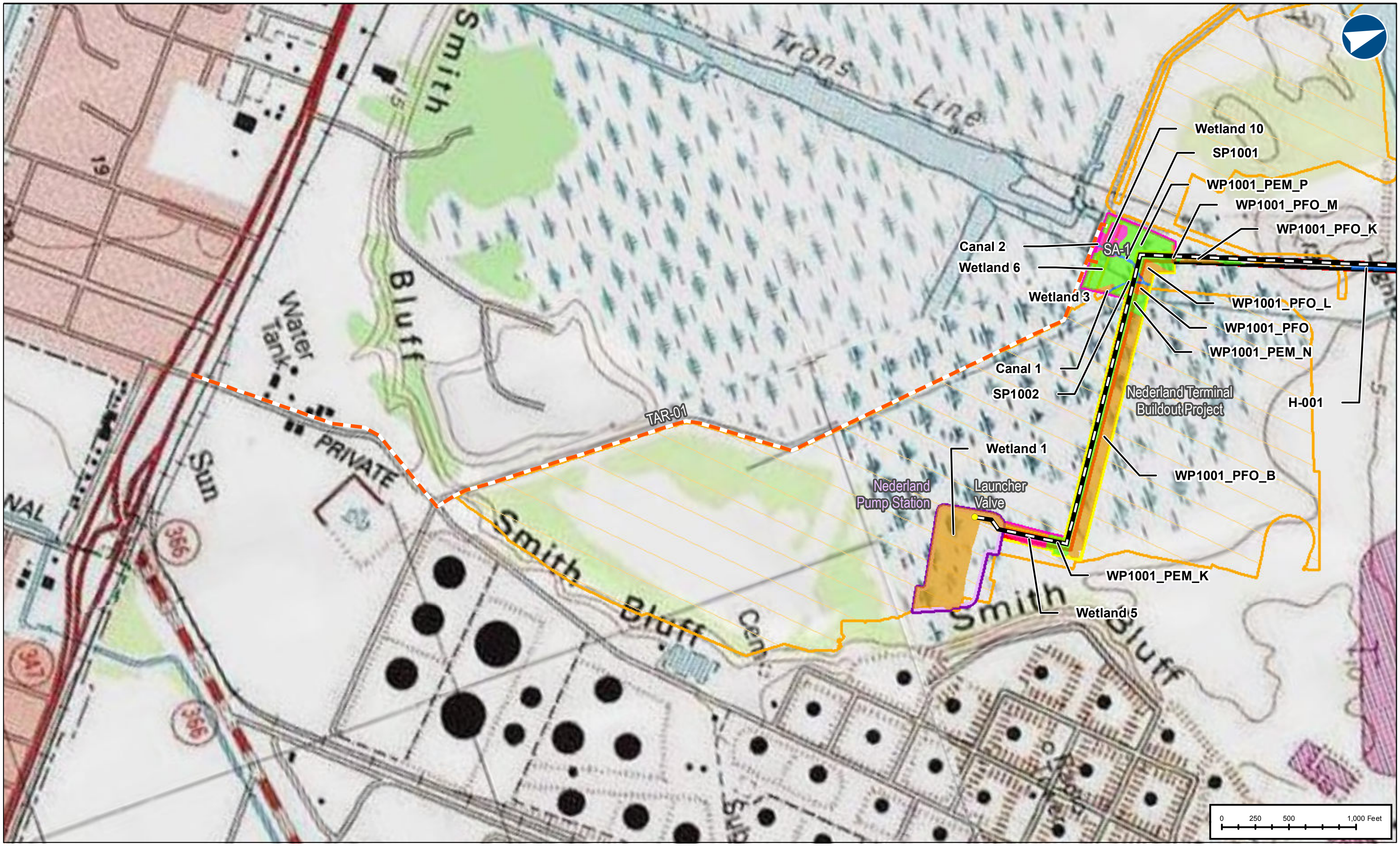
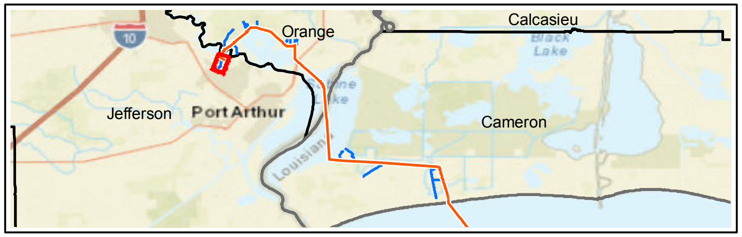
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟪 PSS Wetland
- ☐ HDD Easement (Avoidance)
- ☐ Existing Permanent Easement / Facility for Use
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ☐ ATWS
- ▨ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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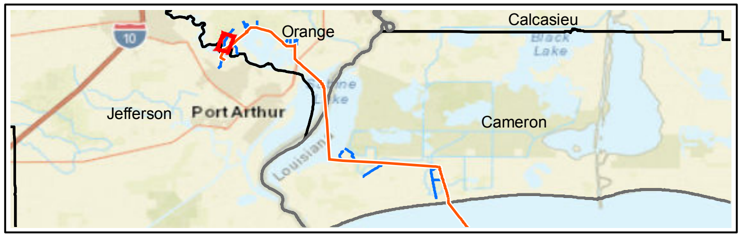
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	24 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Canal
- Project Access Road
- 🟦 Waterbody
- 🟩 PEM Wetland
- 🟧 PFO Wetland
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- 🟪 ATWS
- ⬜ Permanent Access Road Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	JEFFERSON / ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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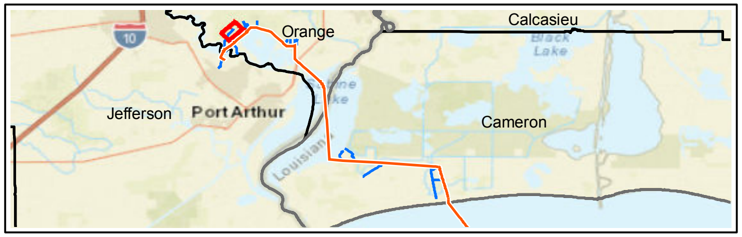
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	25 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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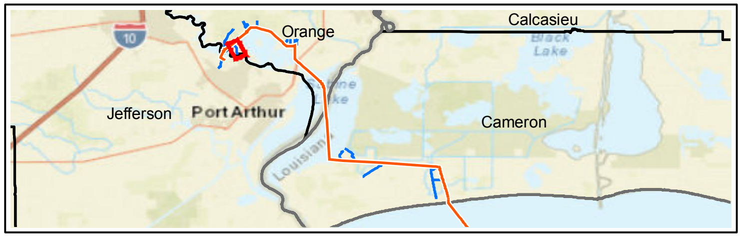
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	26 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟩 PEM Wetland
- ☐ HDD Easement (Avoidance)
- 🟥 Permanent Easement
- 🟨 Temporay Easement
- ☐ ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	JEFFERSON / ORANGE	DRAWN BY:	CW
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DATE:	2020-08-26	PROJECTION:	UTM 15 N

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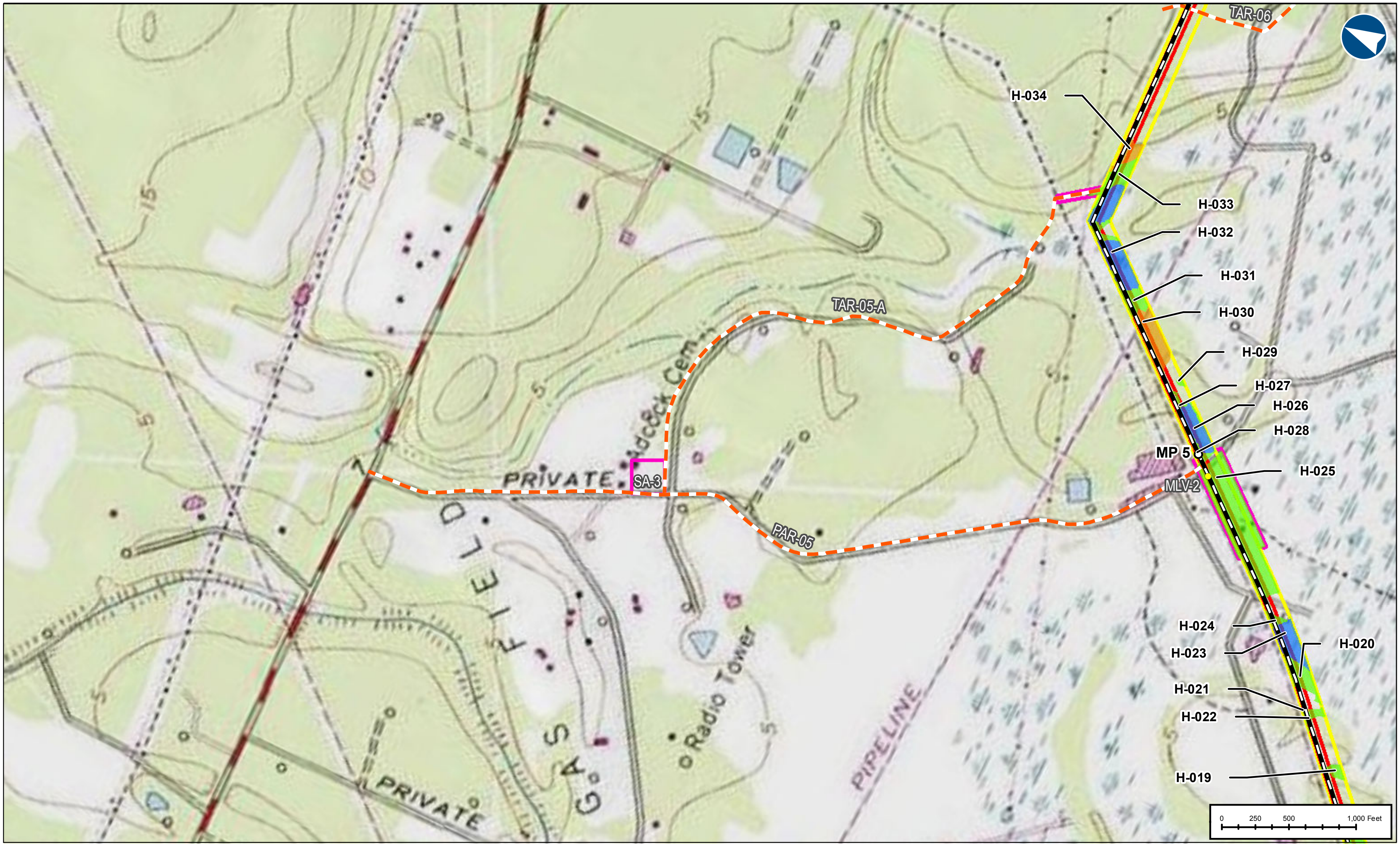
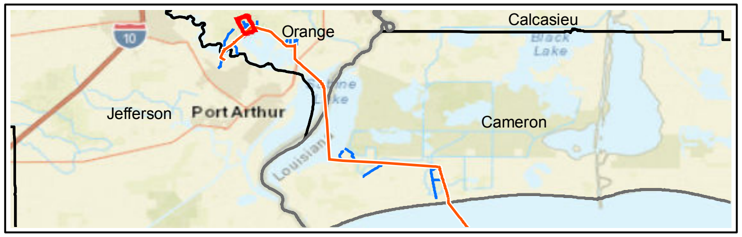
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	27 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost

● Valve Location

Proposed Onshore Pipeline CL

Project Access Road

🟦 Waterbody

🟩 PEM Wetland

🟧 PFO Wetland

🟥 Permanent Easement

🟨 Temporay Easement

▨ ATWS

▨ Permanent Access Road Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH: ORANGE	DRAWN BY: CW
STATE: TEXAS	CHECKED BY: JZ
DATE: 2020-08-26	PROJECTION: UTM 15 N

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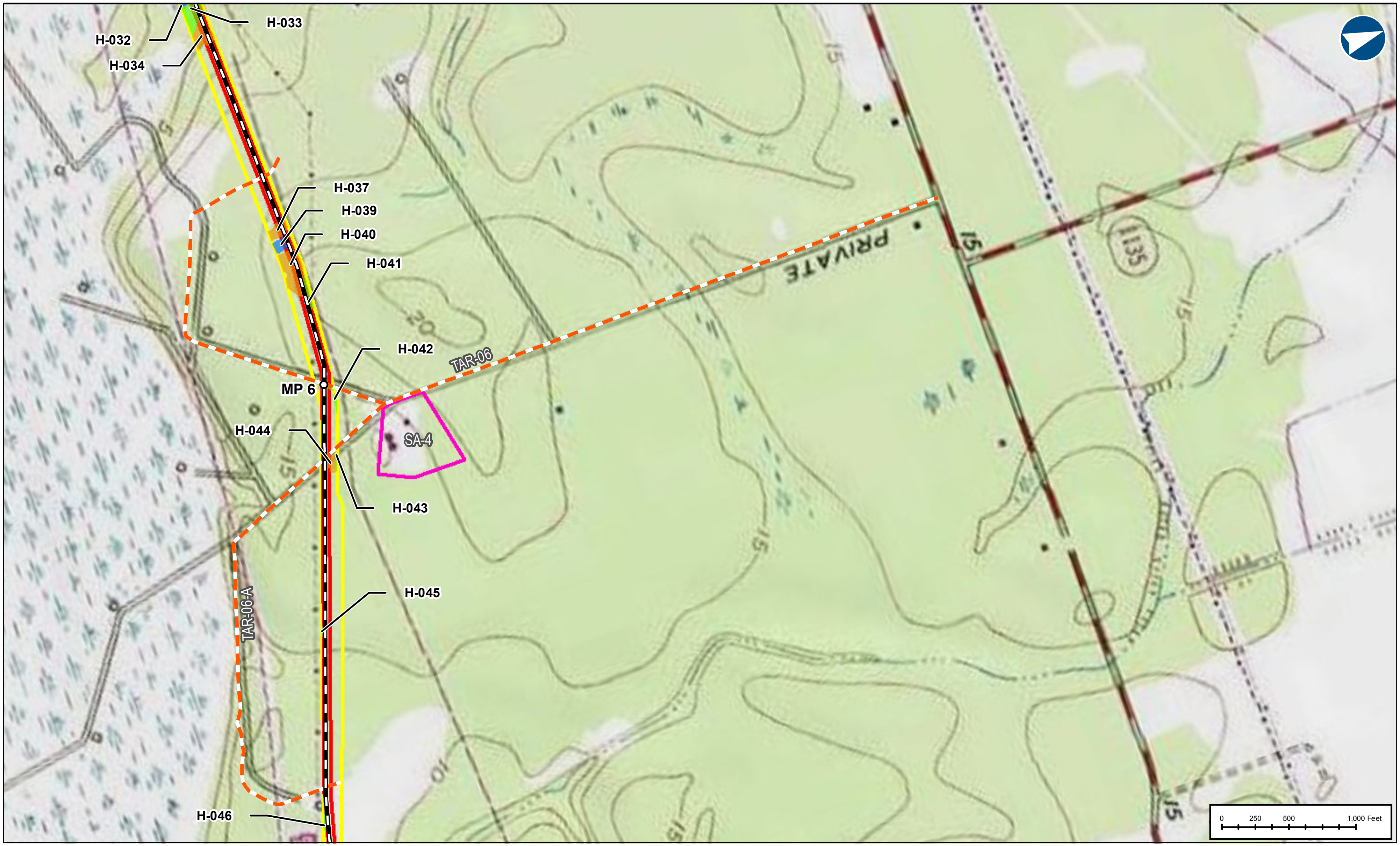
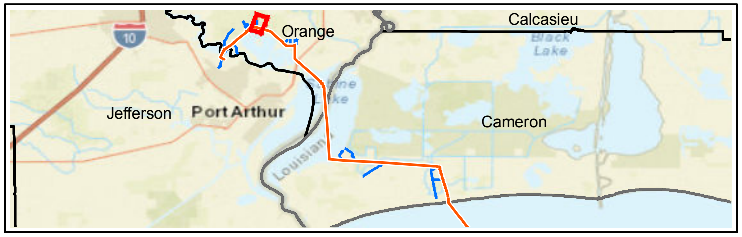
BLUE MARLIN OFFSHORE PORT PROJECT

DWG: 0801-06-001	SHEET: 28 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Road
🟦 Waterbody
🟩 PEM Wetland
🟧 PFO Wetland
🟥 Permanent Easement
🟨 Temporay Easement
▢ ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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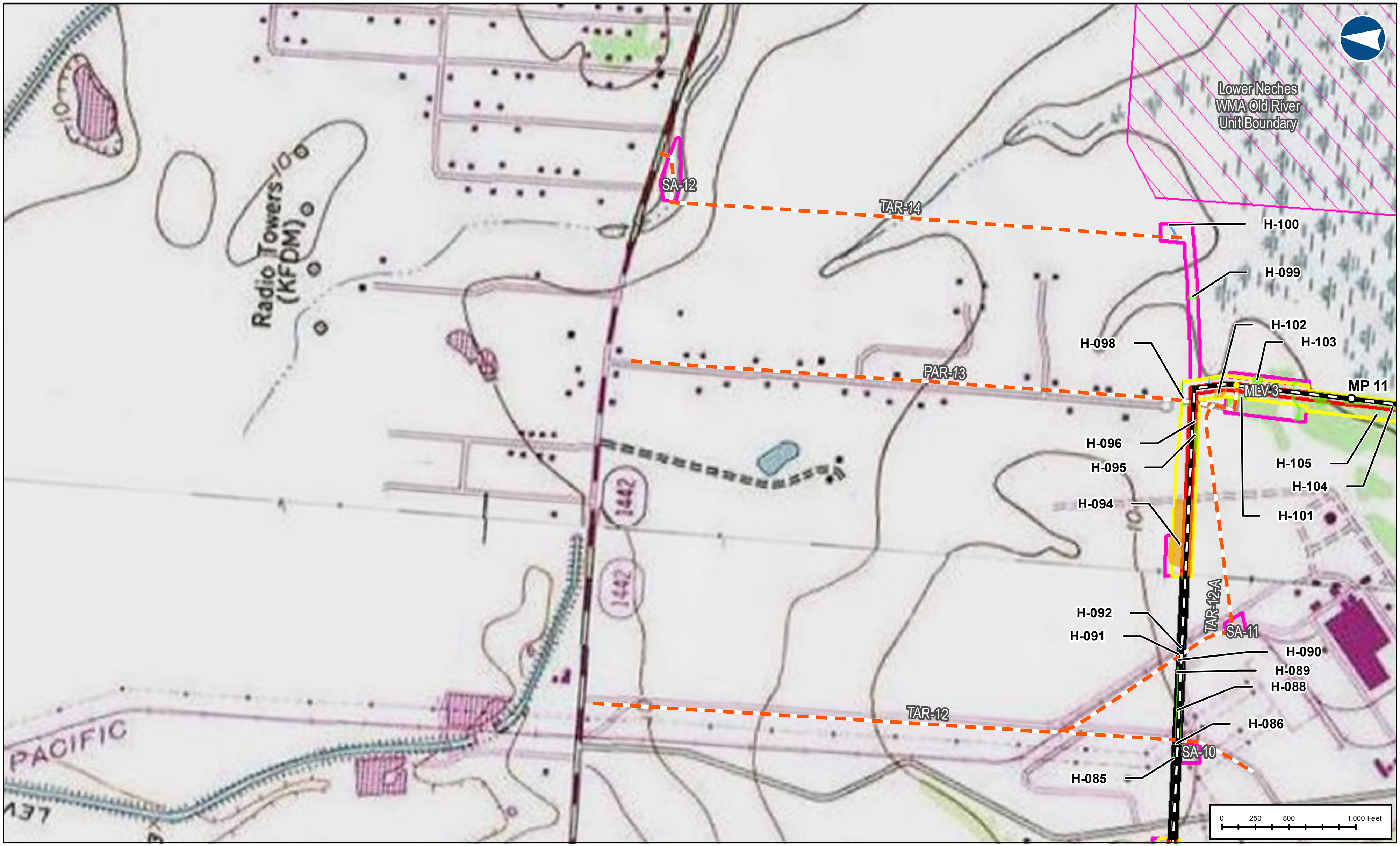
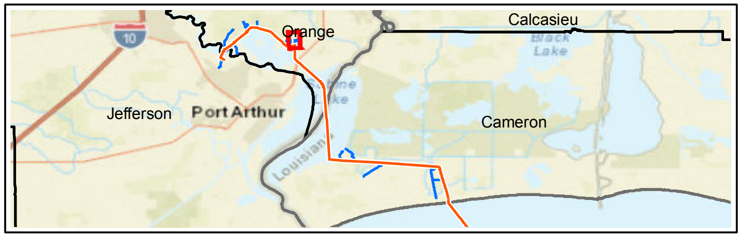
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	29 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost

● Valve Location

Proposed Onshore Pipeline CL

Project Access Road

Waterbody

PEM Wetland

PFO Wetland

HDD Easement (Avoidance)

Permanent Easement

Temporay Easement

ATWS

Permanent Access Road Easement

Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	ORANGE	*DRAWN BY:*	CW
STATE:	TEXAS	*CHECKED BY:*	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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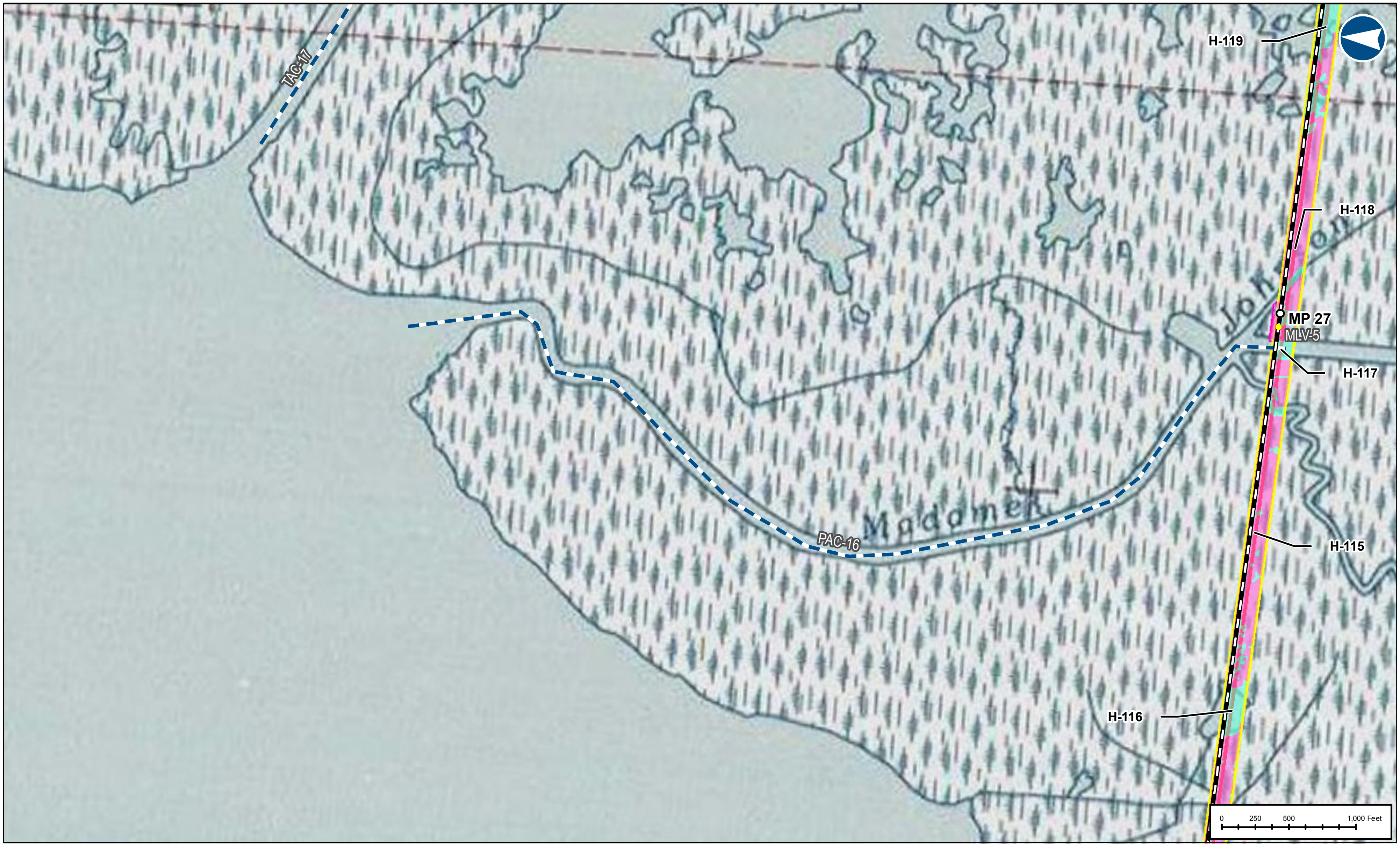
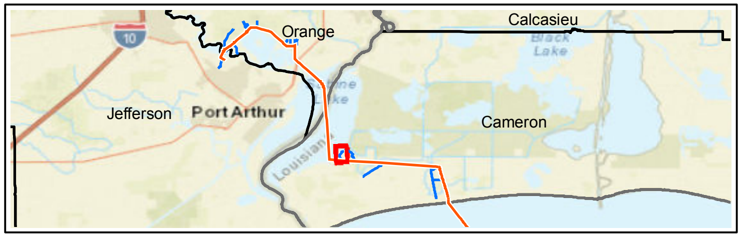
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	30 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost	Estuarine, vegetated intertidal (salt marsh)
● Valve Location	Permanent Easement
Proposed Onshore Pipeline CL	Temporay Easement
Project Access Canal	ATWS
Estuarine, unvegetated subtidal	

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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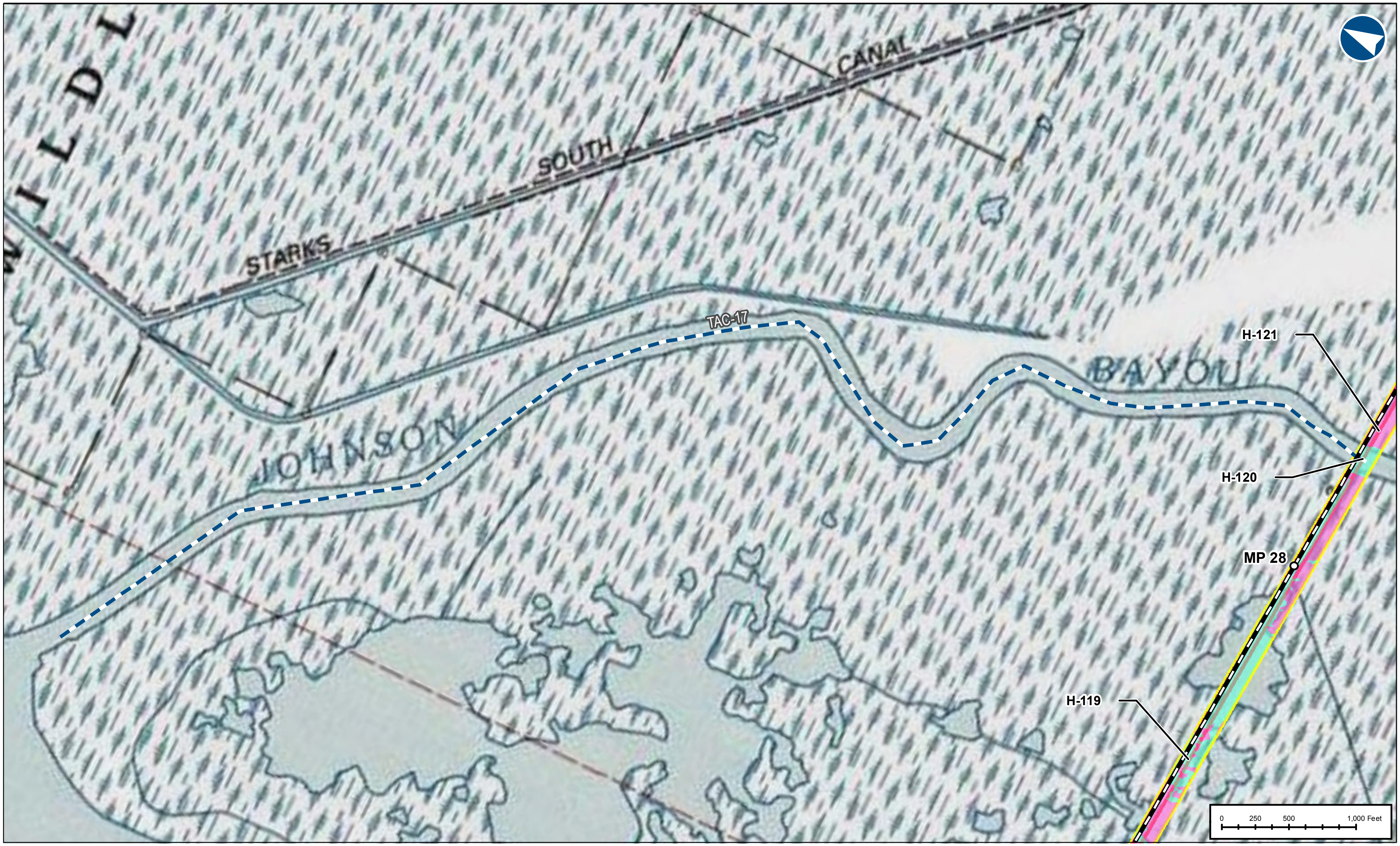
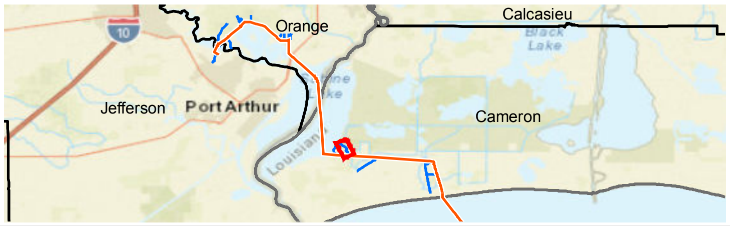
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	31 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





- ○ Proposed Onshore Pipeline Milepost
- ━ Proposed Onshore Pipeline CL
- ╍ Project Access Canal
- 🟩 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- 🟥 Permanent Easement
- 🟨 Temporay Easement

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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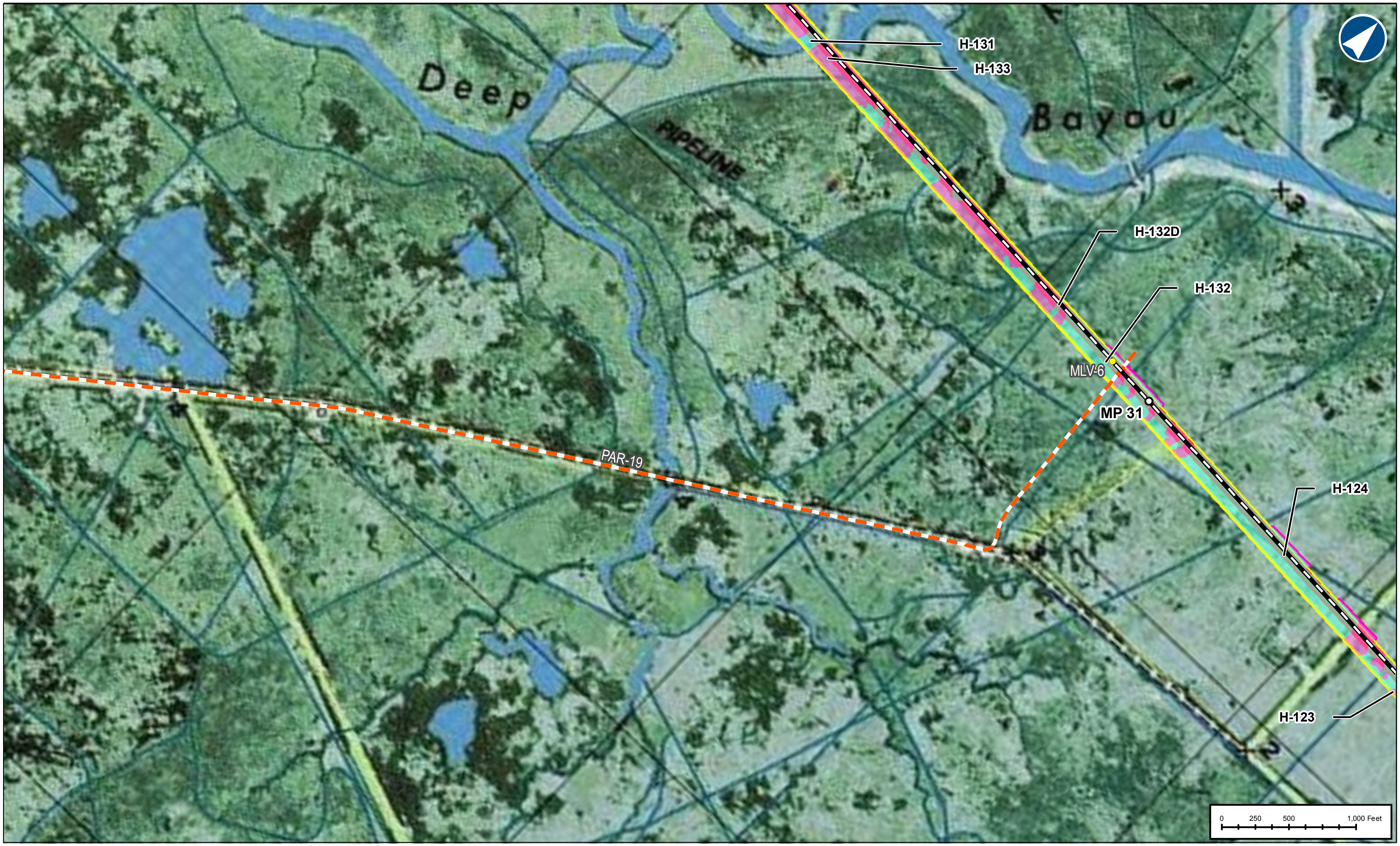
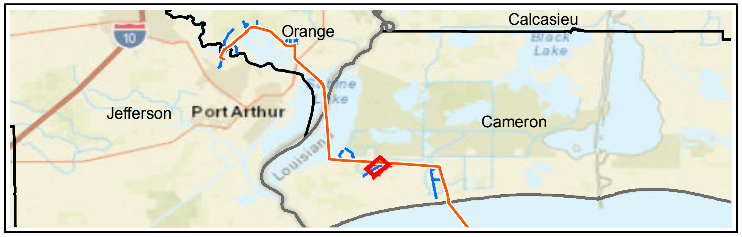
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	32 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Road
🟩 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)
🟥 Permanent Easement
🟨 Temporay Easement
🟪 ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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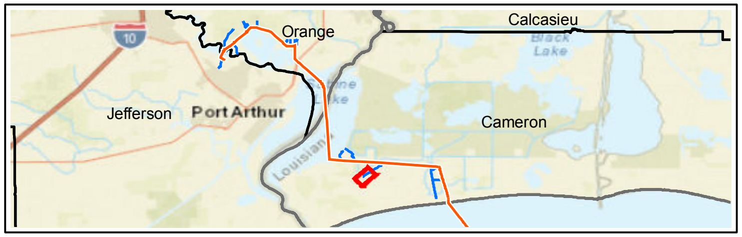
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	33 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT	
TOPOGRAPHIC MAP	
COUNTY/PARISH: CAMERON	DRAWN BY: CW
STATE: LOUISIANA	CHECKED BY: JZ
DATE: 2020-08-26	PROJECTION: UTM 15 N

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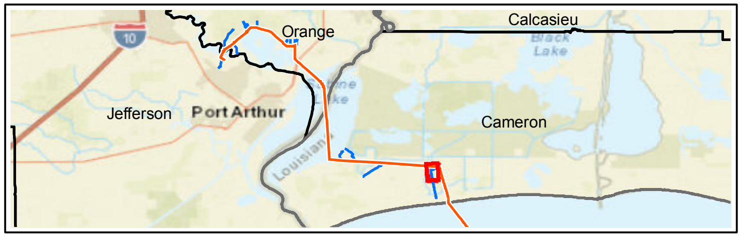
BLUE MARLIN OFFSHORE PORT PROJECT

DWG: 0801-06-001	SHEET: 34 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Road
🟩 Estuarine, unvegetated subtidal
🟪 Estuarine, vegetated intertidal (salt marsh)
🟥 Permanent Easement
🟨 Temporay Easement
🟪 ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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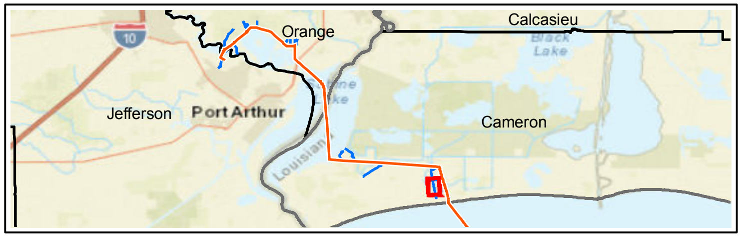
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	35 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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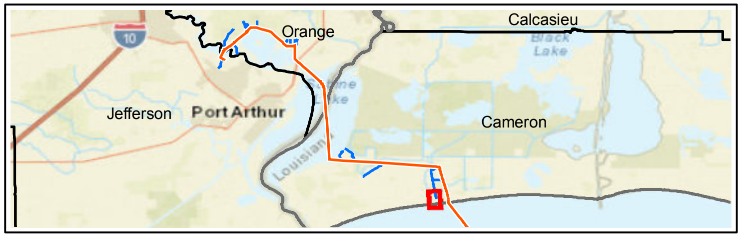
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	36 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- - - Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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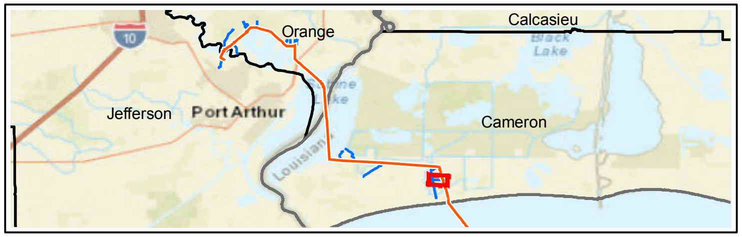
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	37 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-2 TOPOGRAPHIC MAP



- ○ Existing Pipeline Milepost
- Existing Stingray Pipeline To Be Converted to Oil Service
- Project Access Road
- 🟦 Estuarine, unvegetated subtidal
- 🟪 Estuarine, vegetated intertidal (salt marsh)
- ☐ Existing Permanent Easement / Facility for Use
- ☐ ATWS
- ▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT

TOPOGRAPHIC MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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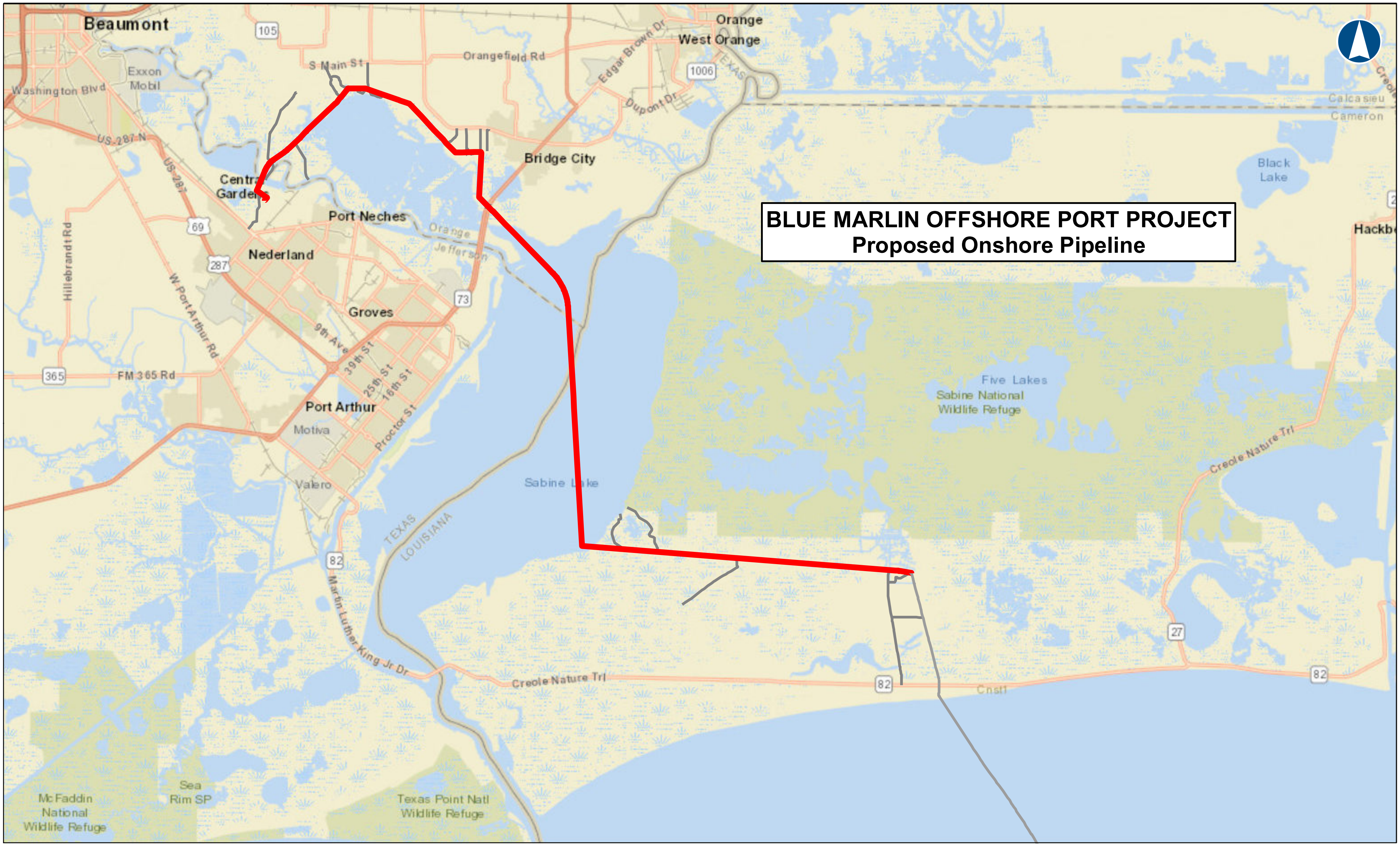
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	38 OF 38

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Proposed Onshore Pipeline

BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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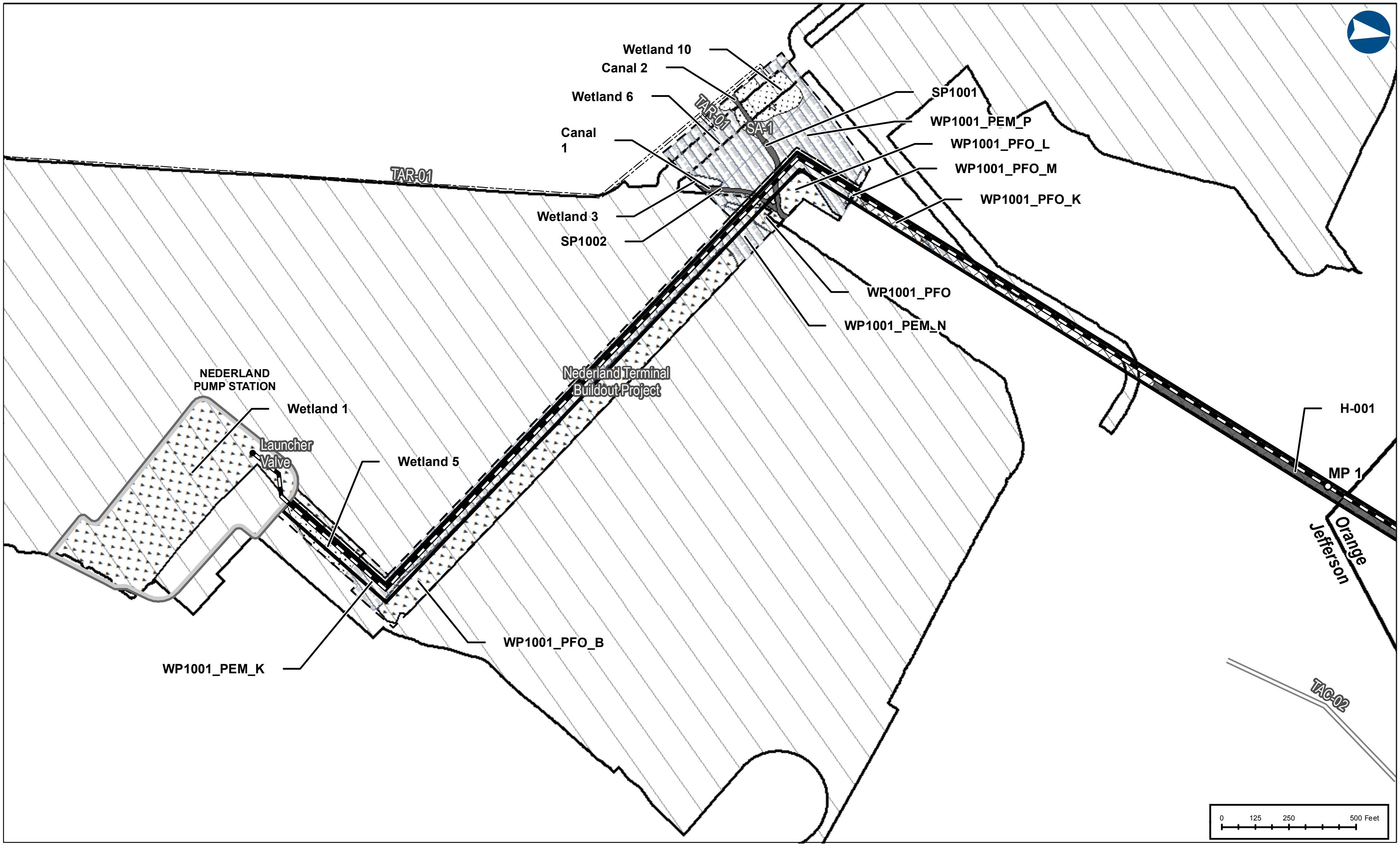
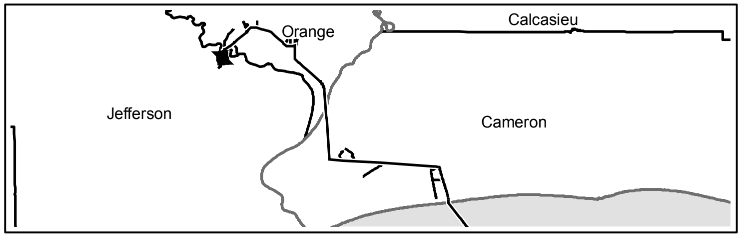
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Canal
- Project Access Road
- ☒ HDD Easement (Avoidance)
- Existing Permanent Easement / Facility for Use
- ▭ Permanent Easement
- Temporay Easement
- ATWS
- ■ Waterbody
- ▨ PEM Wetland
- PFO Wetland
- PSS Wetland
- Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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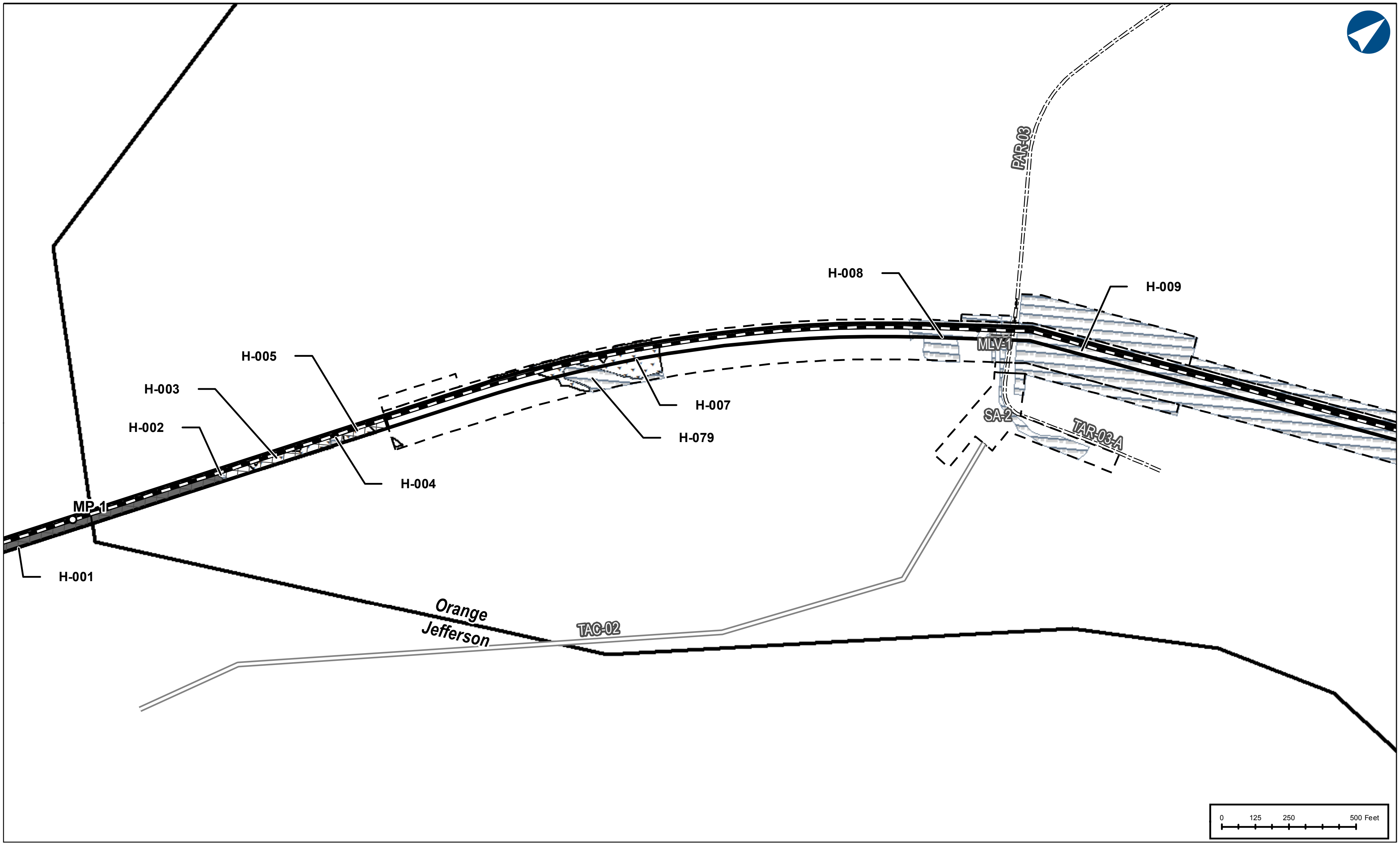
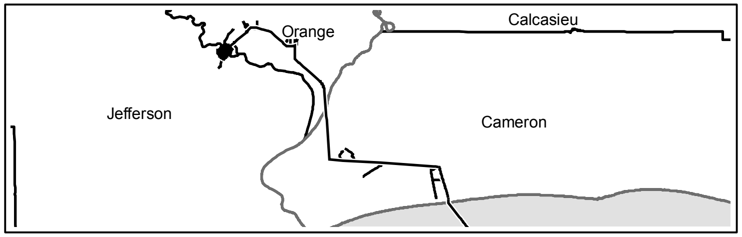
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Canal
Project Access Road
☒ HDD Easement (Avoidance)
▭ Permanent Easement
Temporay Easement
ATWS
▭ Permanent Access Road Easement
■ Waterbody
▨ PEM Wetland
PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT *PLAN VIEW MAP*			
COUNTY/PARISH:	JEFFERSON / ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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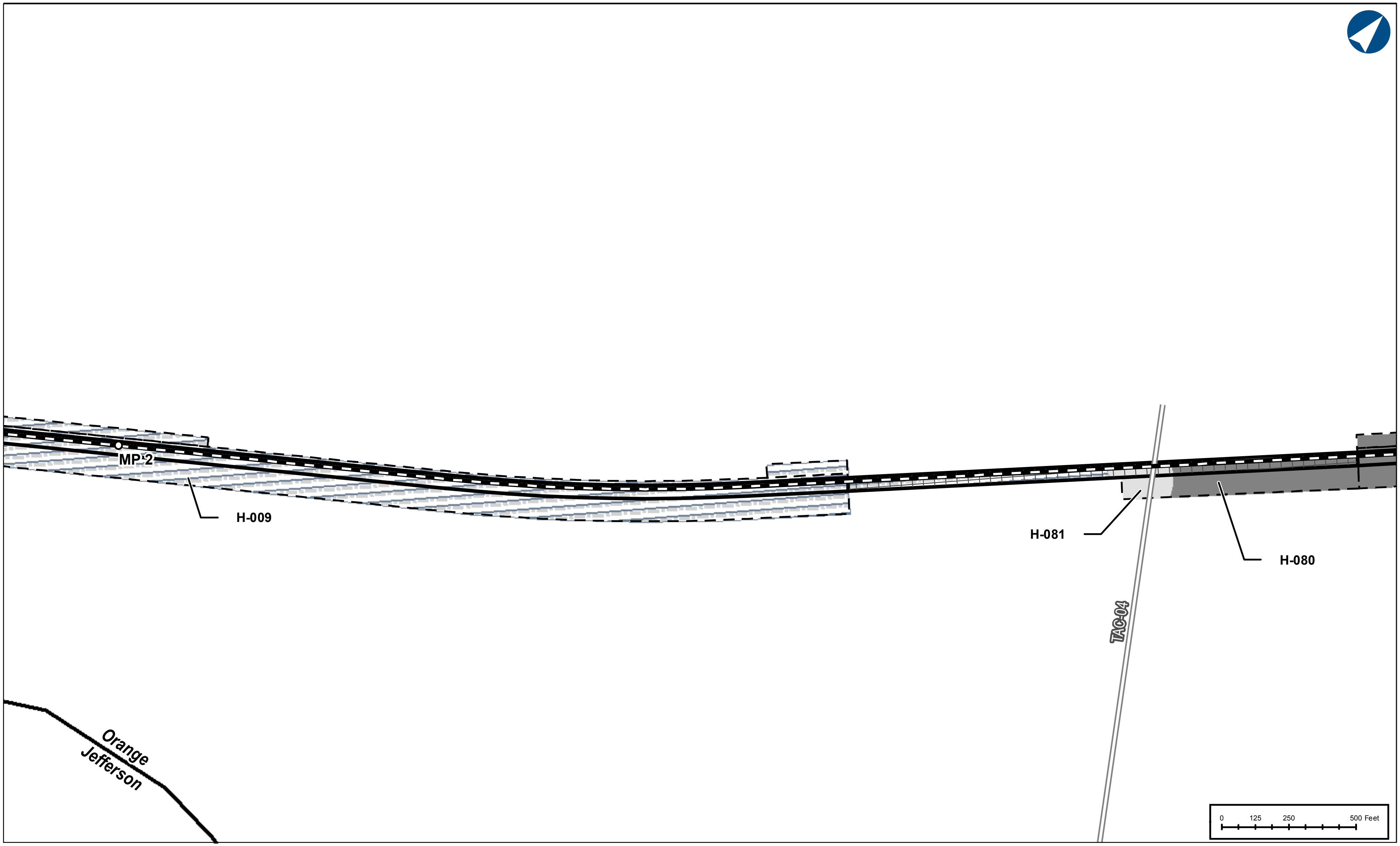
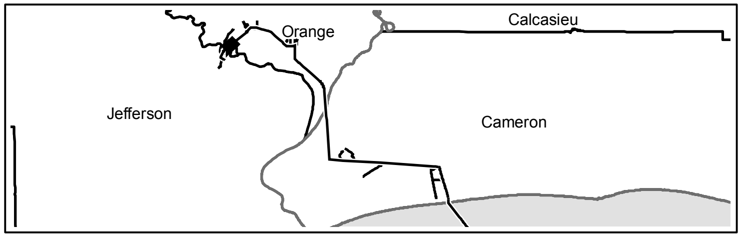
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	2 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- ☒ HDD Easement (Avoidance)
- ☐ Permanent Easement
- Temporay Easement
- ATWS
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)
- ▨ PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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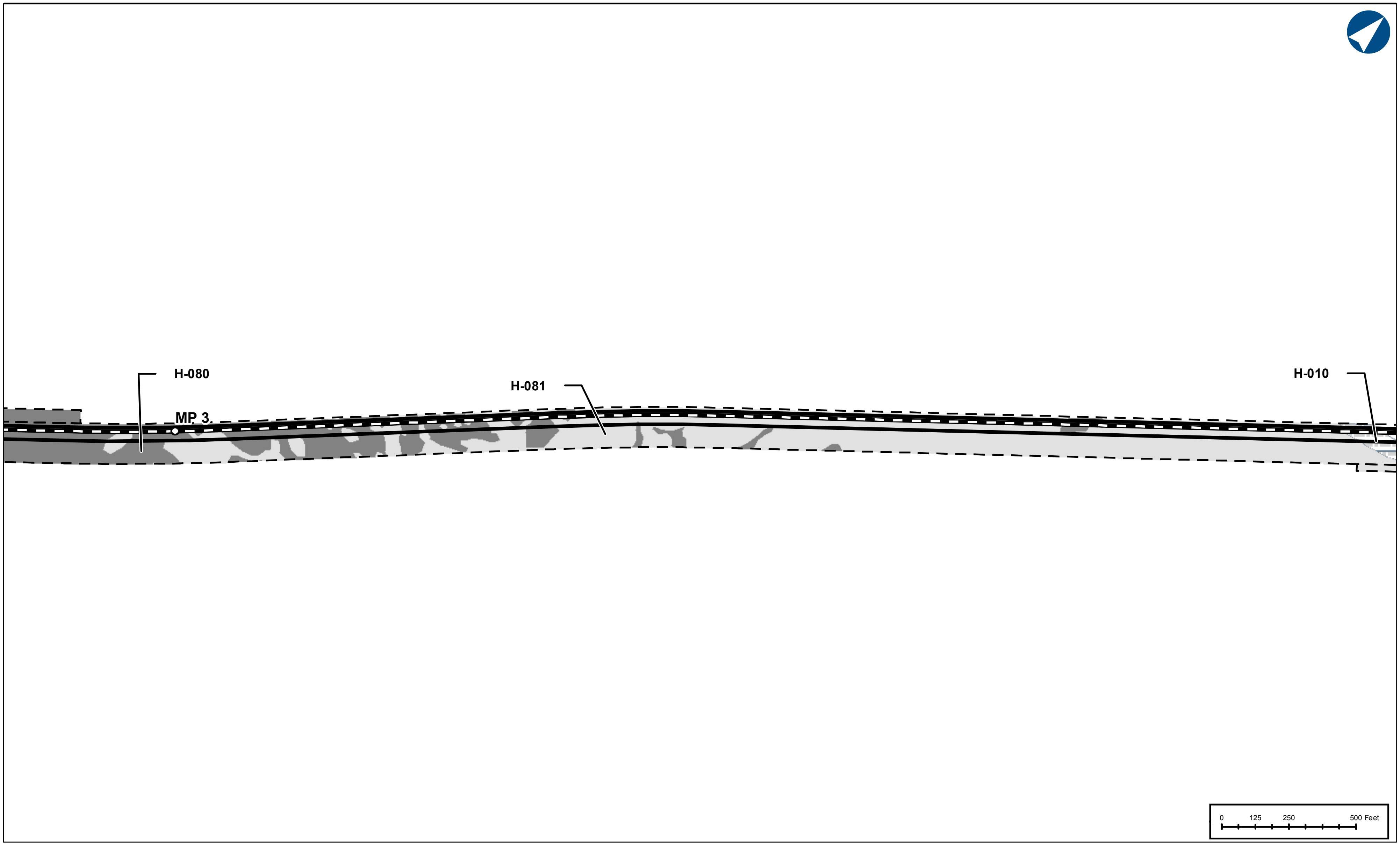
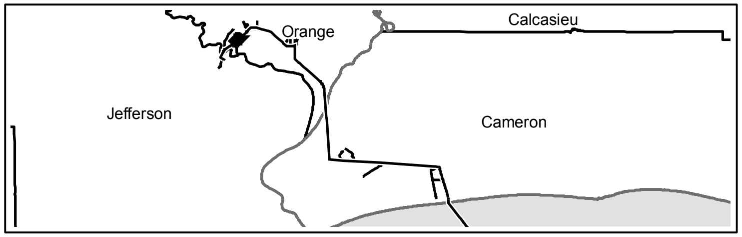
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	3 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Permanent Easement
- Temporay Easement
- ATWS
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)
- ▨ PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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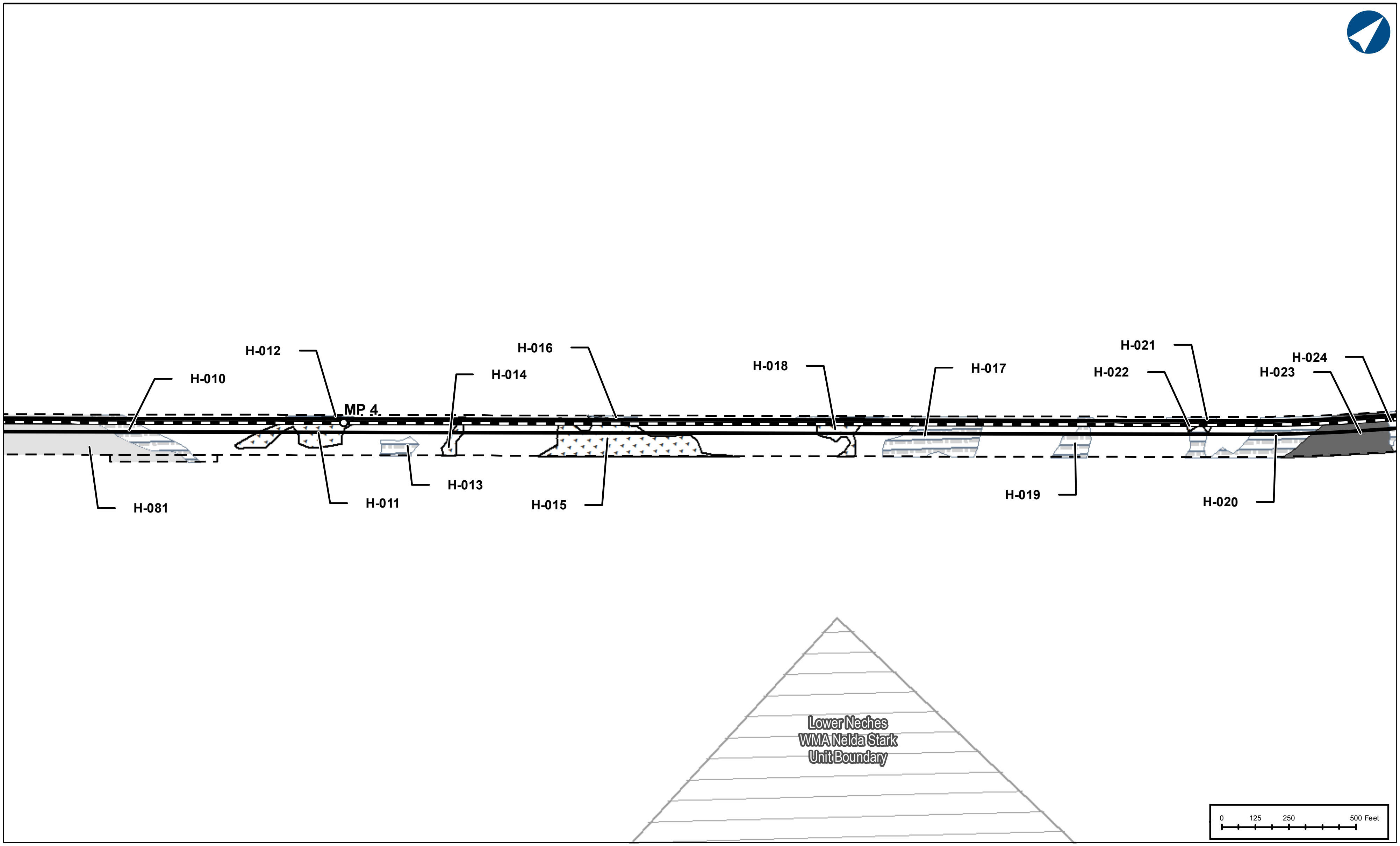
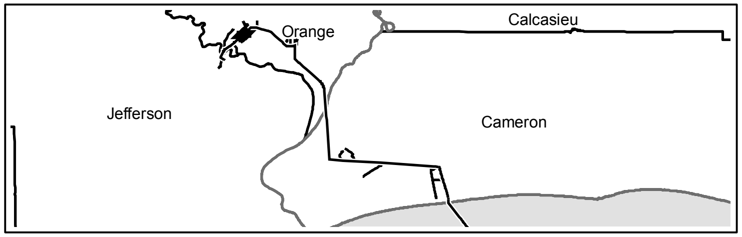
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	4 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Permanent Easement
Temporay Easement
ATWS
■ Waterbody
Estuarine, unvegetated subtidal
▨ PEM Wetland
PFO Wetland
Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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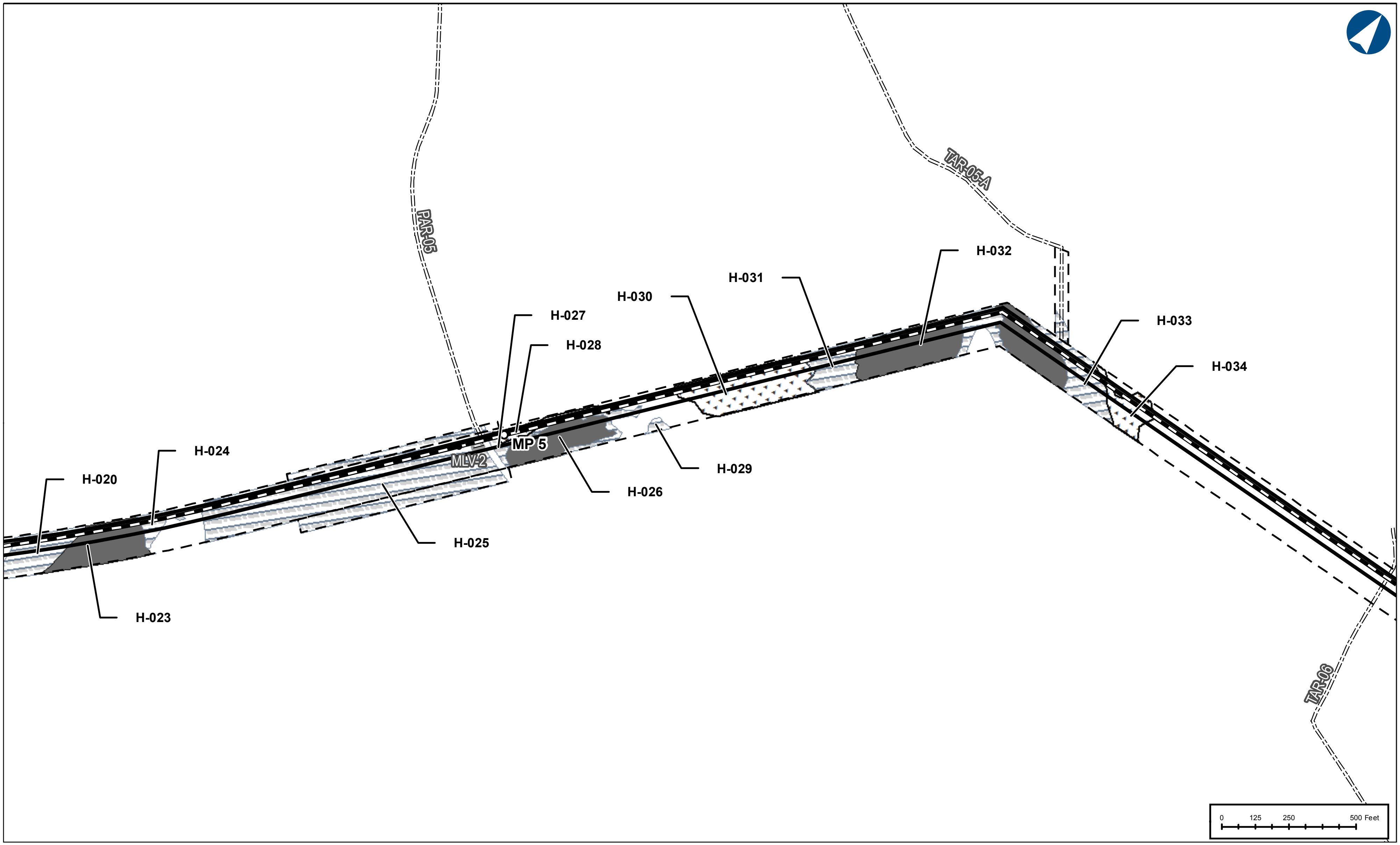
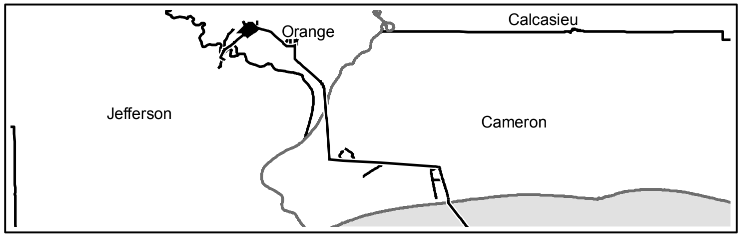
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	5 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- Permanent Easement
- Temporay Easement
- ATWS
- Permanent Access Road Easement
- Waterbody
- PEM Wetland
- PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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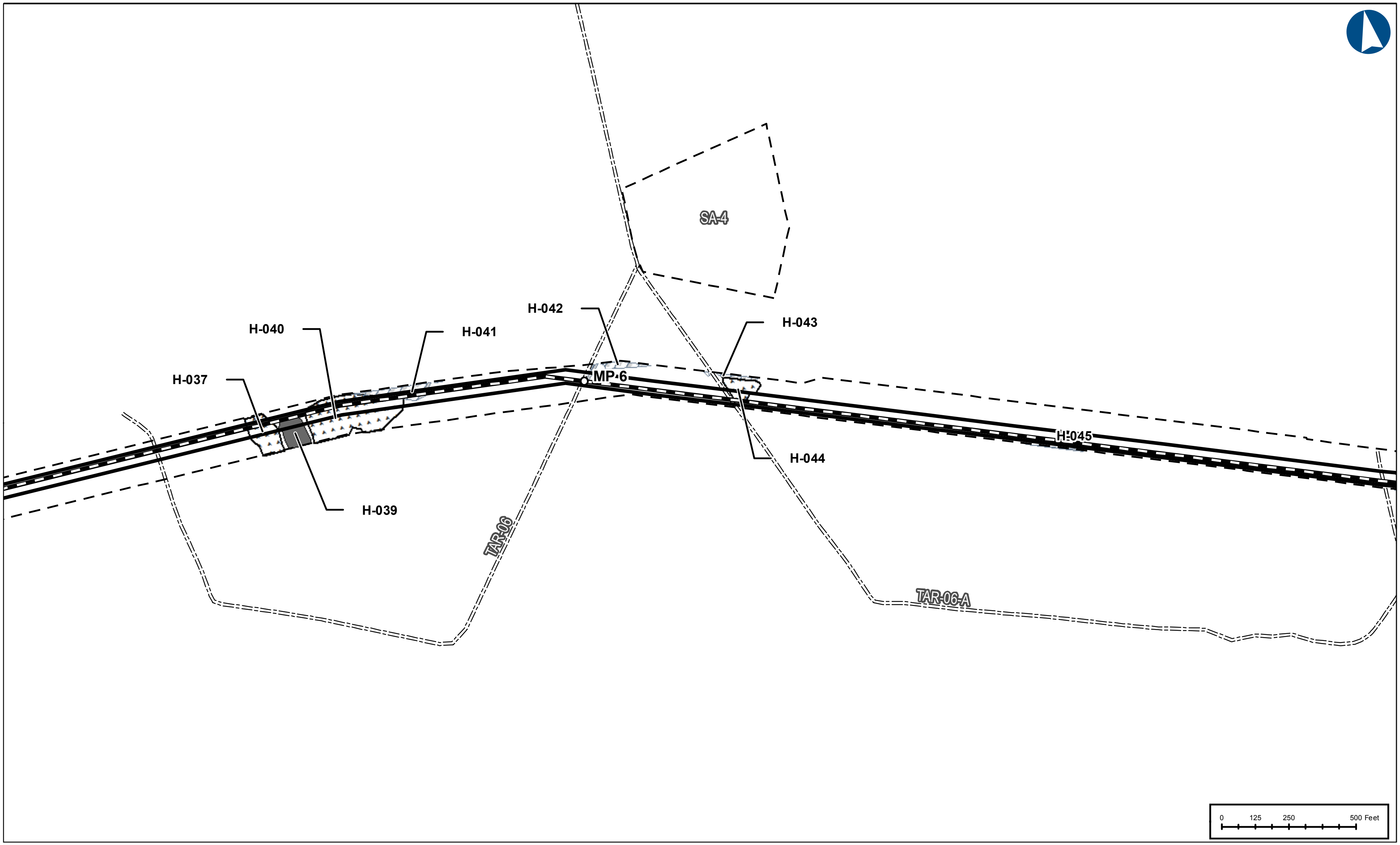
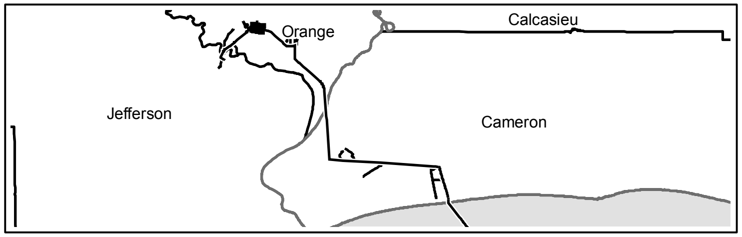
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	6 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- ▭ Permanent Easement
- Temporay Easement
- ATWS
- ■ Waterbody
- ▨ PEM Wetland
- PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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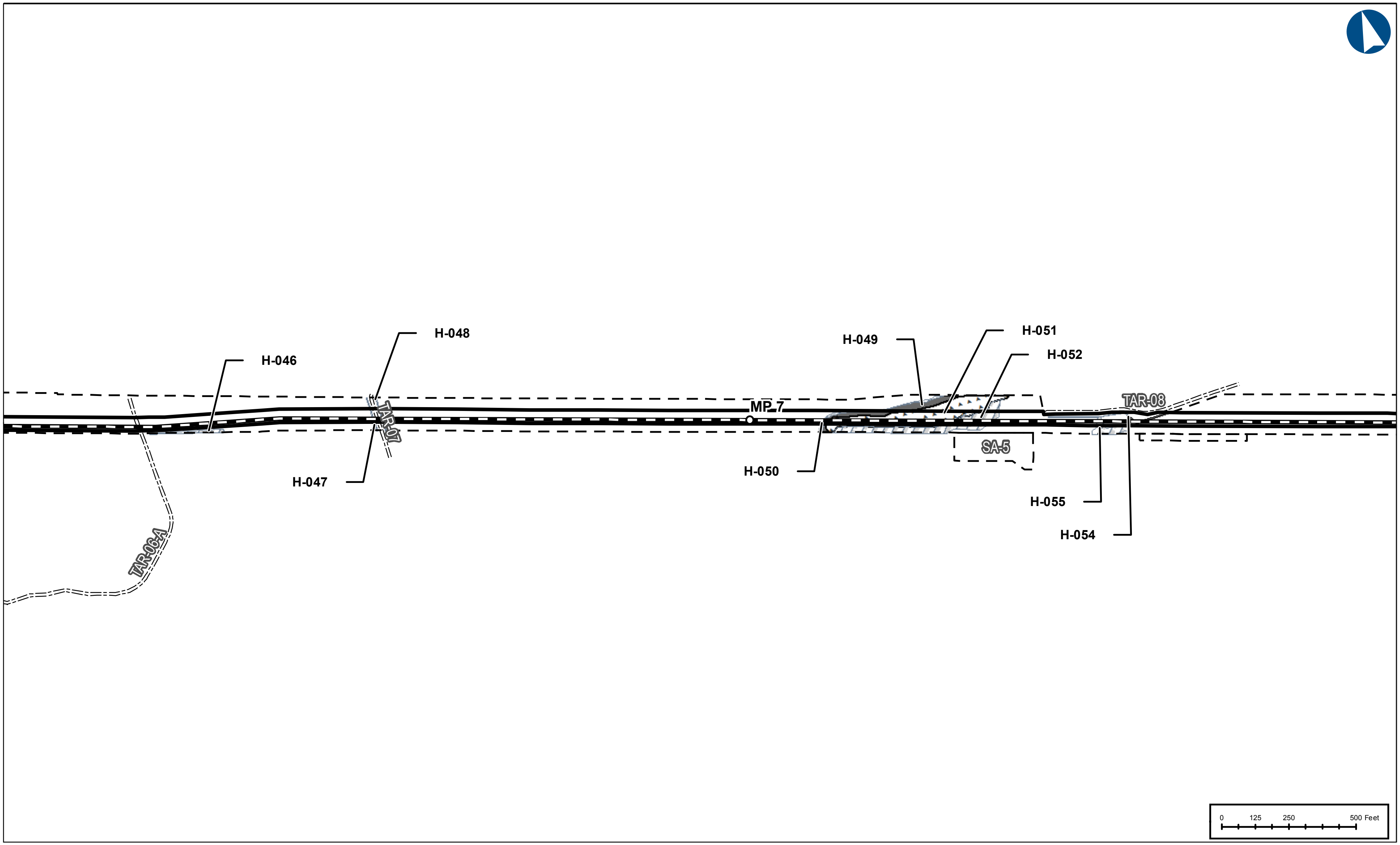
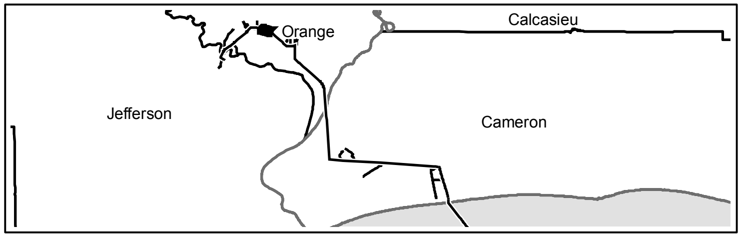
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	7 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ━ Proposed Onshore Pipeline CL
- ==== Project Access Road
- ▭ Permanent Easement
- ⌐ ¬ Temporay Easement
- ⌐ ¬ ATWS
- ■ Waterbody
- ▨ PEM Wetland
- ▲ PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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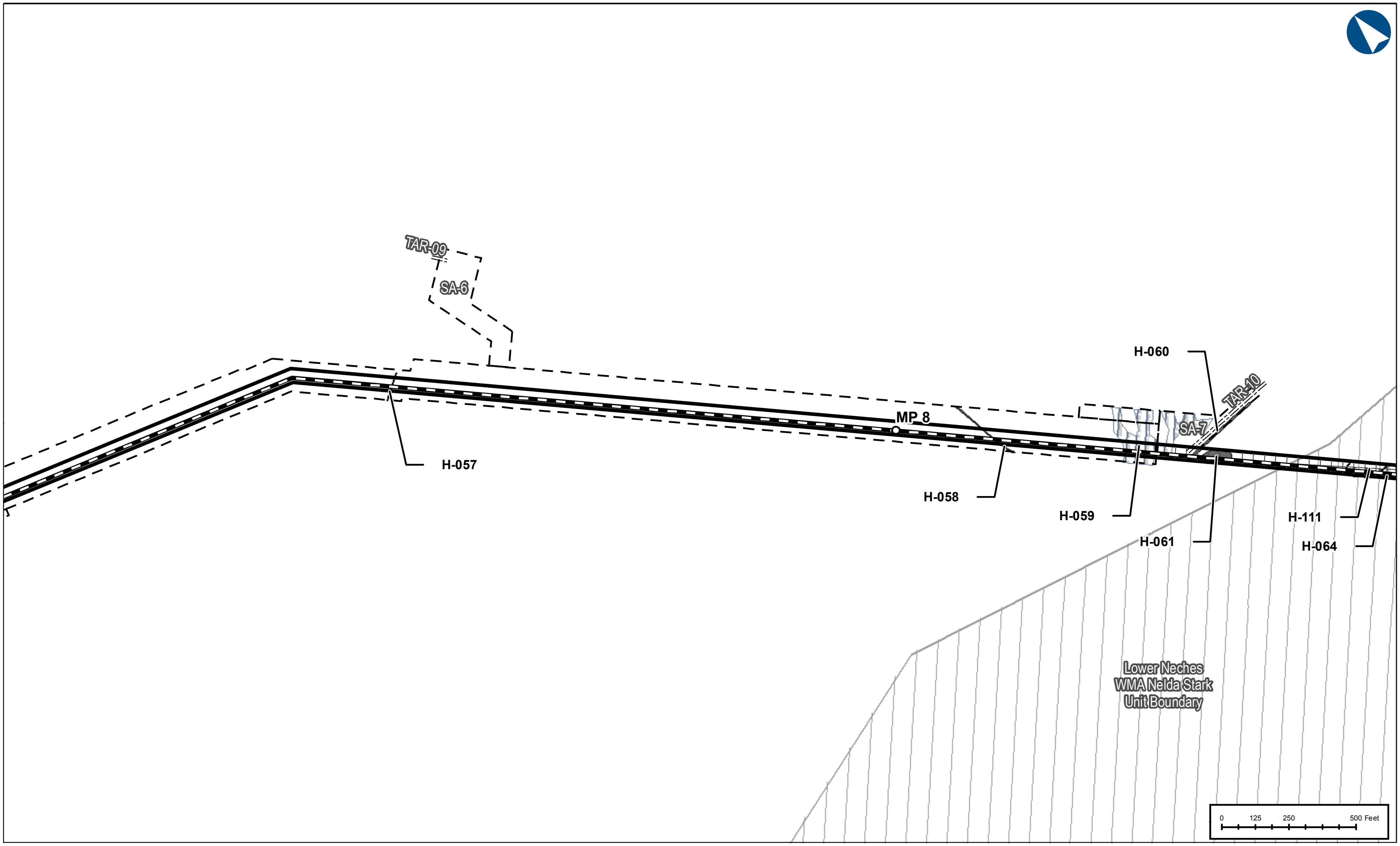
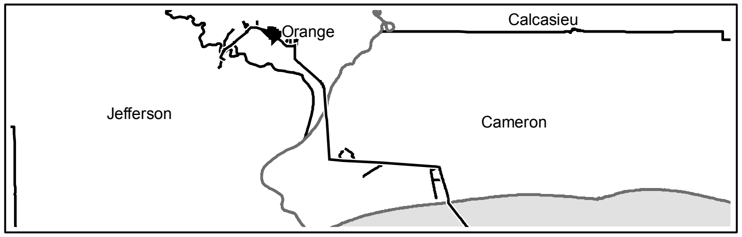
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	8 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- ☒ HDD Easement (Avoidance)
- ☐ Permanent Easement
- Temporay Easement
- ATWS
- ■ Waterbody
- ▨ PEM Wetland
- PFO Wetland
- ☐ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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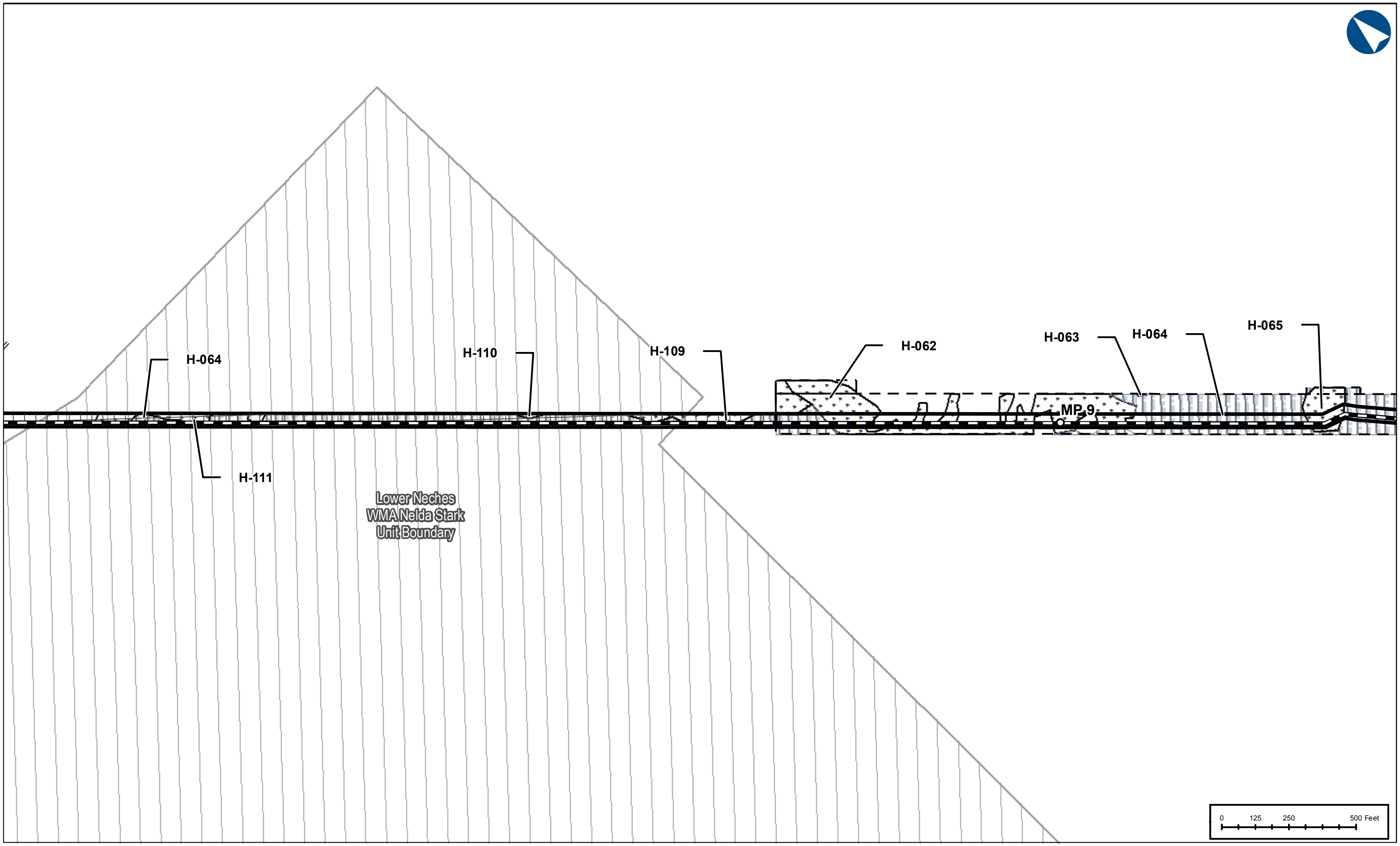
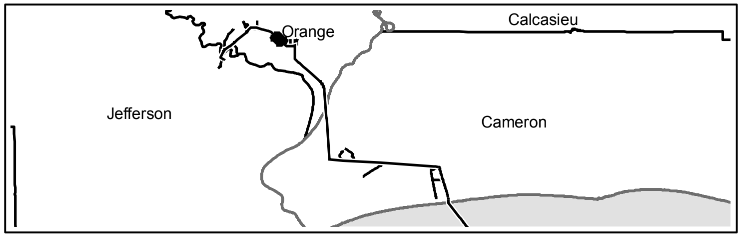
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	9 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ═ Project Access Road
- ☒ HDD Easement (Avoidance)
- ▭ Permanent Easement
- ⁞ Temporay Easement
- ⁞ ATWS
- ▨ PEM Wetland
- ▭ PFO Wetland
- ▭ Lower Neches WMA Nelda Stark Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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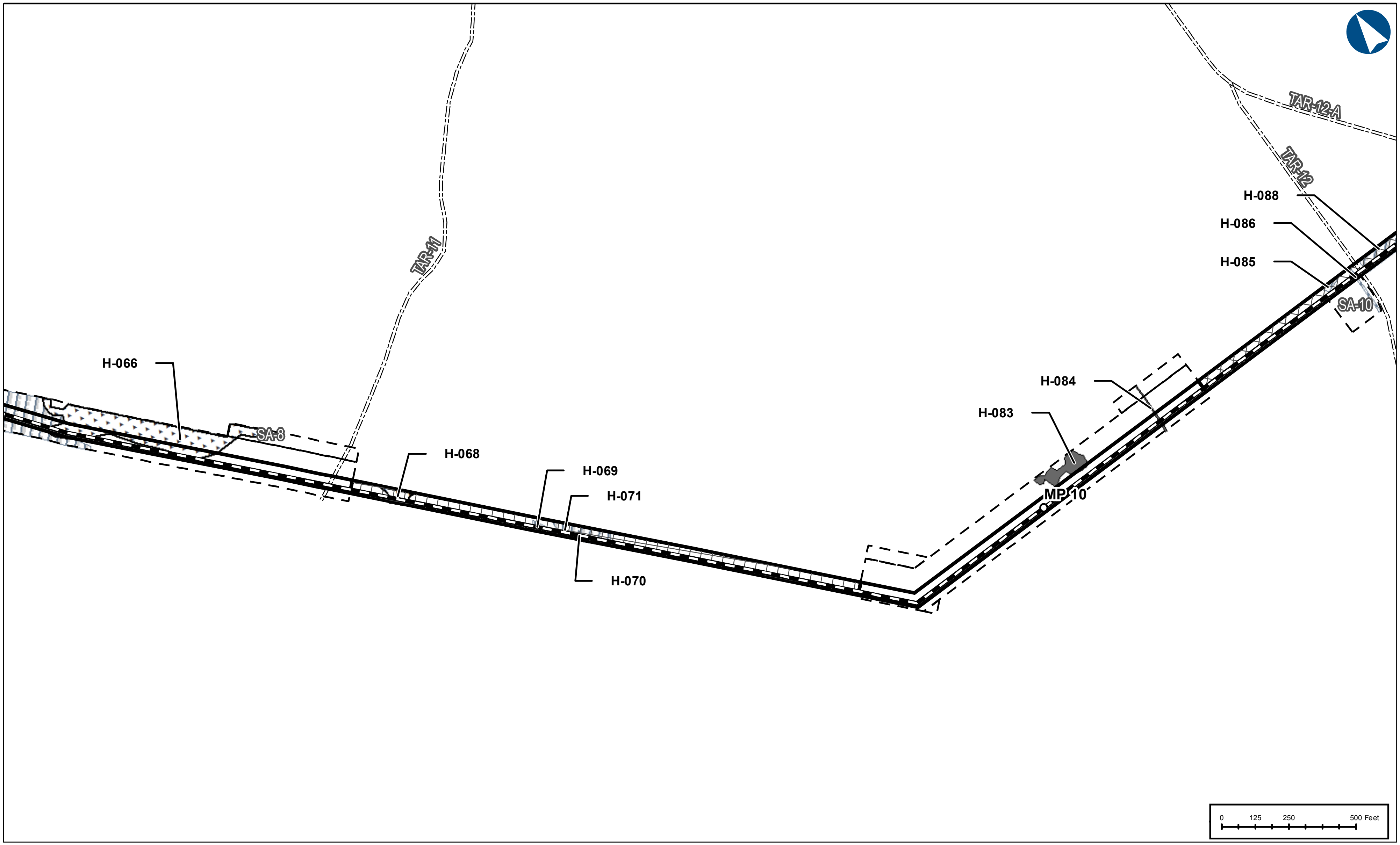
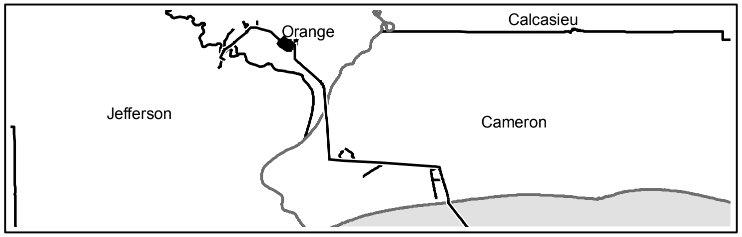
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	10 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost	⌐ ¬	Temporay Easement
▬	Proposed Onshore Pipeline CL	⌐ ¬	ATWS
═	Project Access Road	■	Waterbody
☒	HDD Easement (Avoidance)	▨	PEM Wetland
▭	Permanent Easement	▴	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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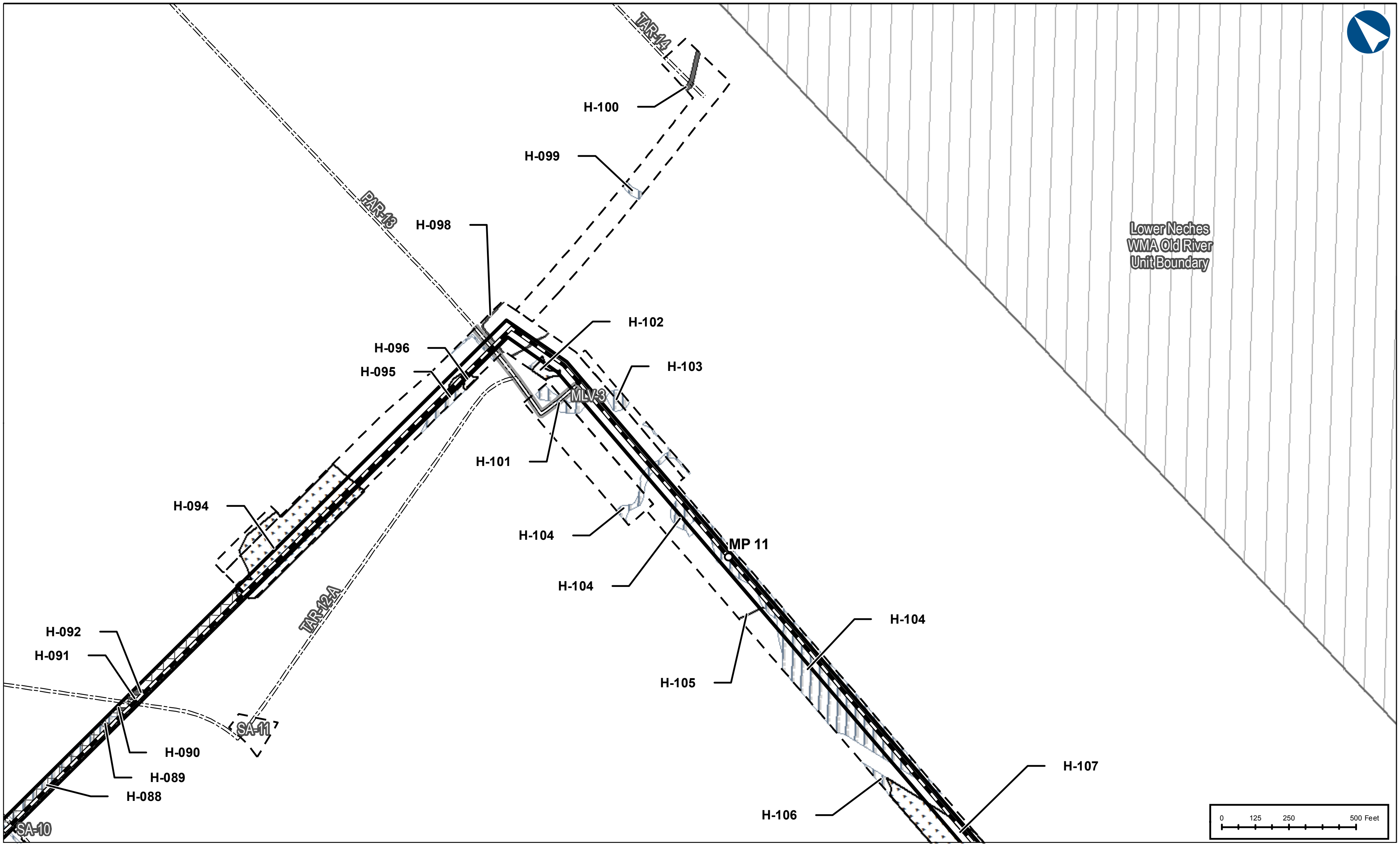
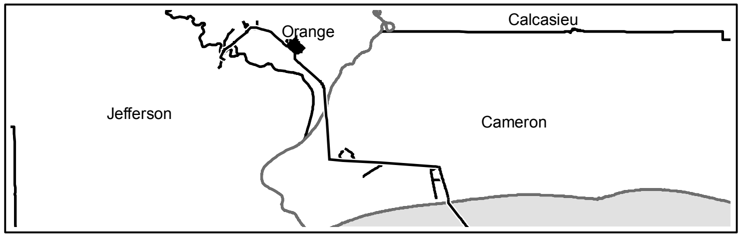
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	11 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Road
HDD Easement (Avoidance)
Permanent Easement
Temporay Easement
ATWS
Permanent Access Road Easement
Waterbody
▨ PEM Wetland
PFO Wetland
Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH: ORANGE	DRAWN BY: CW
STATE: TEXAS	CHECKED BY: JZ

DATE: 2020-08-26
PROJECTION: UTM 15 N

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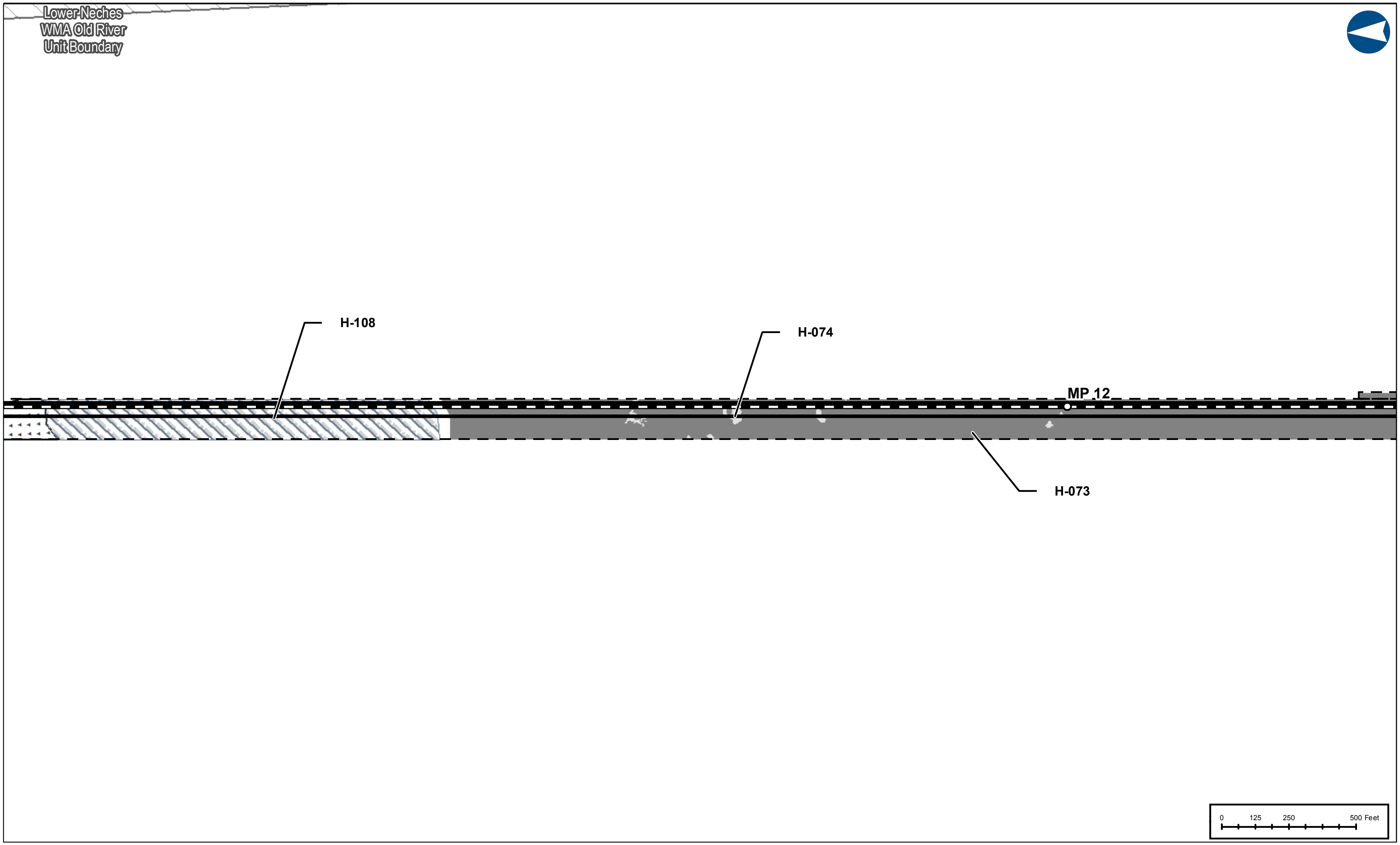
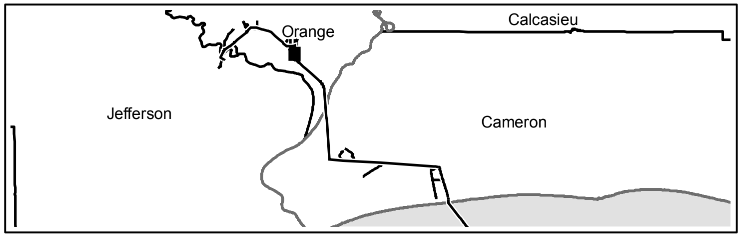
BLUE MARLIN OFFSHORE PORT PROJECT

DWG: 0801-06-001
SHEET: 12 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost	▭	Estuarine, unvegetated subtidal
━	Proposed Onshore Pipeline CL	■	Estuarine, vegetated intertidal (salt marsh)
▭	Permanent Easement	▨	PEM Wetland
⬚	Temporay Easement	▭	PFO Wetland
⬚	ATWS	▨	Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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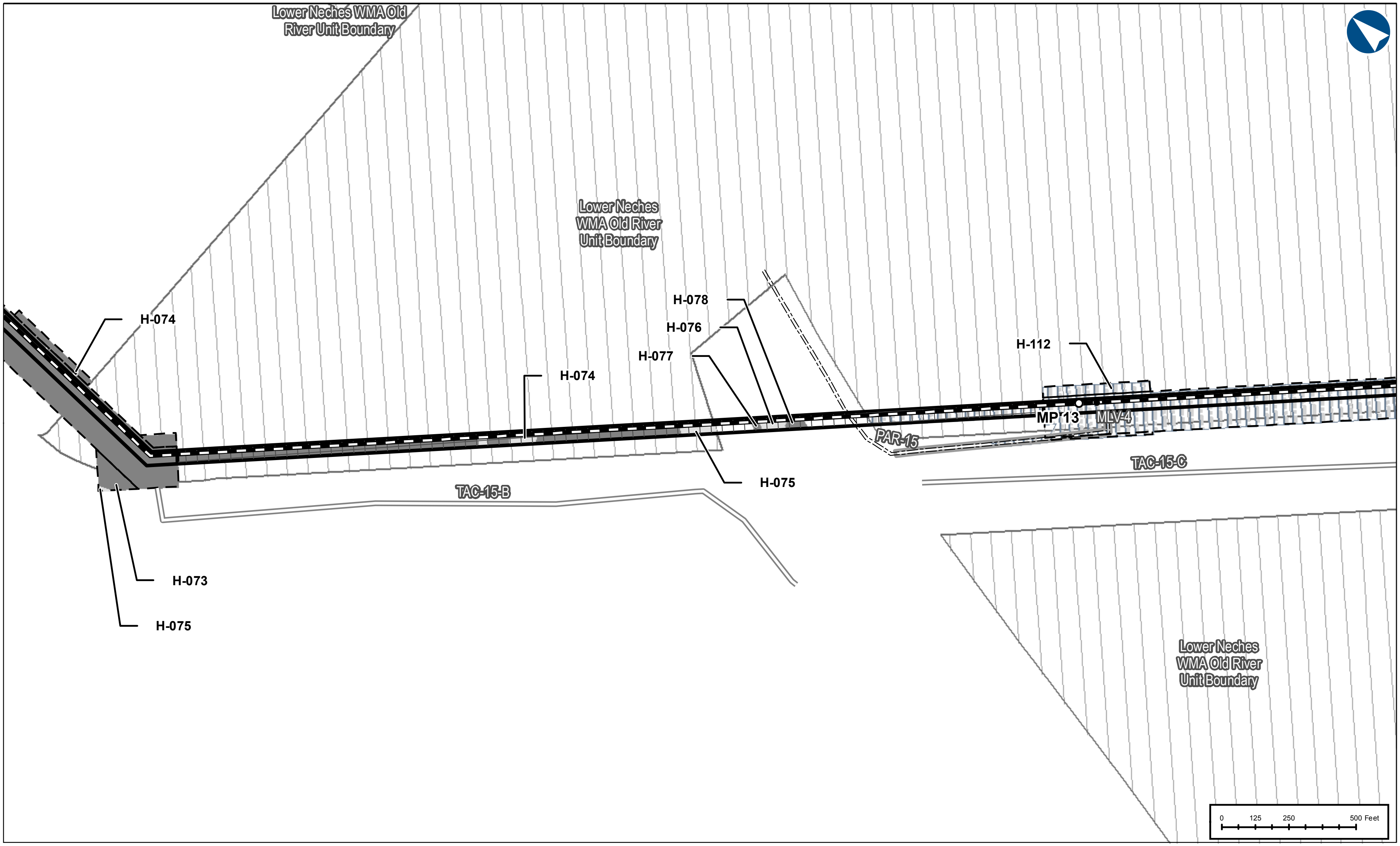
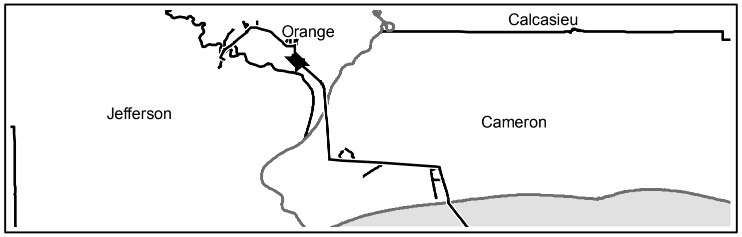
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	13 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost	⌐¦	Temporay Easement
●	Valve Location	⌐¦	ATWS
━■━	Proposed Onshore Pipeline CL	▭	Permanent Access Road Easement
═	Project Access Canal	░	Estuarine, unvegetated subtidal
╌	Project Access Road	▓	Estuarine, vegetated intertidal (salt marsh)
☒	HDD Easement (Avoidance)	▨	PEM Wetland
▭	Permanent Easement	▨	Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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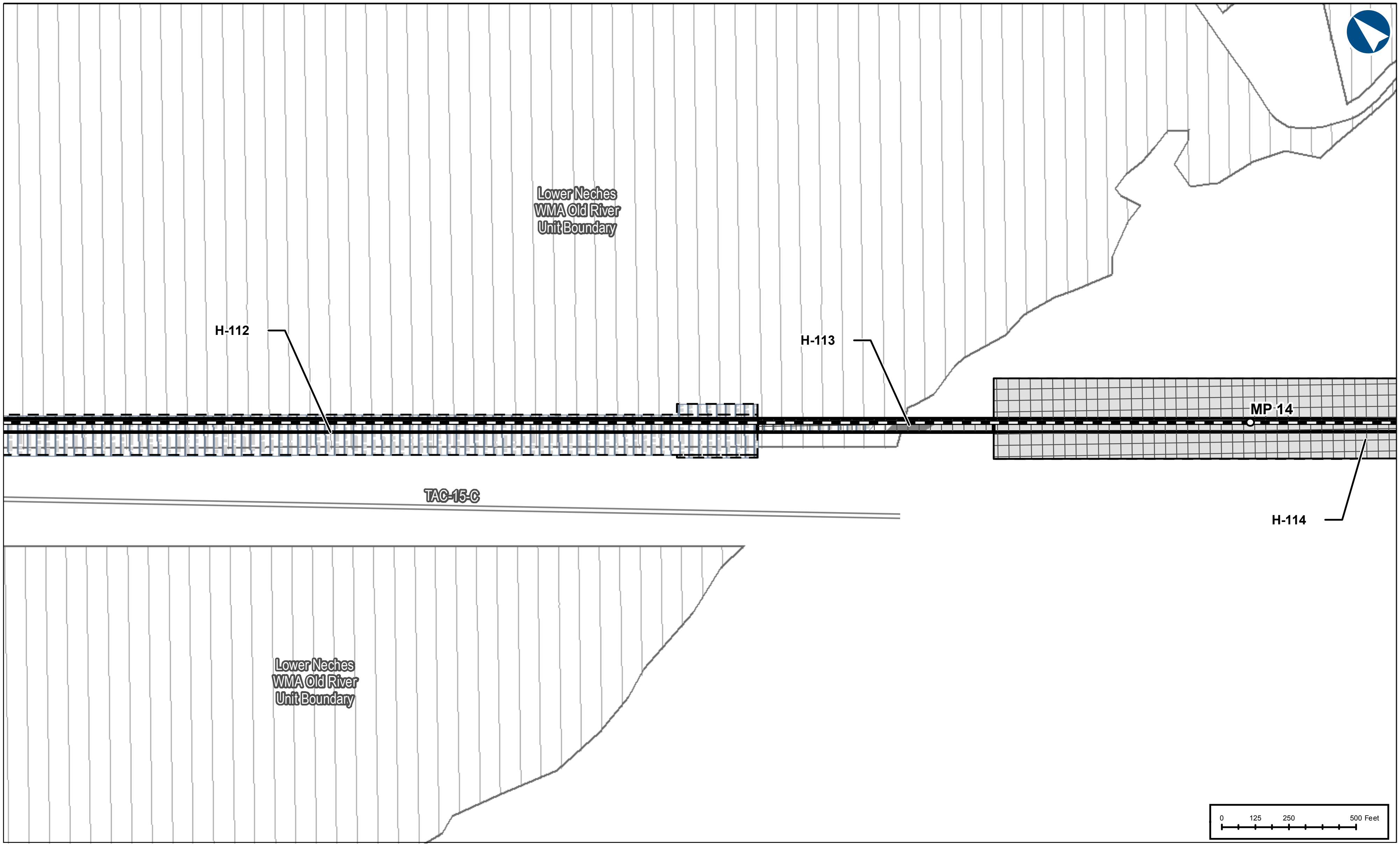
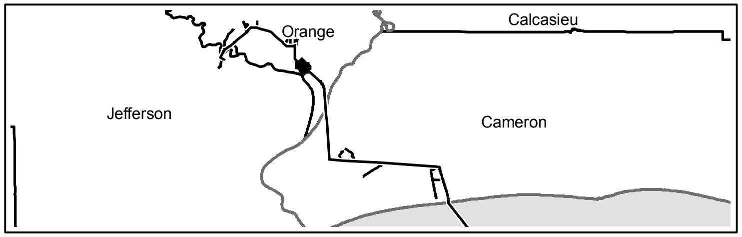
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	14 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- ☒ HDD Easement (Avoidance)
- ☐ Permanent Easement
- Temporay Easement
- ATWS
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)
- ▨ PEM Wetland
- Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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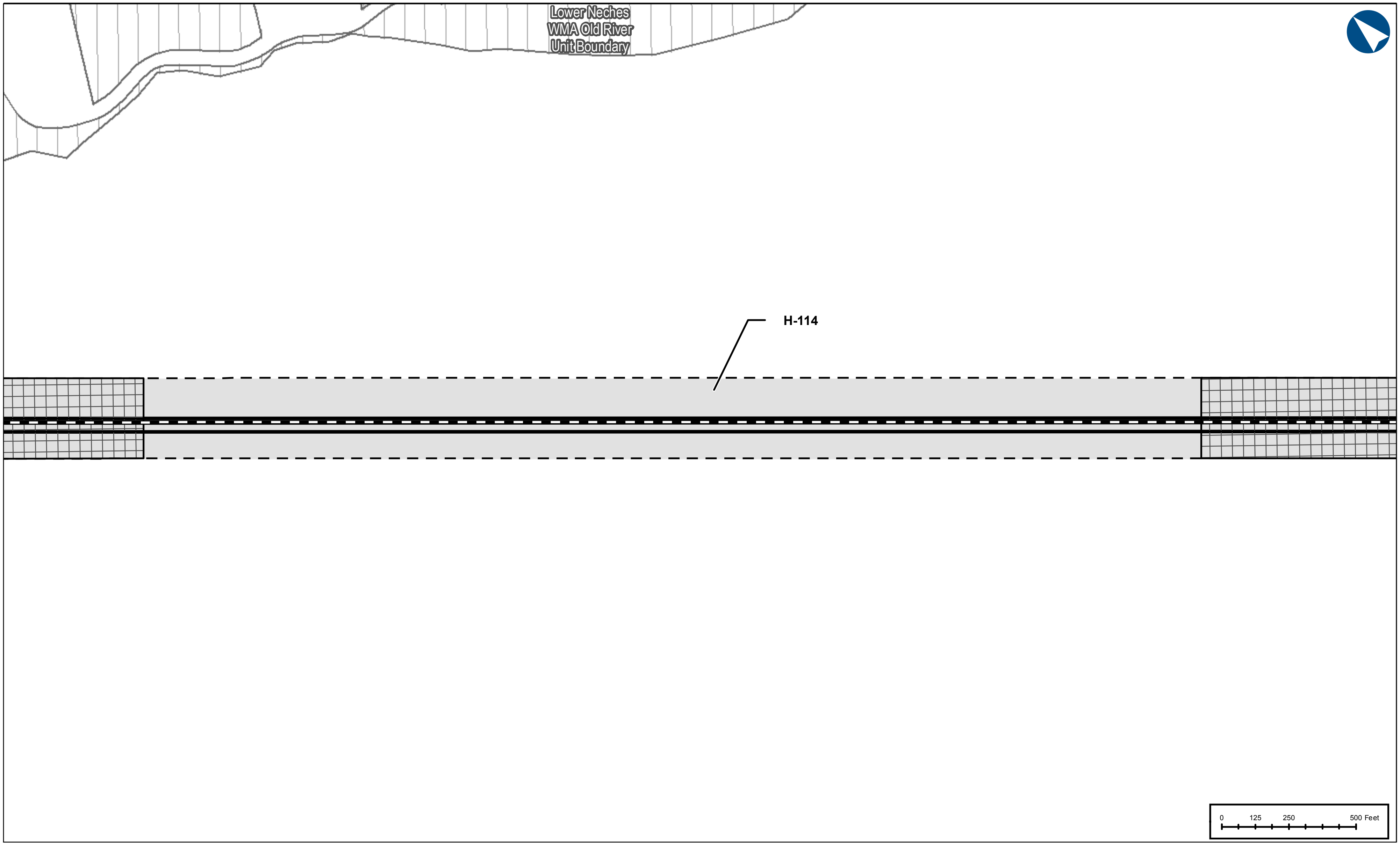
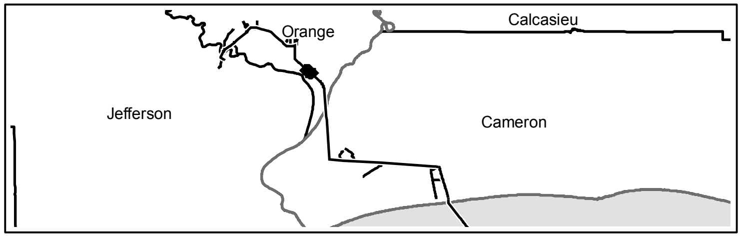
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	15 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ▬ Proposed Onshore Pipeline CL
- ☒ HDD Easement (Avoidance)
- ☐ Permanent Easement
- ⬚ Temporay Easement
- ▨ Estuarine, unvegetated subtidal
- ▧ Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE: 2020-08-26 PROJECTION: UTM 15 N

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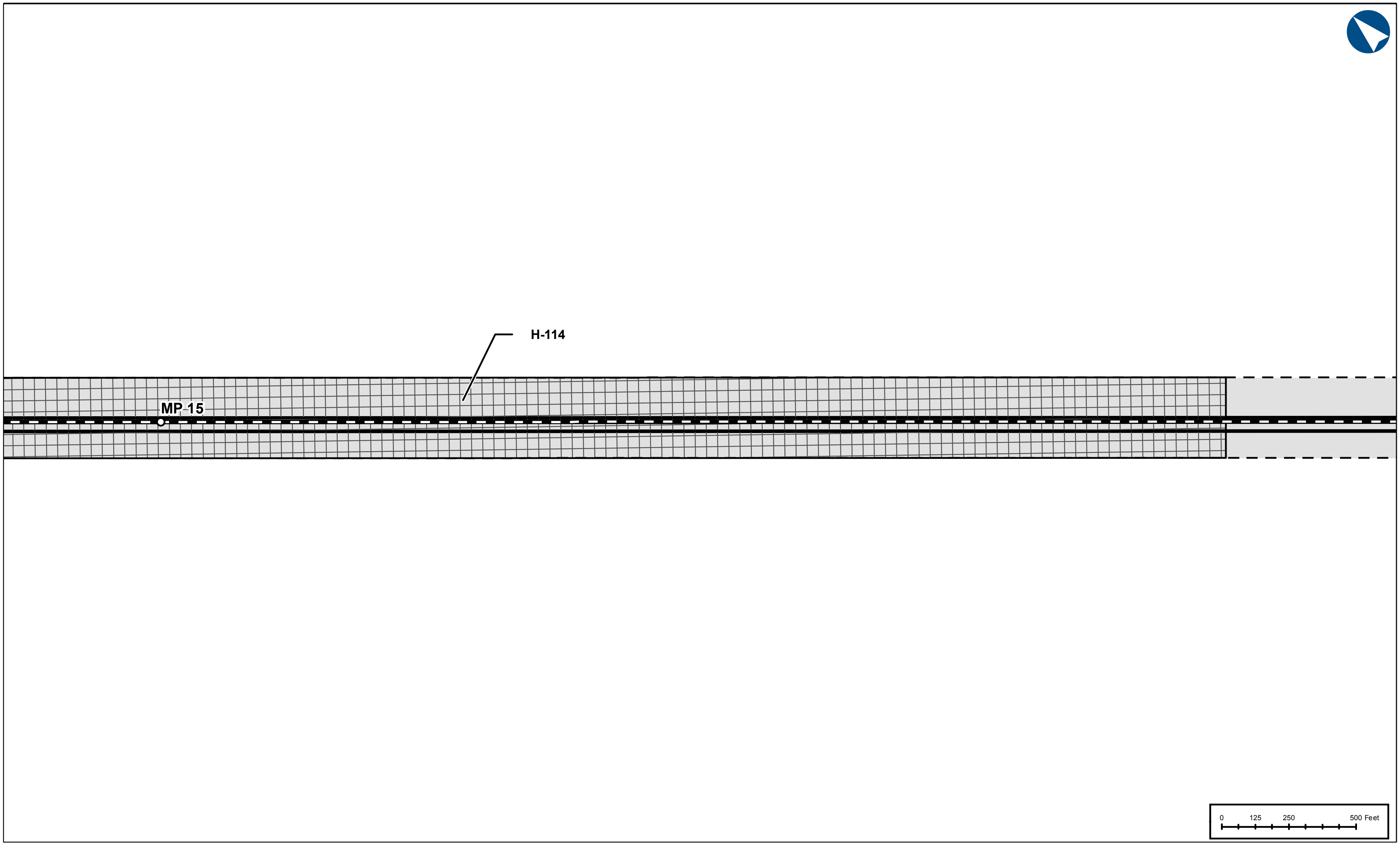
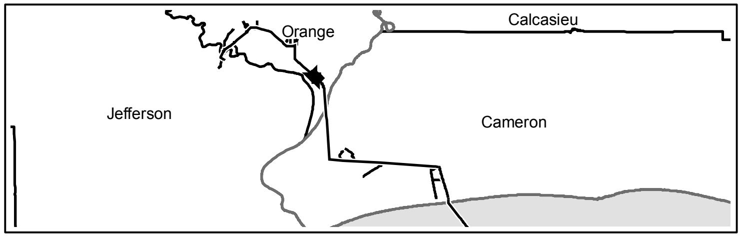
BLUE MARLIN OFFSHORE PORT PROJECT

DWG: 0801-06-001 SHEET: 16 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ☒ HDD Easement (Avoidance)
- ☐ Permanent Easement
- ⬚ Temporay Easement
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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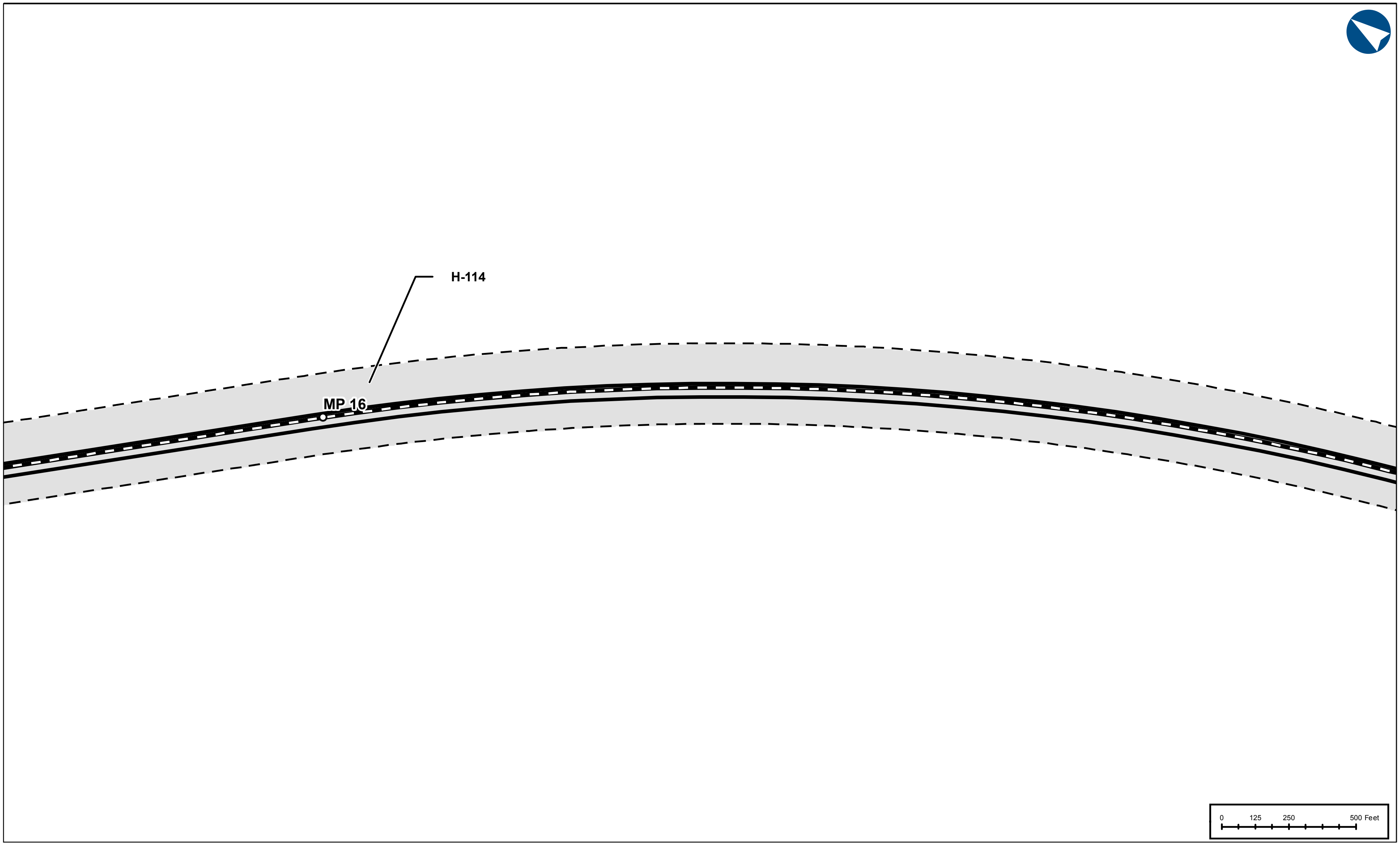
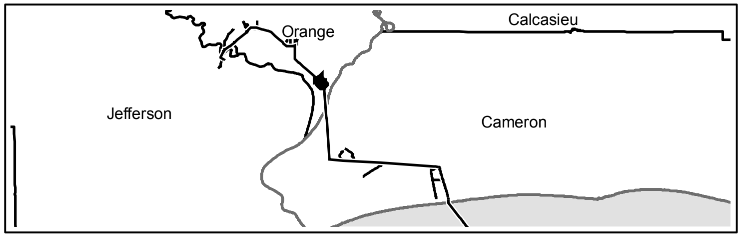
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	17 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Permanent Easement
- Temporay Easement
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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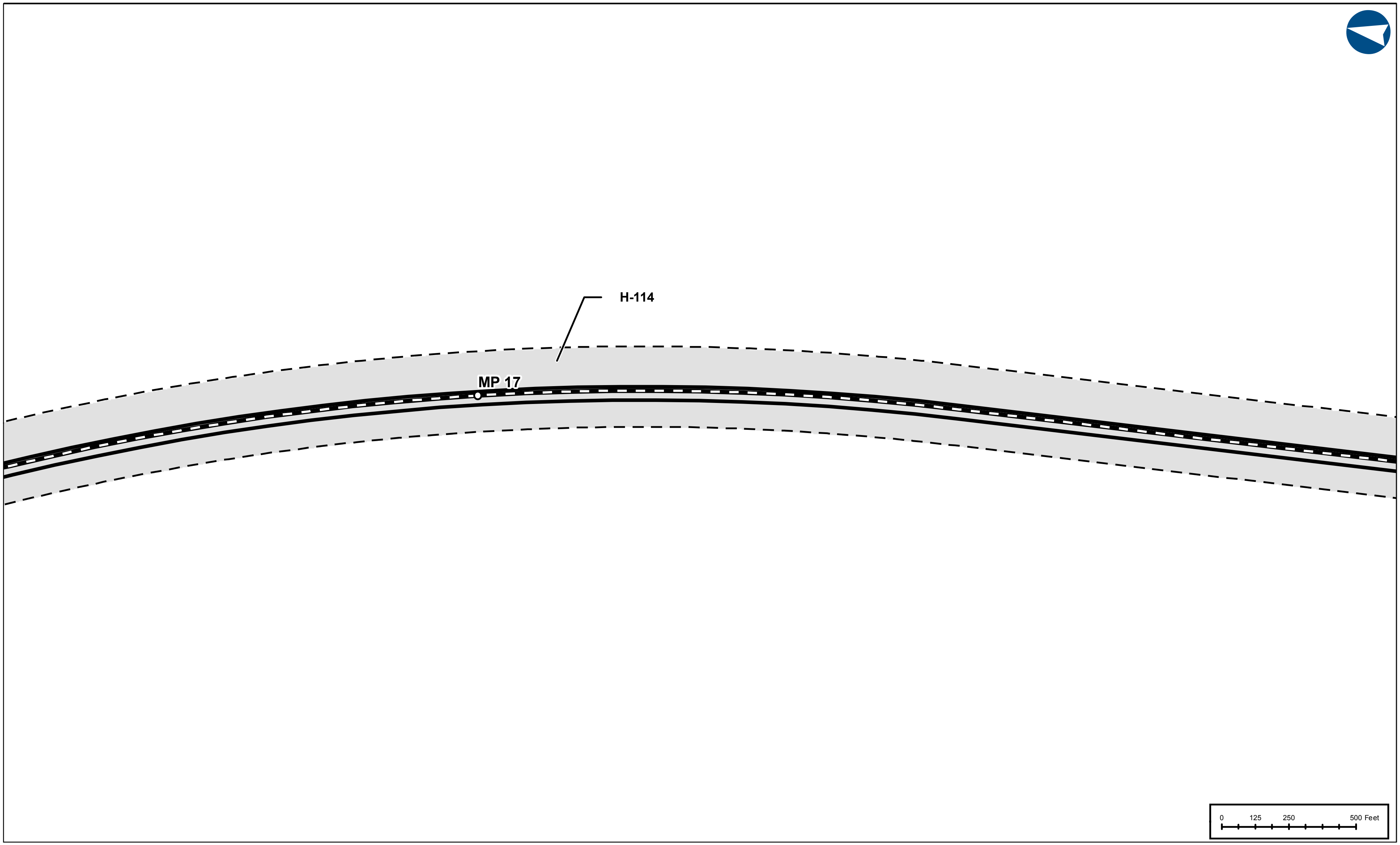
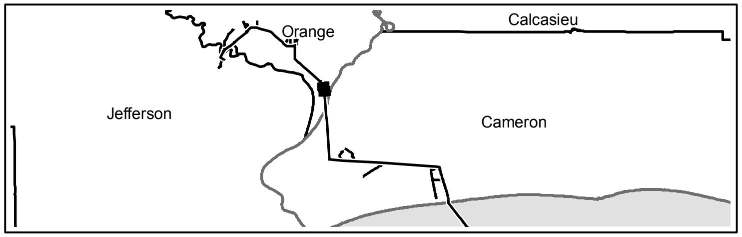
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	18 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ☐ Permanent Easement
- ⬚ Temporay Easement
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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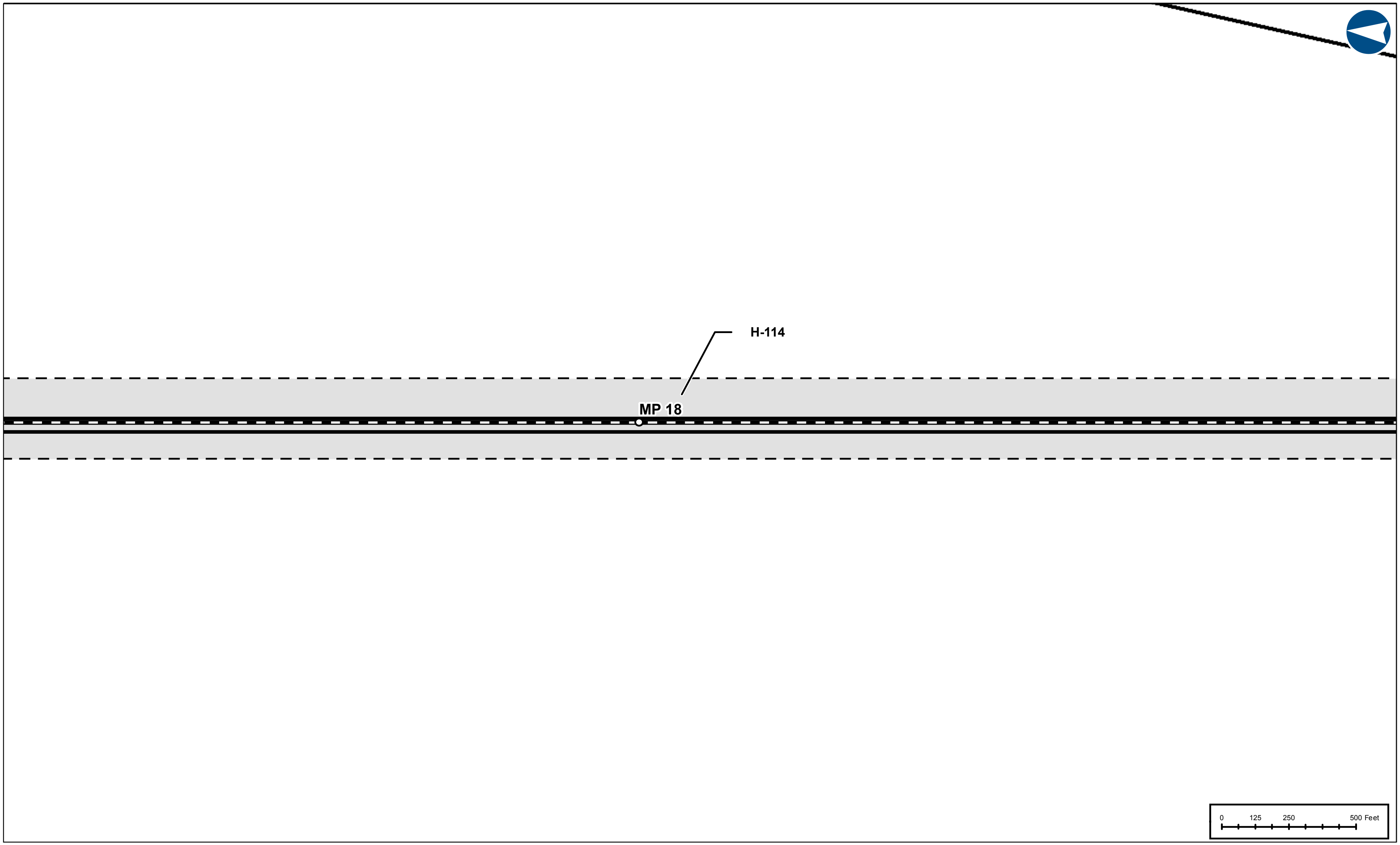
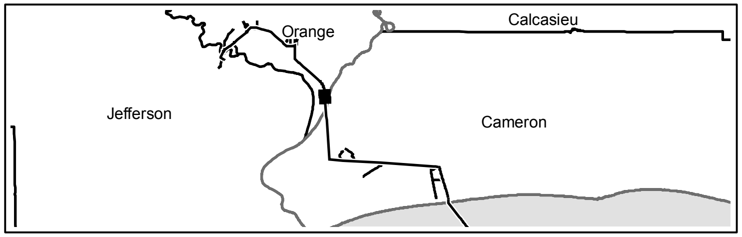
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	19 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost
▬	Proposed Onshore Pipeline CL
▭	Permanent Easement
⬚	Temporay Easement
▨	Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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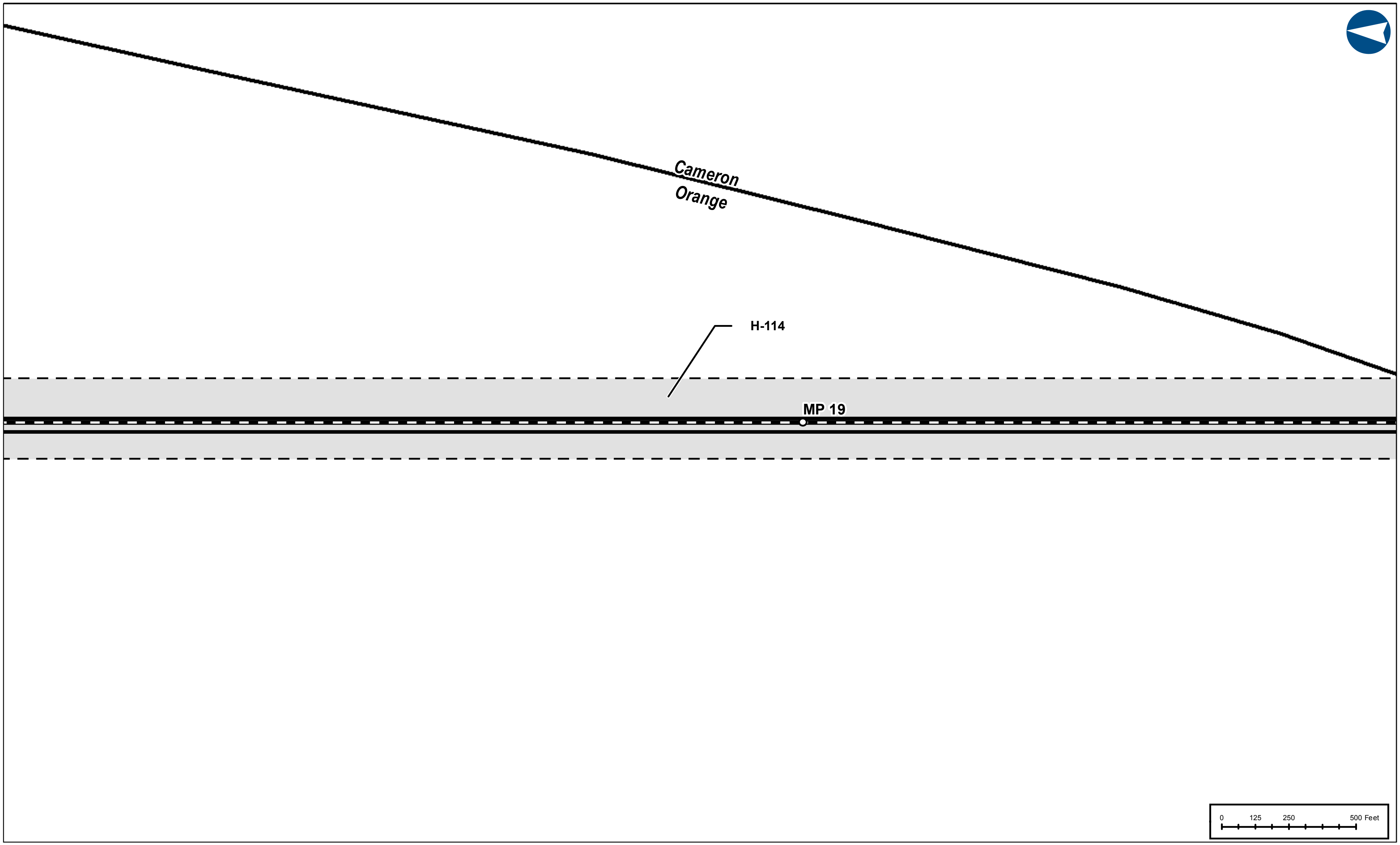
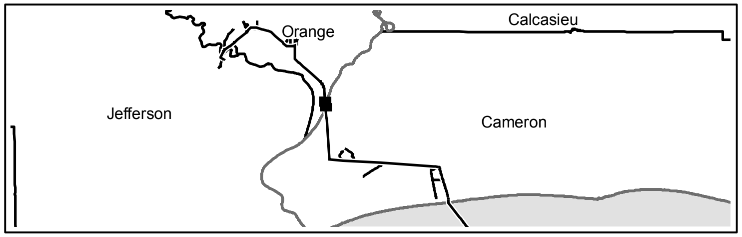
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	20 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

Proposed Onshore Pipeline CL

Permanent Easement

Temporay Easement

▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE / CAMERON	***DRAWN BY:***	CW
STATE:	TEXAS / LOUISIANA	***CHECKED BY:***	JZ

DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

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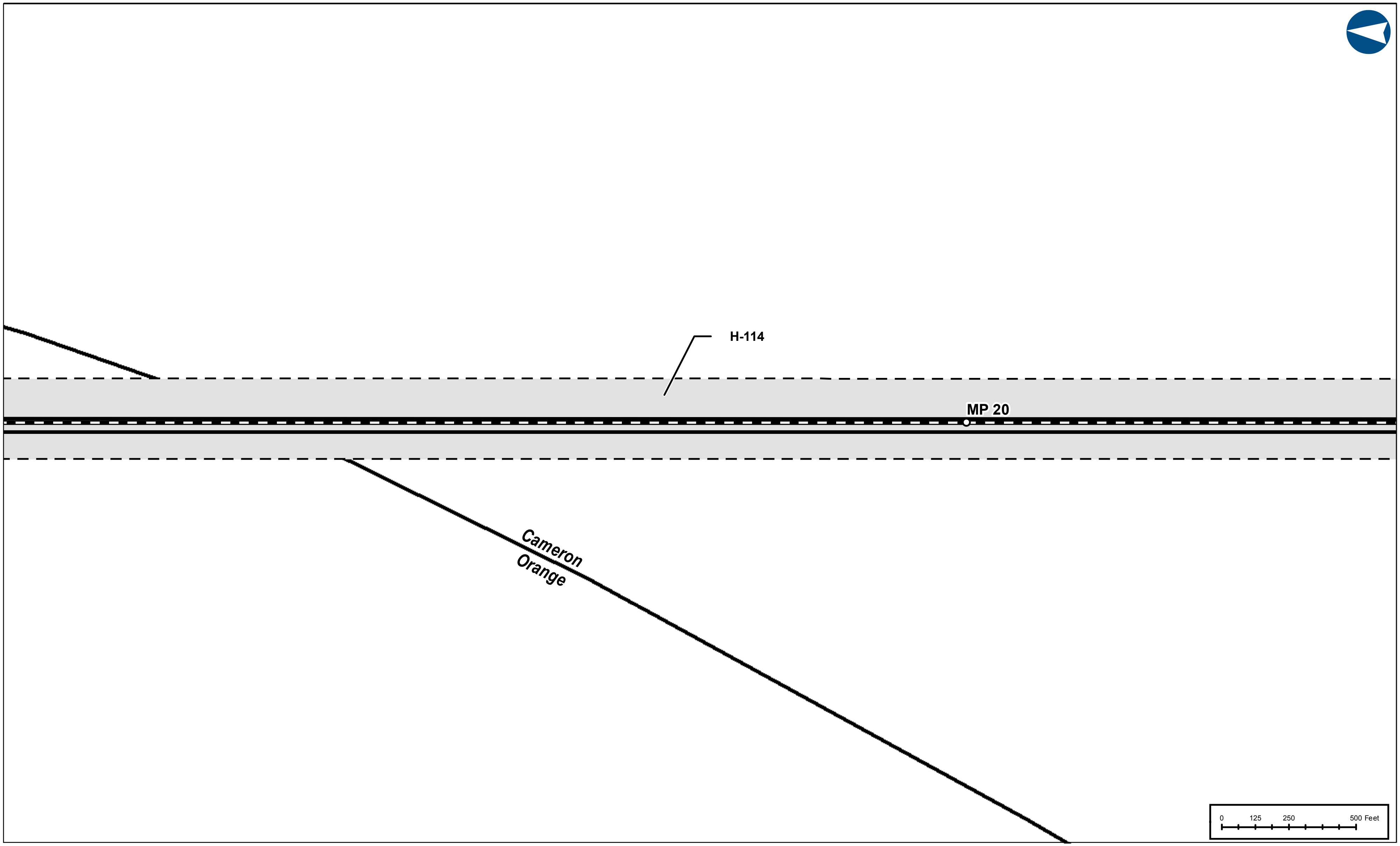
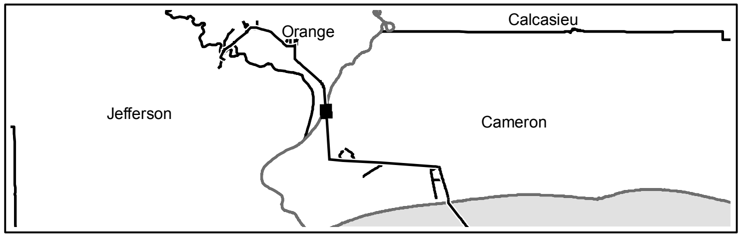
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	21 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

☐ Permanent Easement

⬚ Temporay Easement

▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE / CAMERON	DRAWN BY:	CW
STATE:	TEXAS / LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	22 OF 76

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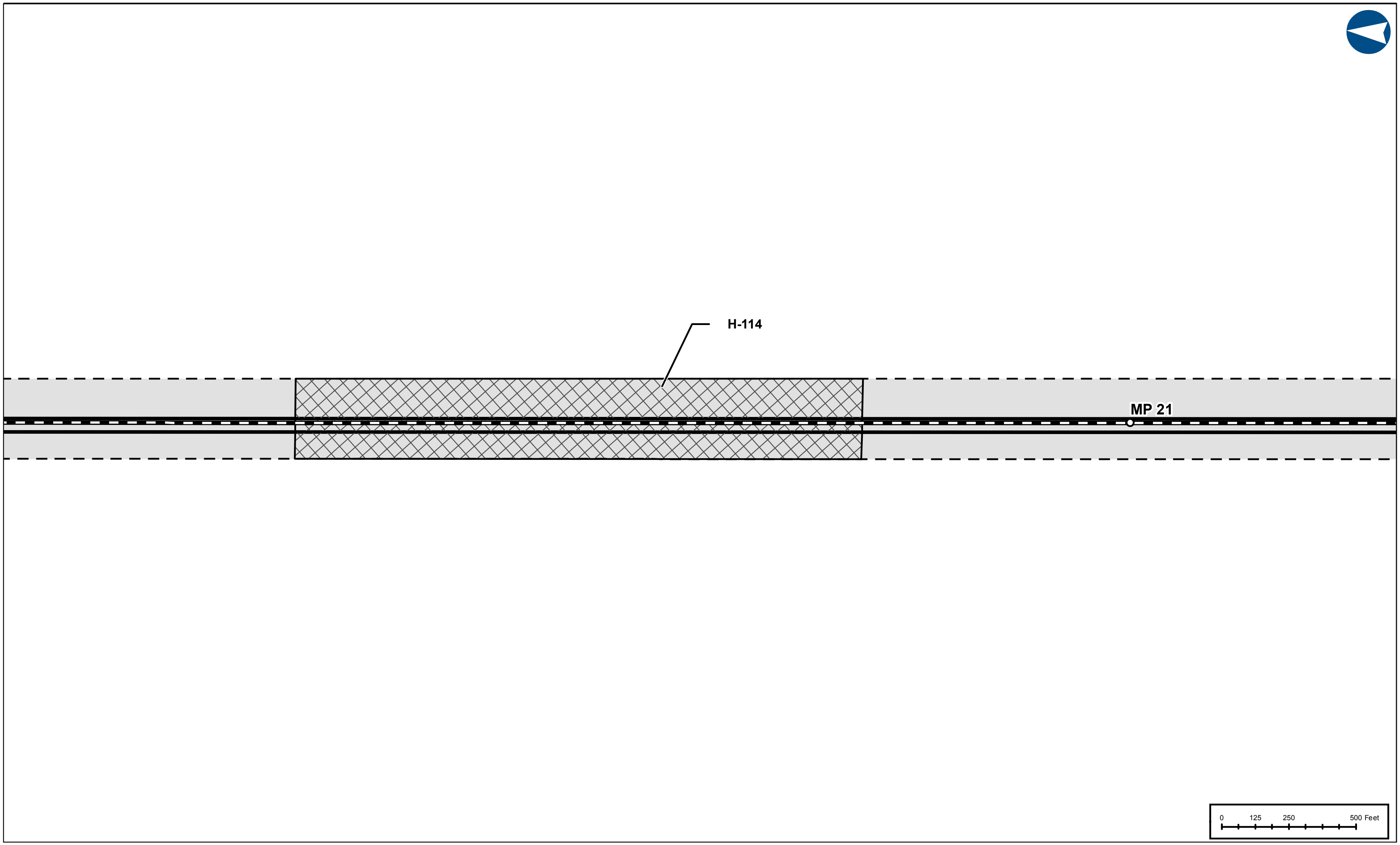
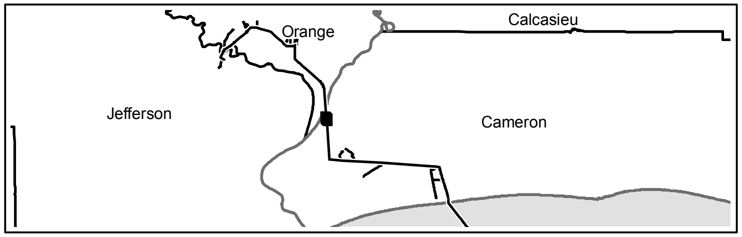
BLUE MARLIN OFFSHORE PORT PROJECT

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ▨ HDD Easement (Avoidance)
- ☐ Permanent Easement
- ⬚ Temporay Easement
- ▢ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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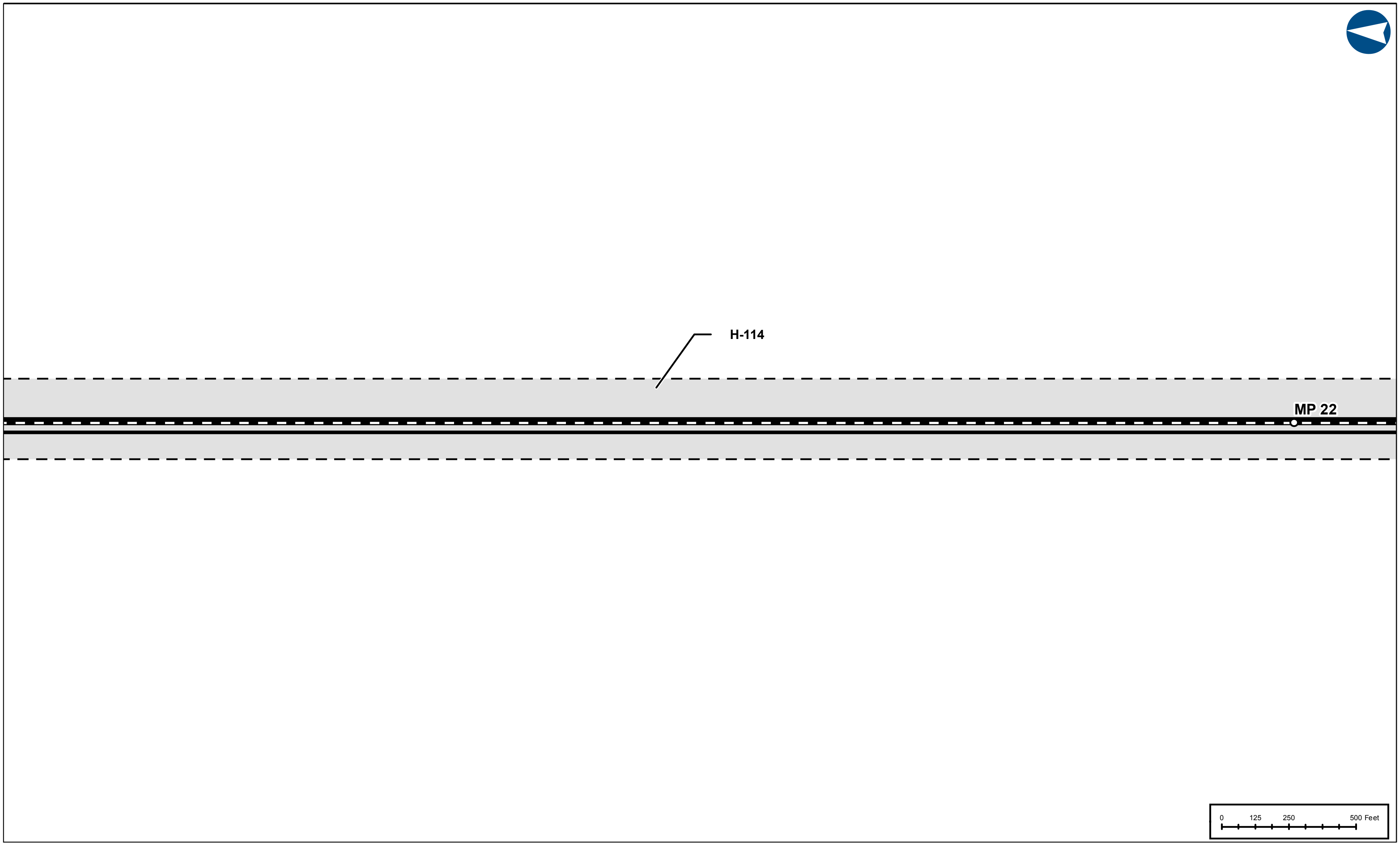
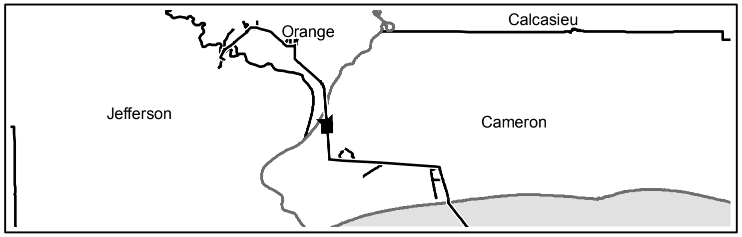
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	23 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

▭ Permanent Easement

┆ Temporay Easement

▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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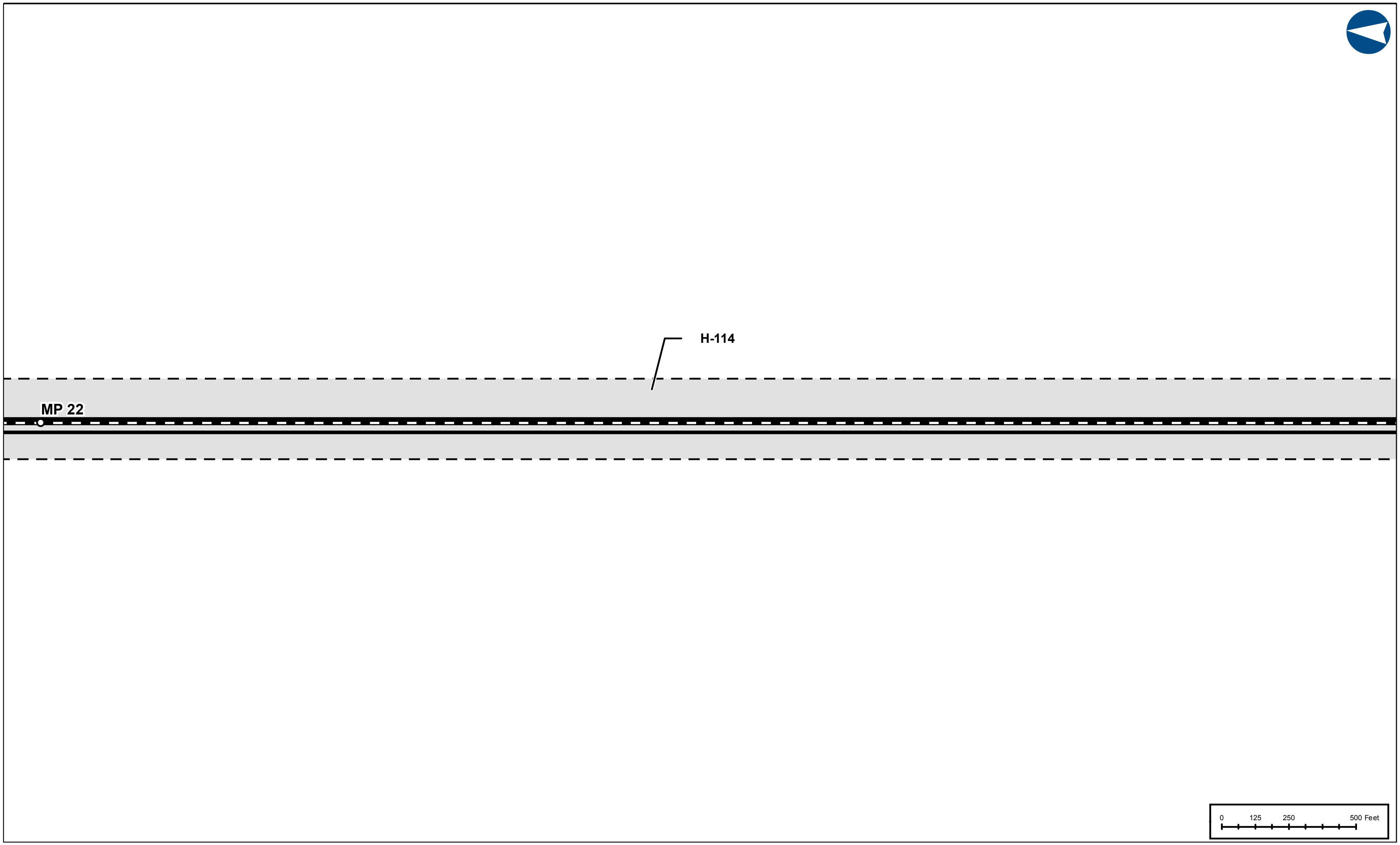
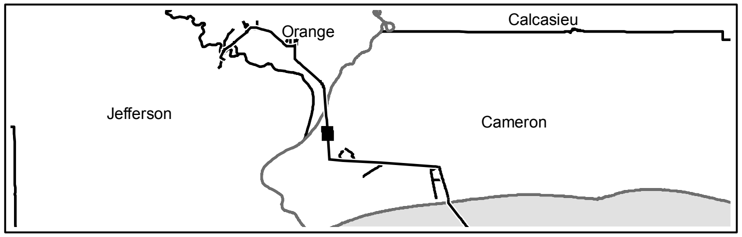
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	24 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ☐ Permanent Easement
- ⬚ Temporay Easement
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

PREPARED BY

exp Energy Services Inc.
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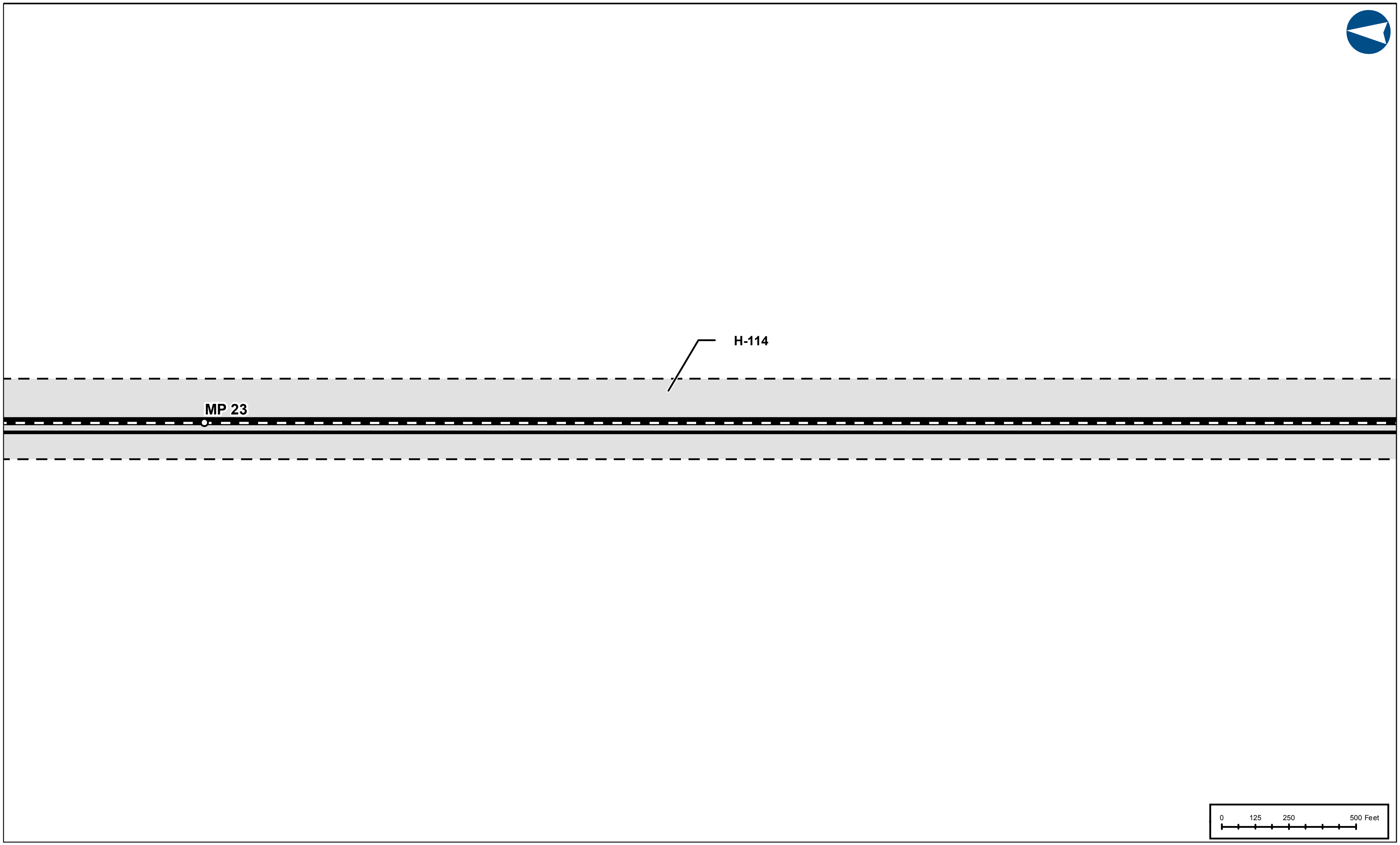
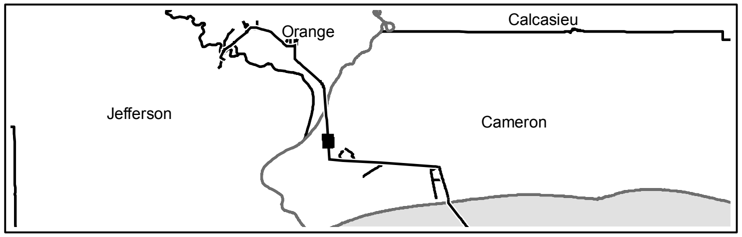
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	25 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

▬ Proposed Onshore Pipeline CL

☐ Permanent Easement

⬚ Temporay Easement

▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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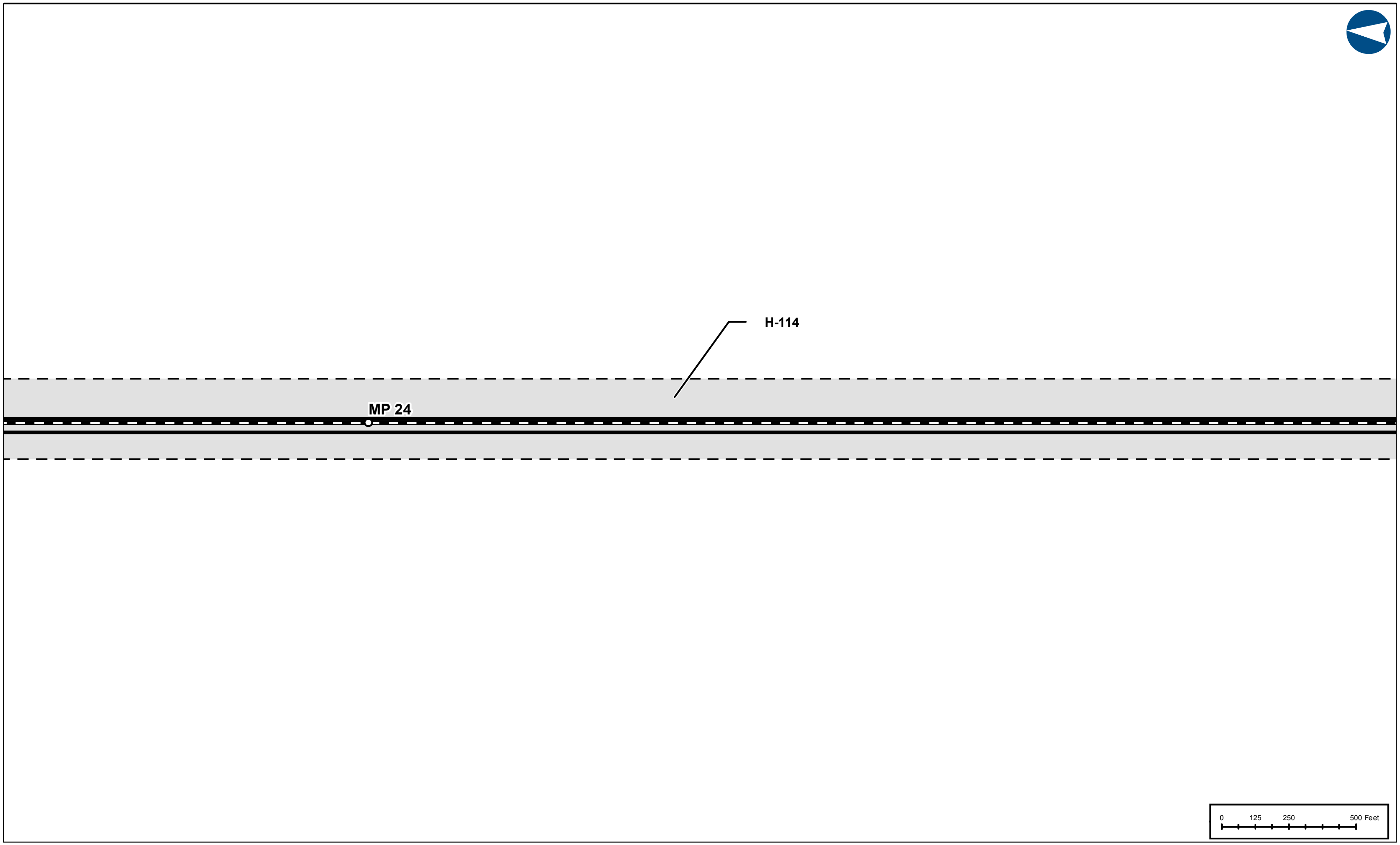
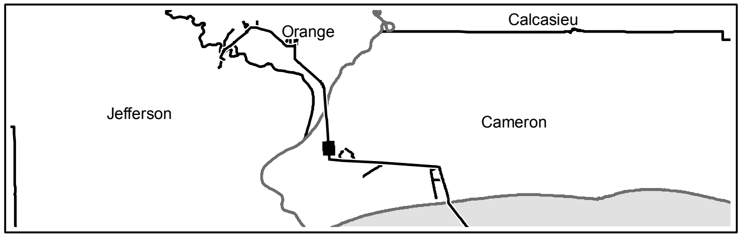
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	26 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Permanent Easement
- Temporay Easement
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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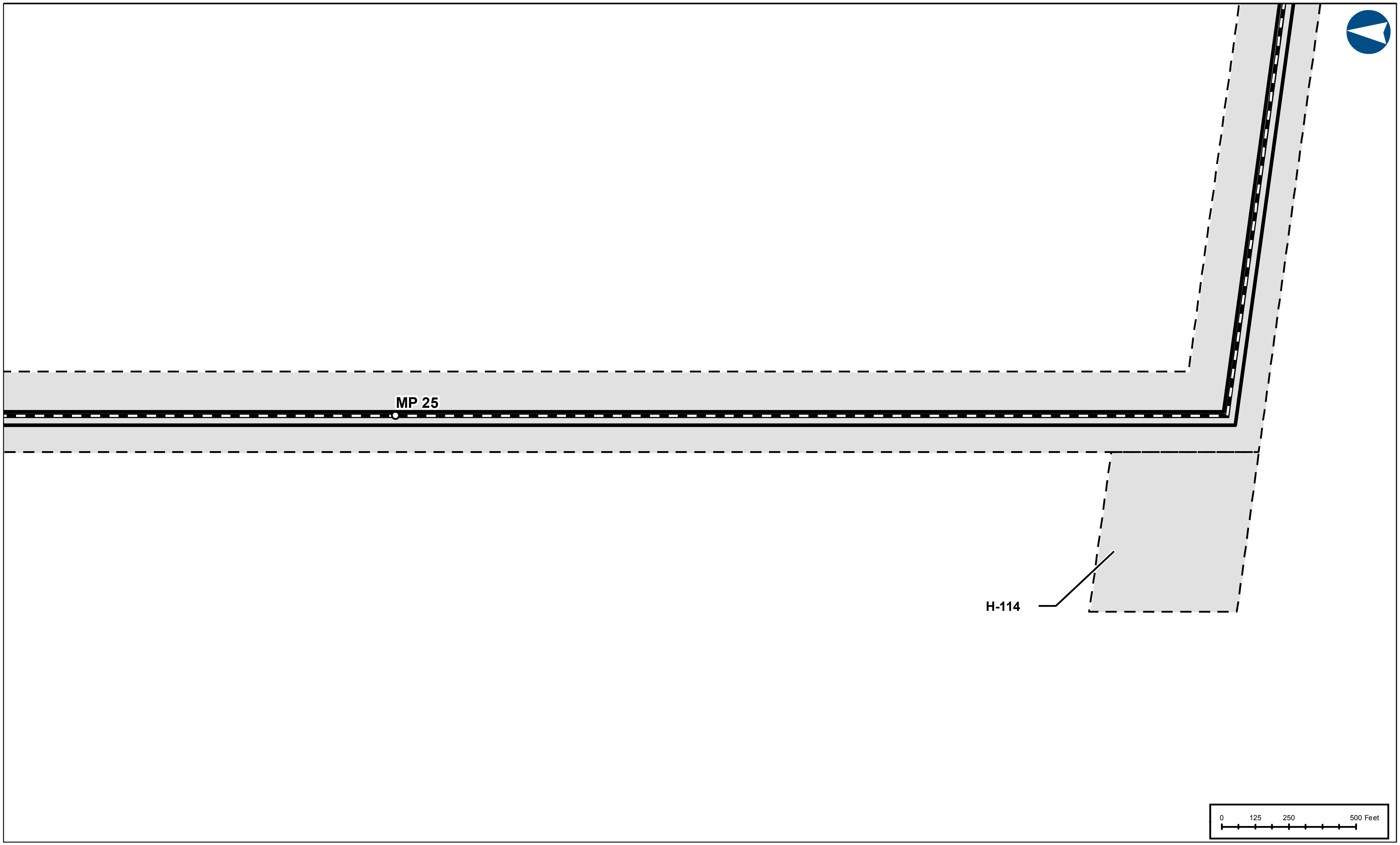
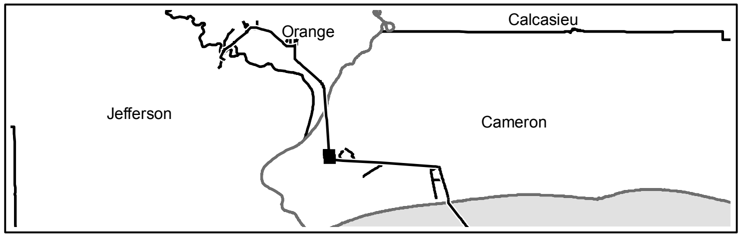
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	27 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ▬ Proposed Onshore Pipeline CL
- ▭ Permanent Easement
- ⬚ Temporay Easement
- ⬚ ATWS
- ▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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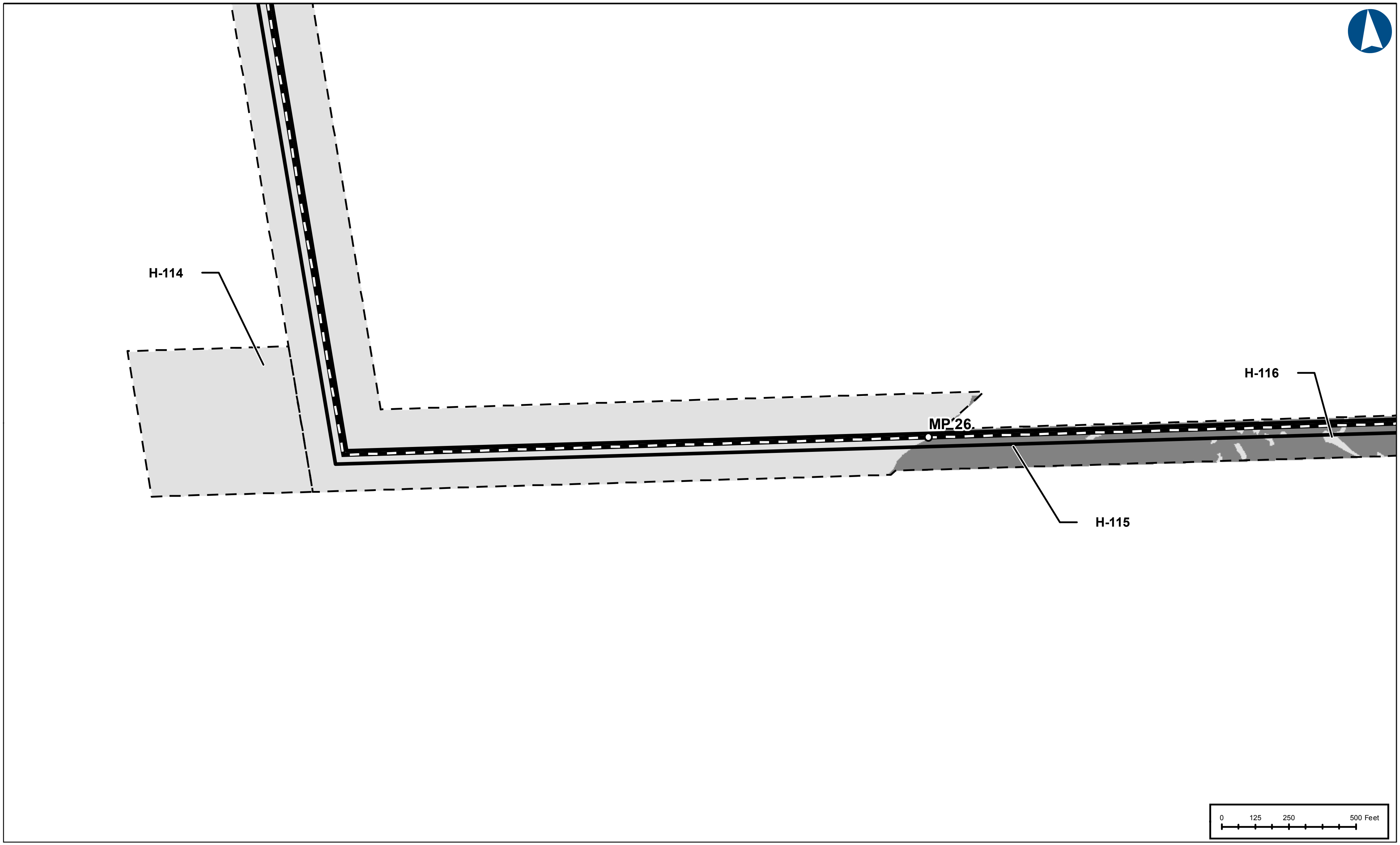
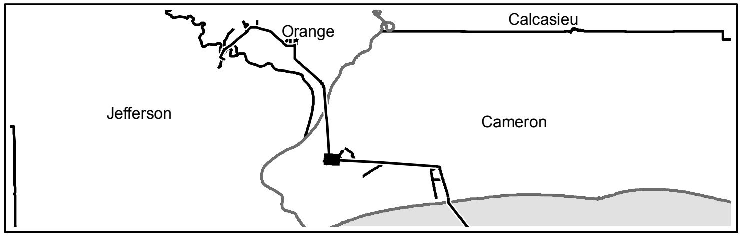
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	28 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

Proposed Onshore Pipeline CL

Permanent Easement

Temporay Easement

ATWS

▢ Estuarine, unvegetated subtidal

■ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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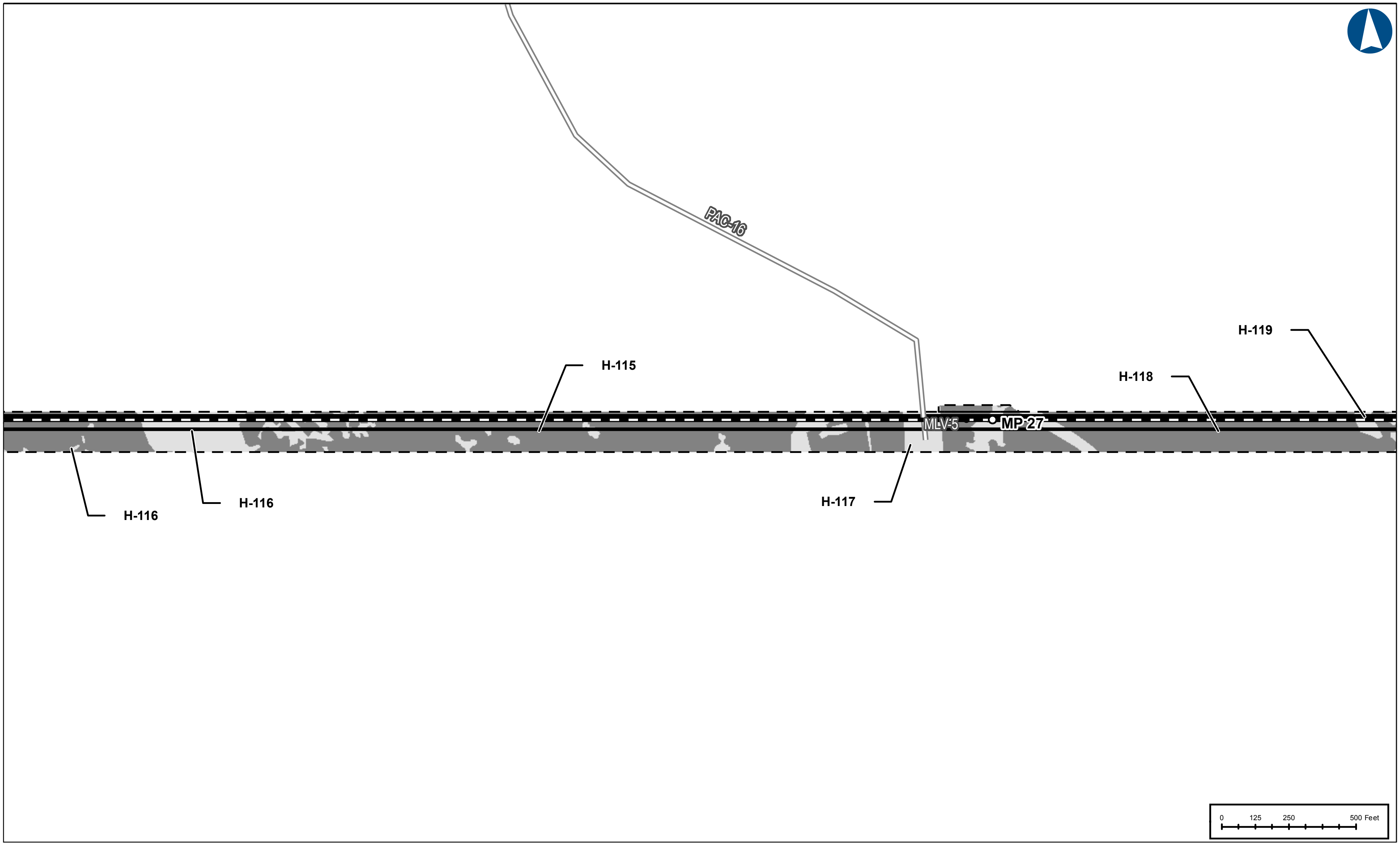
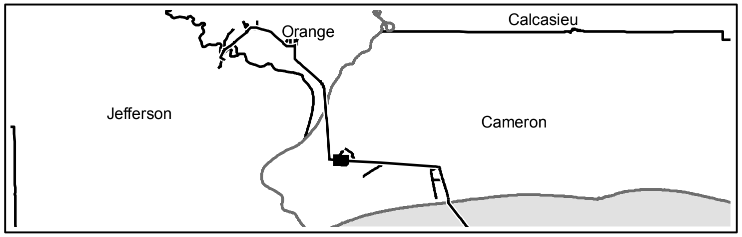
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	29 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Canal
Permanent Easement
Temporay Easement
ATWS
Estuarine, unvegetated subtidal
Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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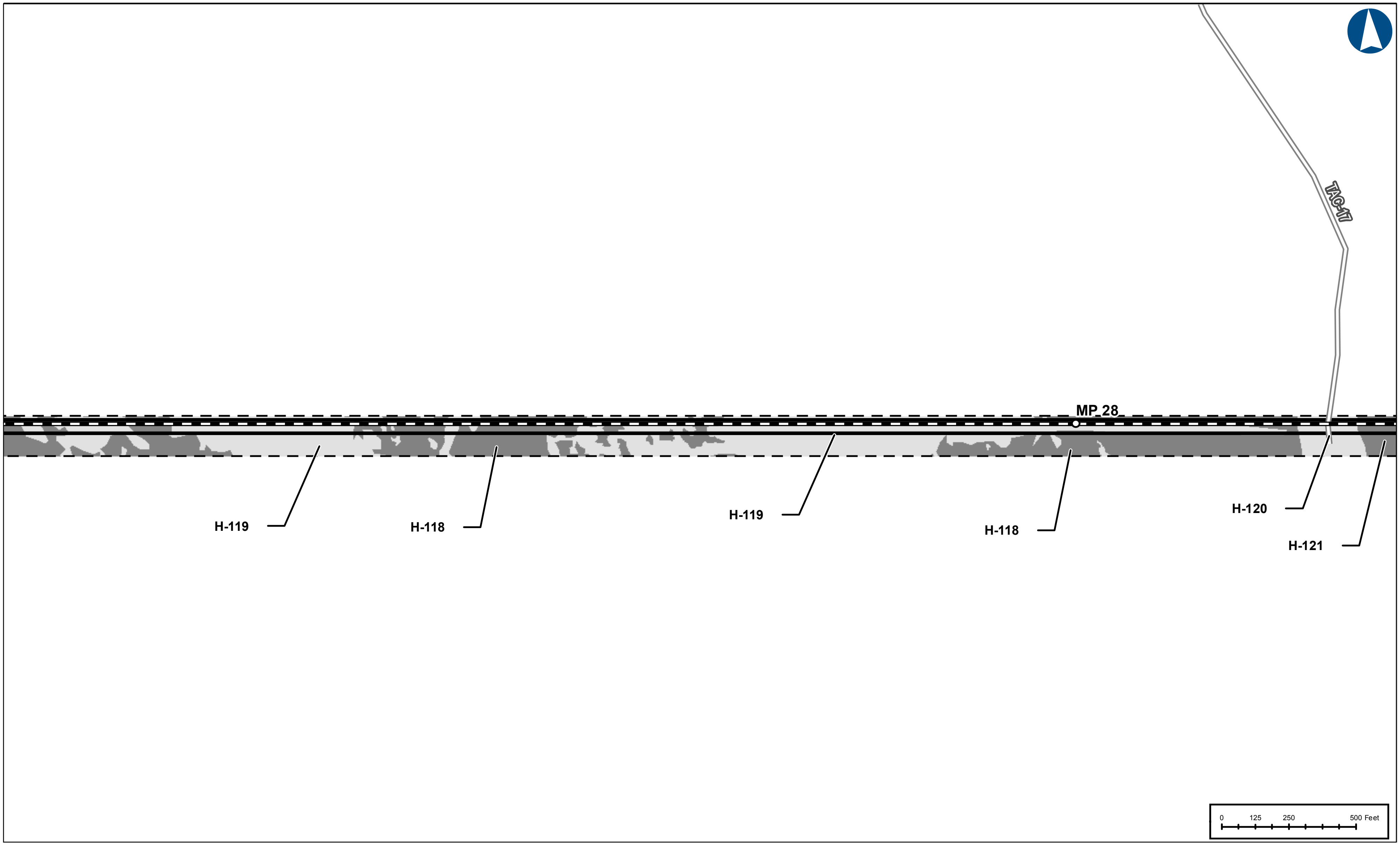
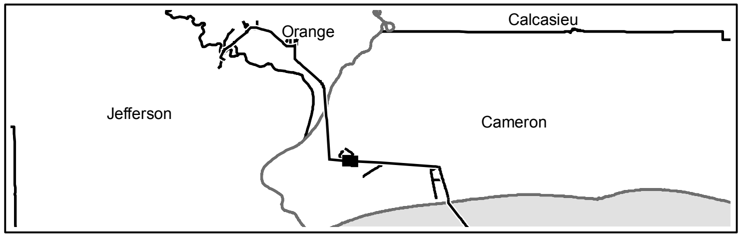
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	30 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
━ Proposed Onshore Pipeline CL
═ Project Access Canal
▭ Permanent Easement
⌐ ¬ Temporay Easement
░ Estuarine, unvegetated subtidal
▓ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
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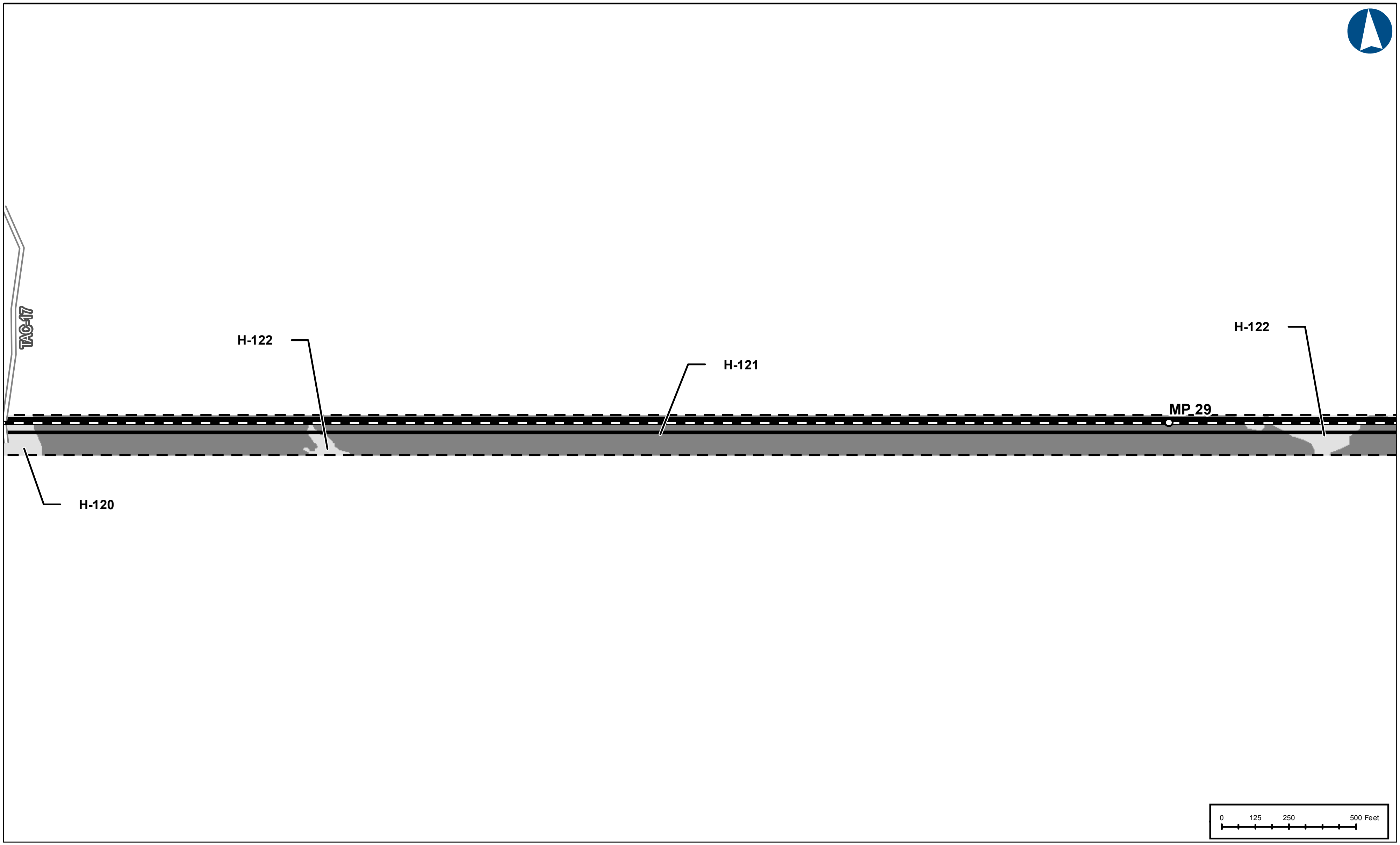
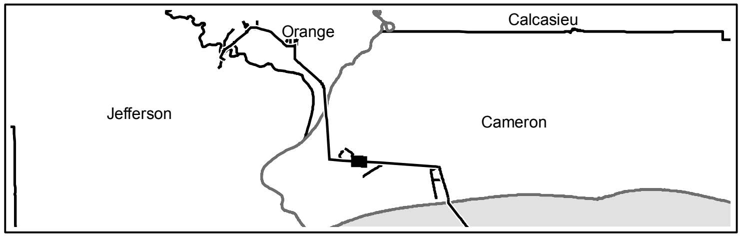
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	31 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ━ Proposed Onshore Pipeline CL
- ═ Project Access Canal
- ▭ Permanent Easement
- ⌐ ¬ Temporay Easement
- ░ Estuarine, unvegetated subtidal
- ▓ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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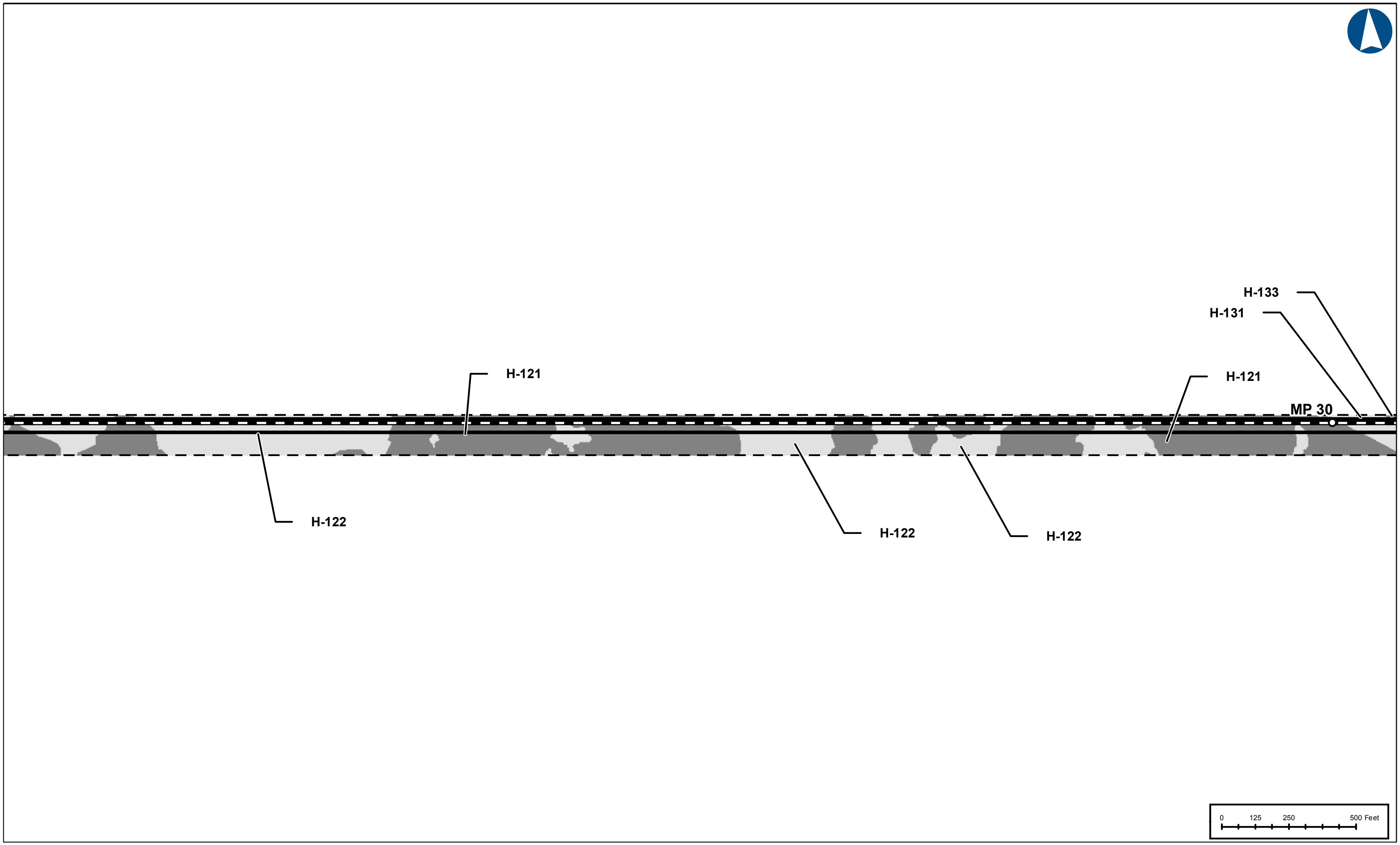
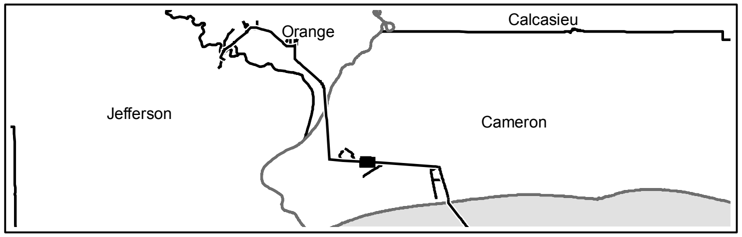
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	32 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost
━	Proposed Onshore Pipeline CL
▭	Permanent Easement
⬚	Temporay Easement
░	Estuarine, unvegetated subtidal
▓	Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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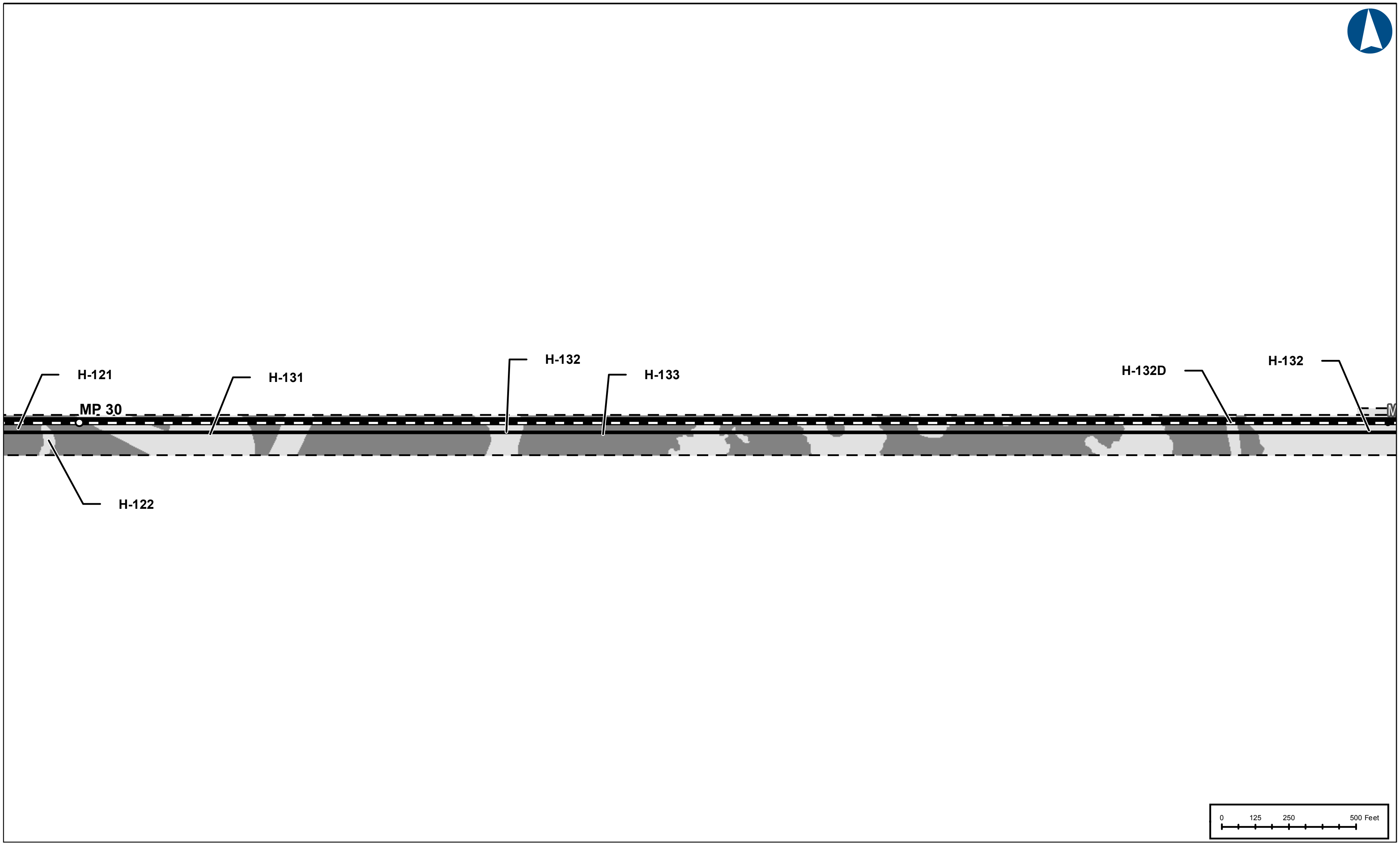
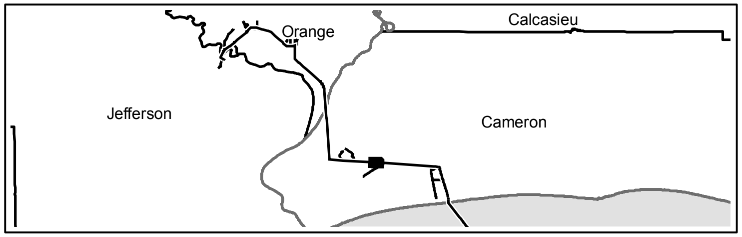
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	33 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
▬ Proposed Onshore Pipeline CL
▭ Permanent Easement
⬚ Temporay Easement
⬚ ATWS
▢ Estuarine, unvegetated subtidal
■ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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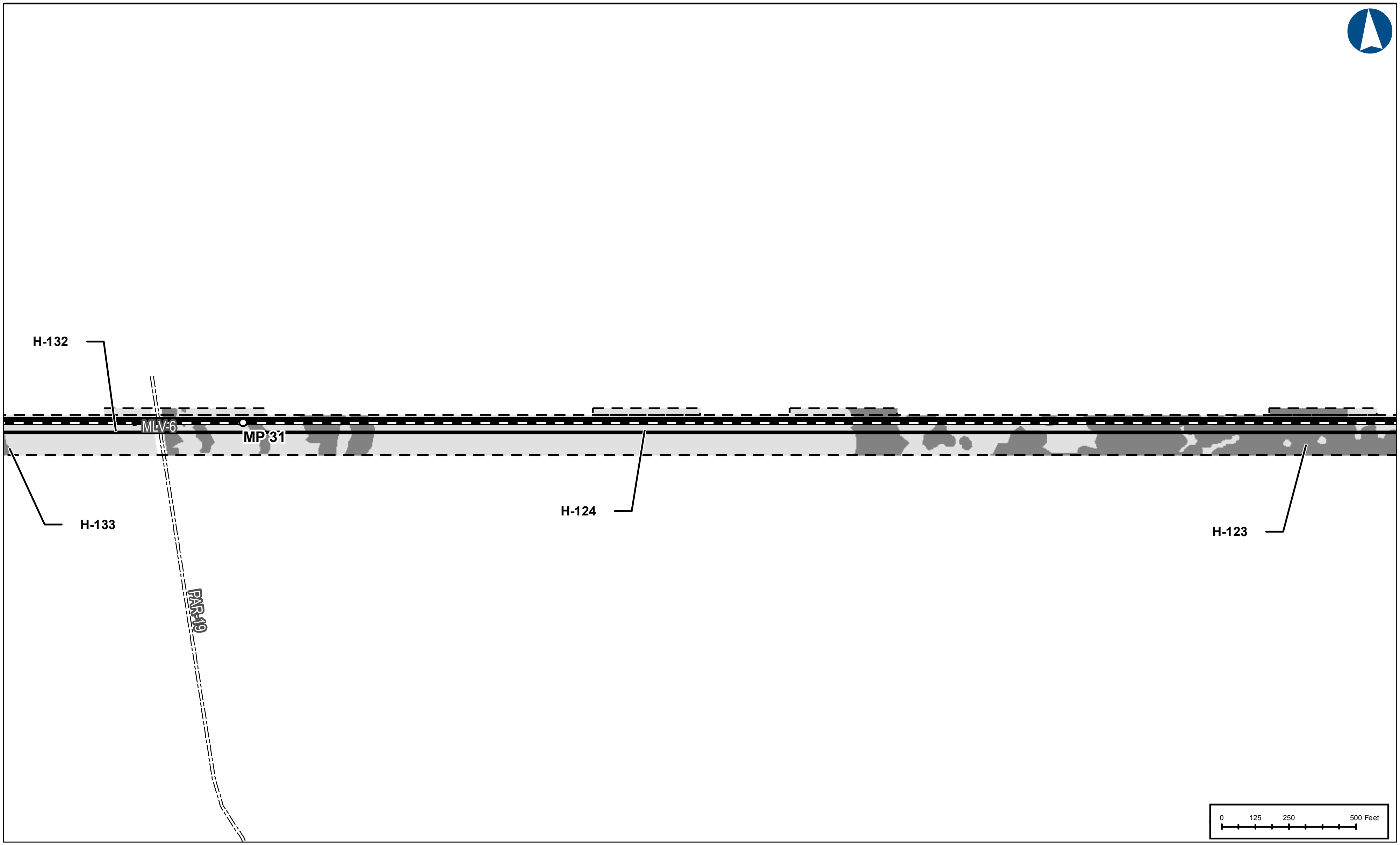
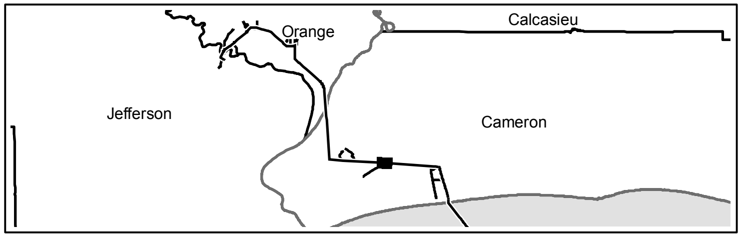
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	34 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost	⌜⌟ Temporay Easement
● Valve Location	⌜⌟ ATWS
━ Proposed Onshore Pipeline CL	░ Estuarine, unvegetated subtidal
═ Project Access Road	▓ Estuarine, vegetated intertidal (salt marsh)
▭ Permanent Easement	

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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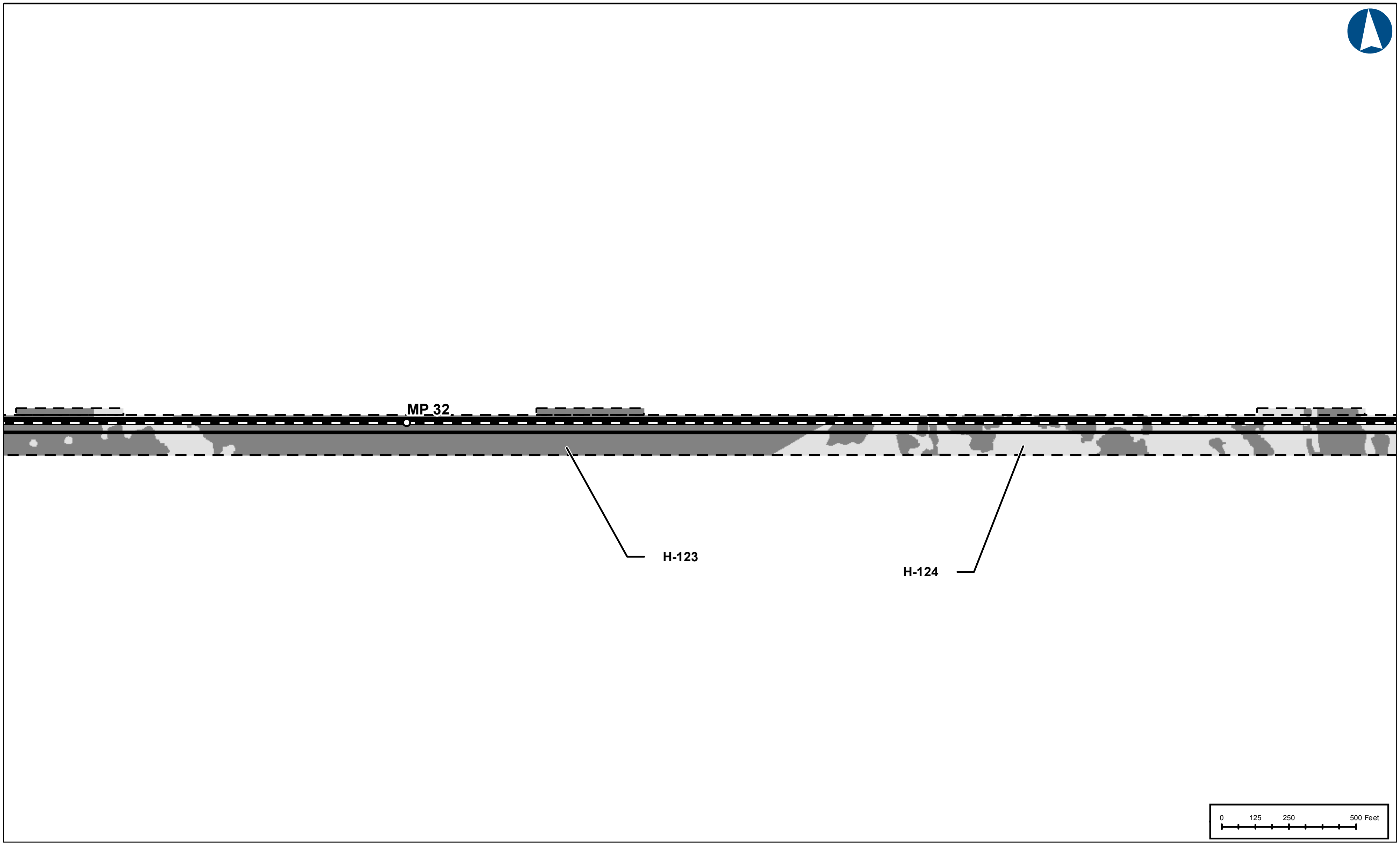
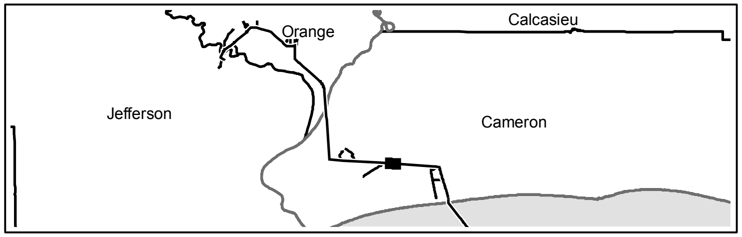
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	35 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Permanent Easement
Temporay Easement
ATWS
▨ Estuarine, unvegetated subtidal
▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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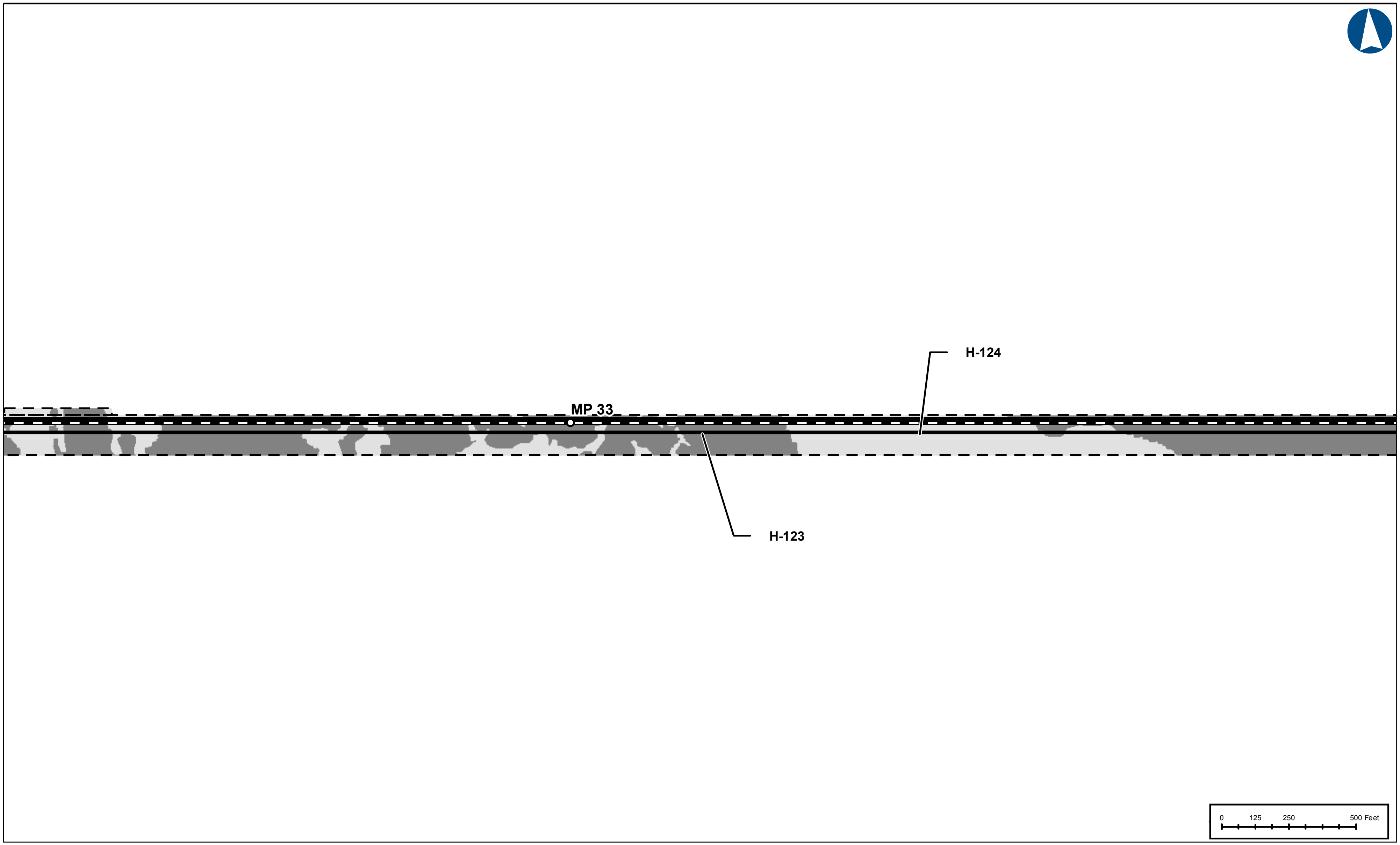
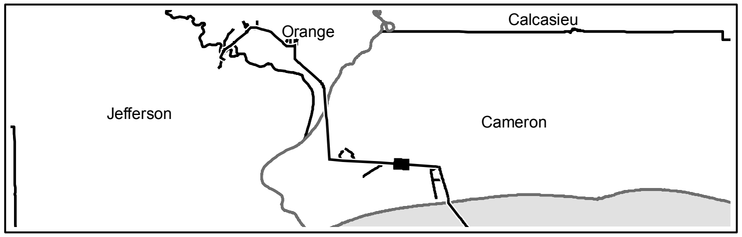
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	36 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost
━	Proposed Onshore Pipeline CL
▭	Permanent Easement
⬚	Temporay Easement
⬚	ATWS
░	Estuarine, unvegetated subtidal
▓	Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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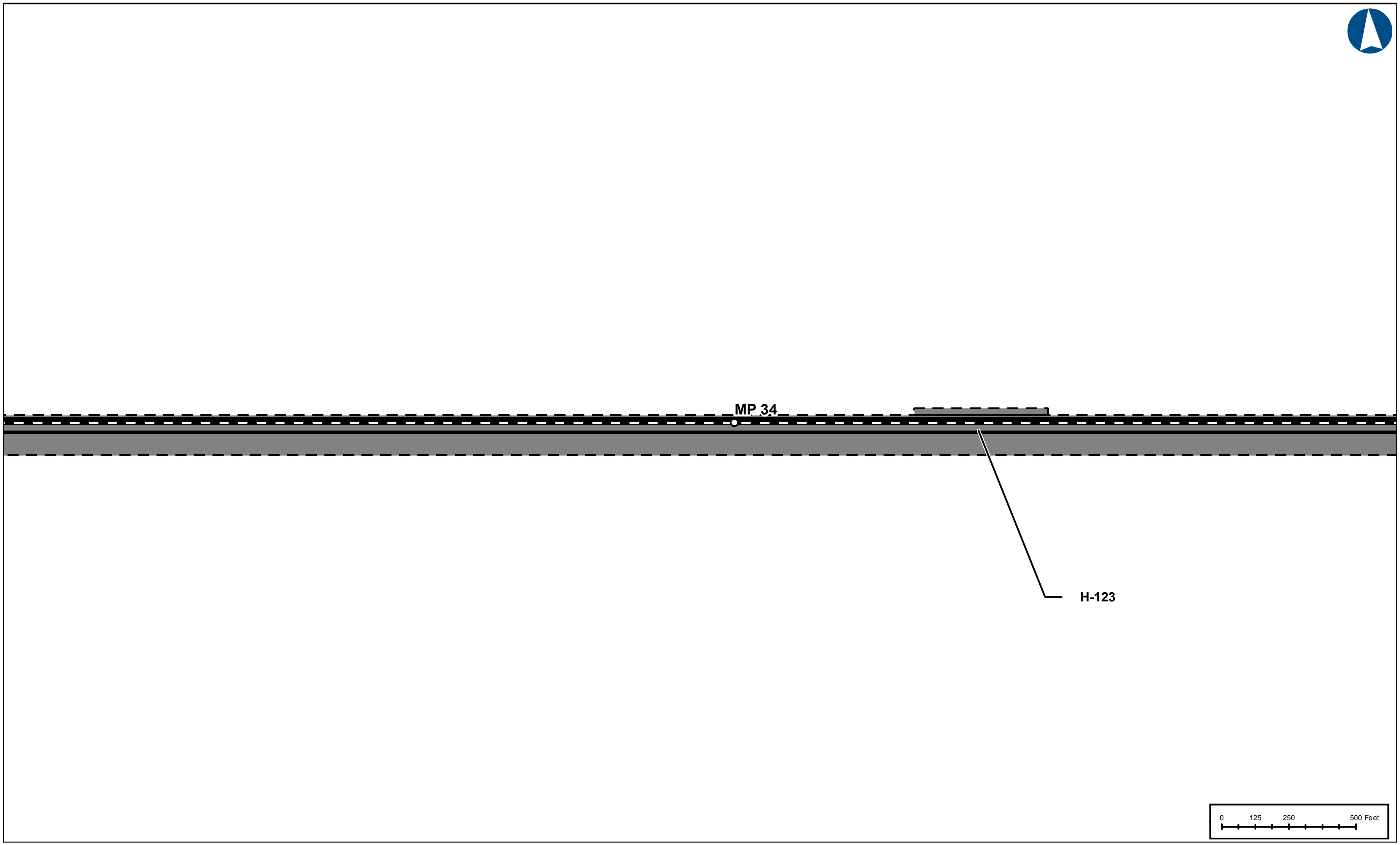
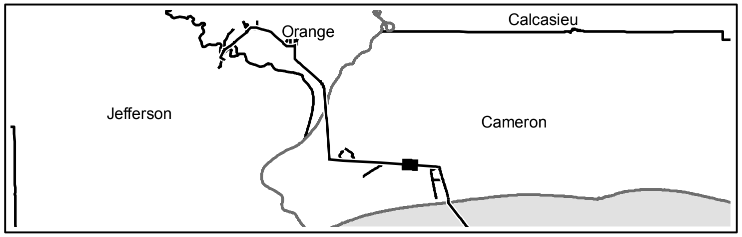
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	37 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
▬ Proposed Onshore Pipeline CL
▭ Permanent Easement
⬚ Temporay Easement
⬚ ATWS
▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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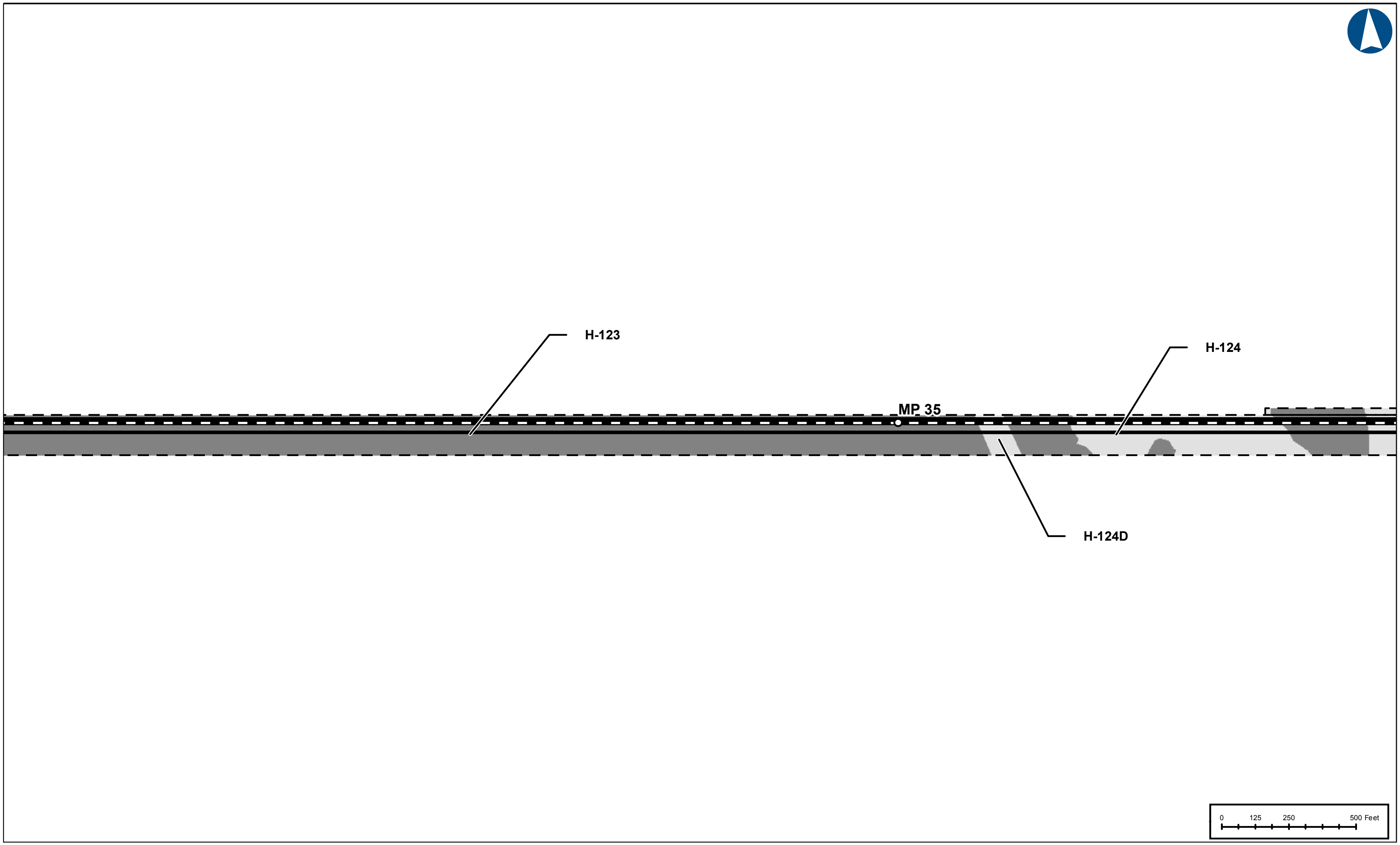
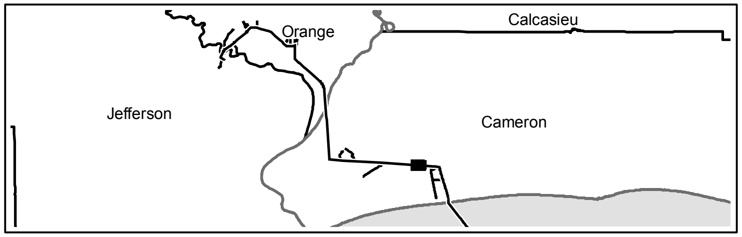
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	38 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Permanent Easement
- Temporay Easement
- ATWS
- ▢ Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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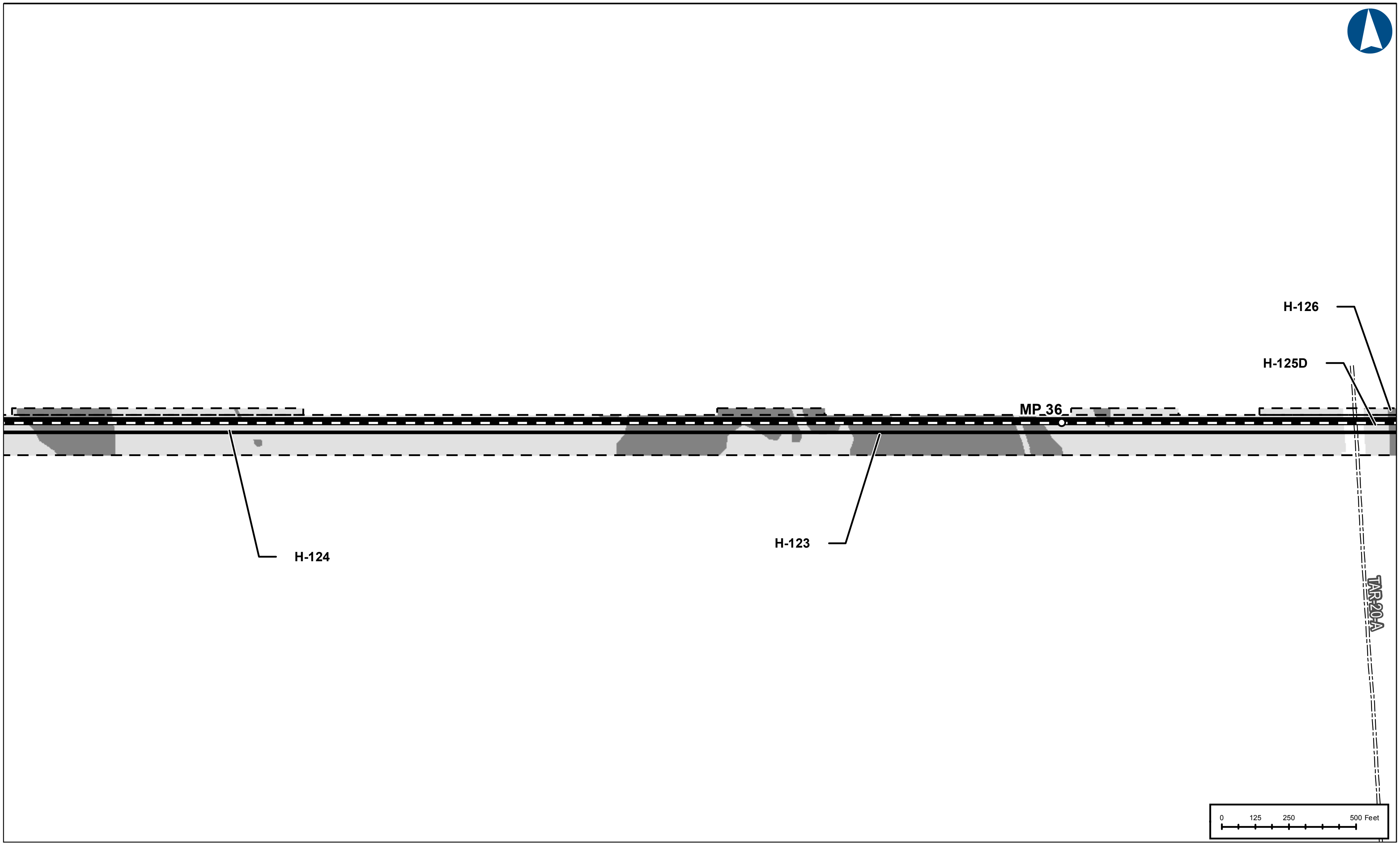
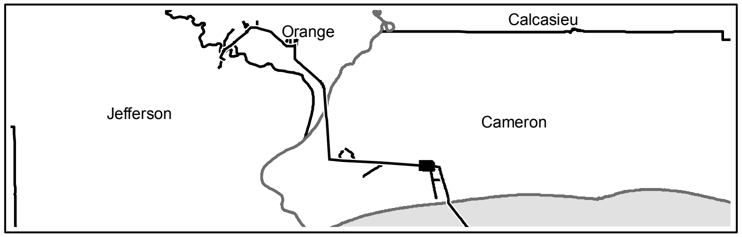
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	39 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Road
- Permanent Easement
- Temporay Easement
- ATWS
- ▨ Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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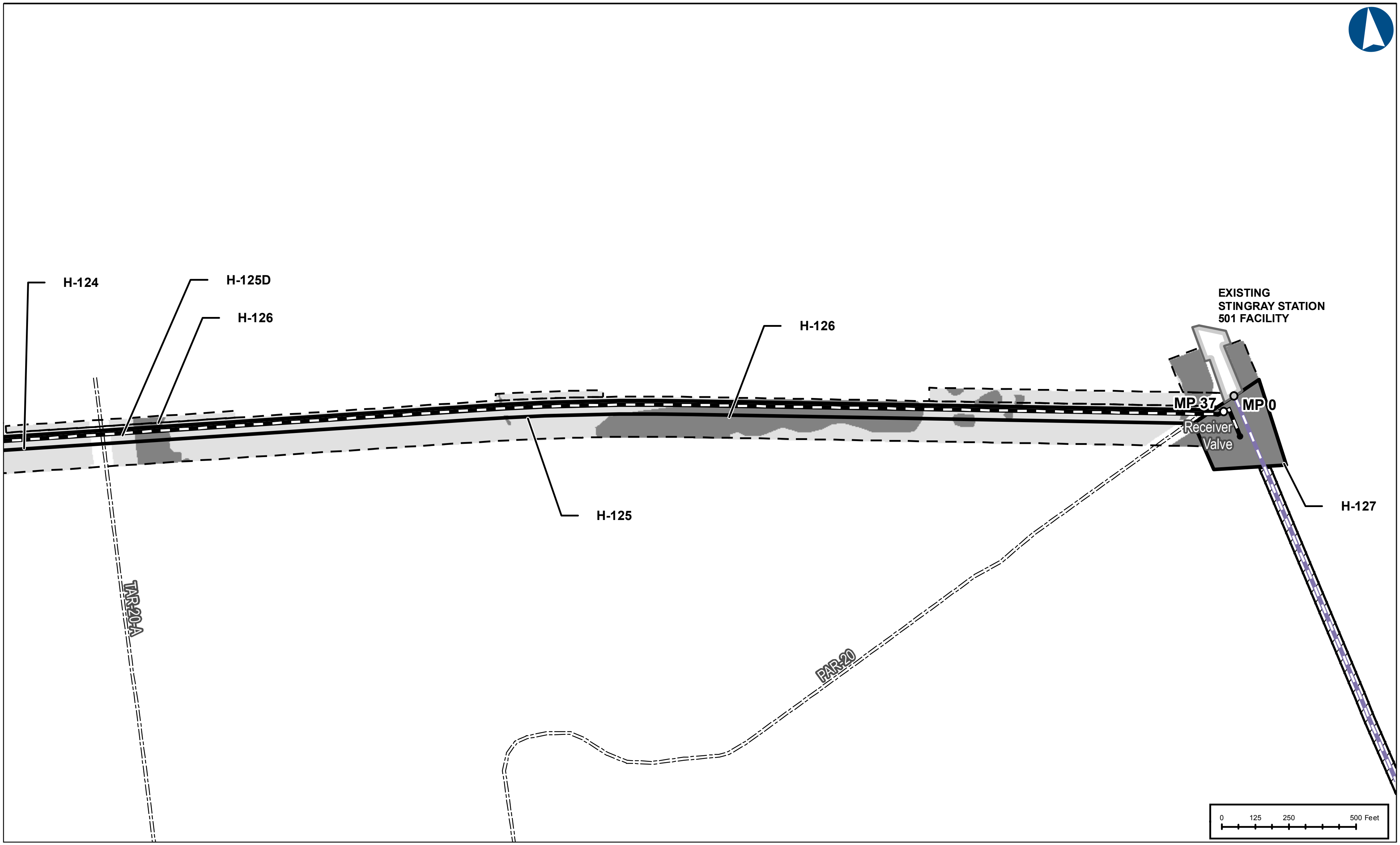
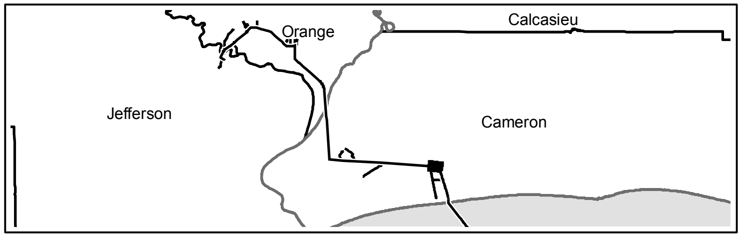
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N

DWG:	0801-06-001	SHEET:	40 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost	▭ Permanent Easement
○ Existing Pipeline Milepost	⌐ Temporay Easement
● Valve Location	⌐ ATWS
▬ Proposed Onshore Pipeline CL	▨ Existing Permanent Easement (No Impact)
▬ Existing Stingray Pipeline To Be Converted to Oil Service	▢ Estuarine, unvegetated subtidal
╌ Project Access Road	■ Estuarine, vegetated intertidal (salt marsh)
▭ Existing Permanent Easement / Facility for Use	

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

PREPARED BY

exp Energy Services Inc.
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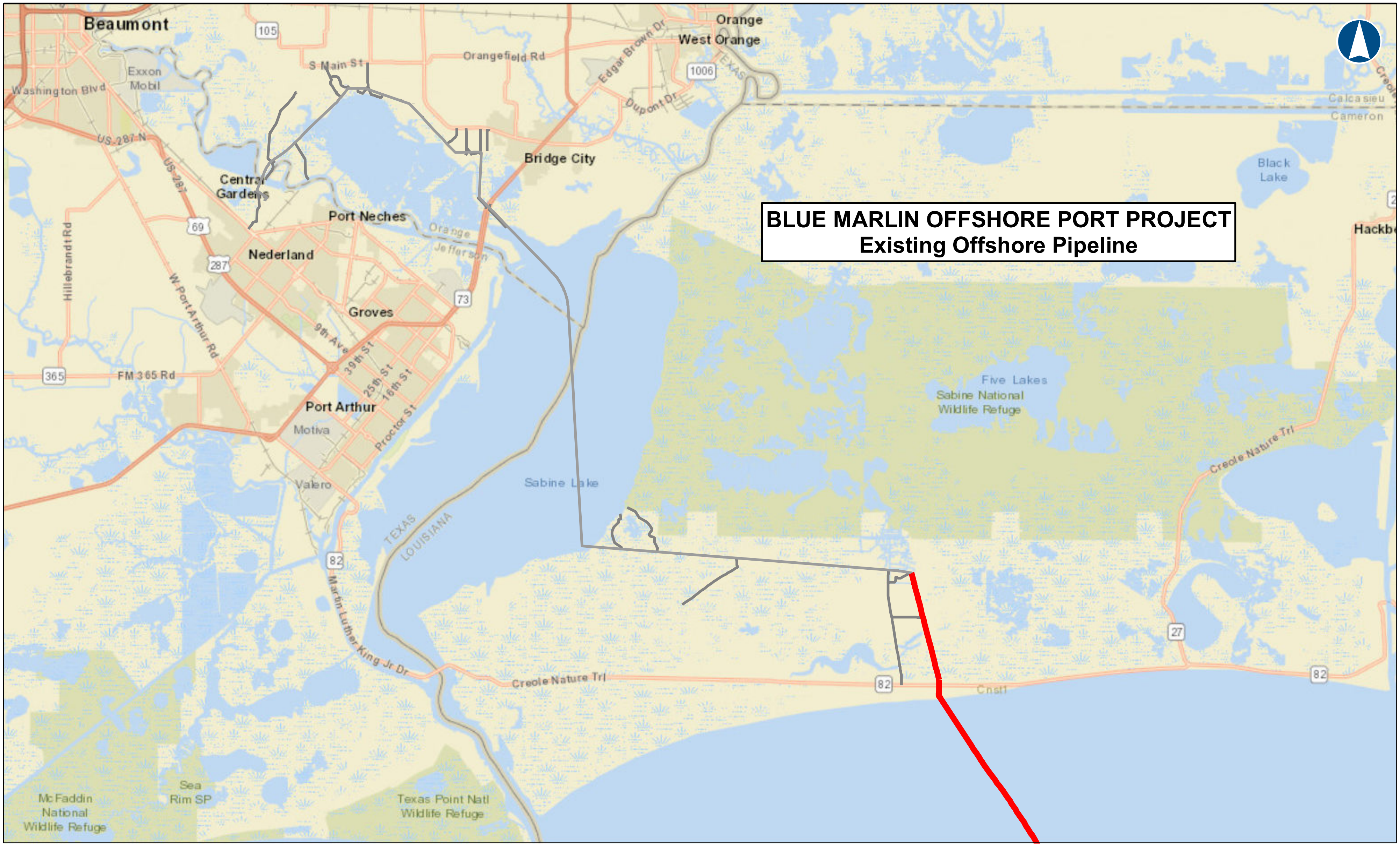
HOUSTON, TX 77027, USA

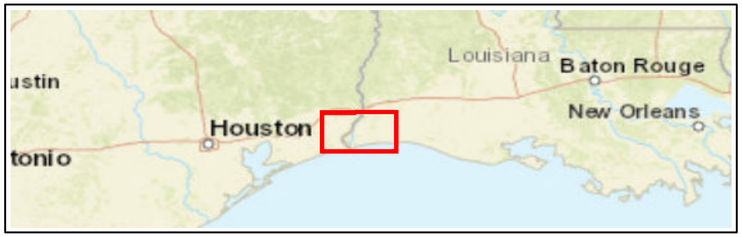
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	41 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Existing Offshore Pipeline



BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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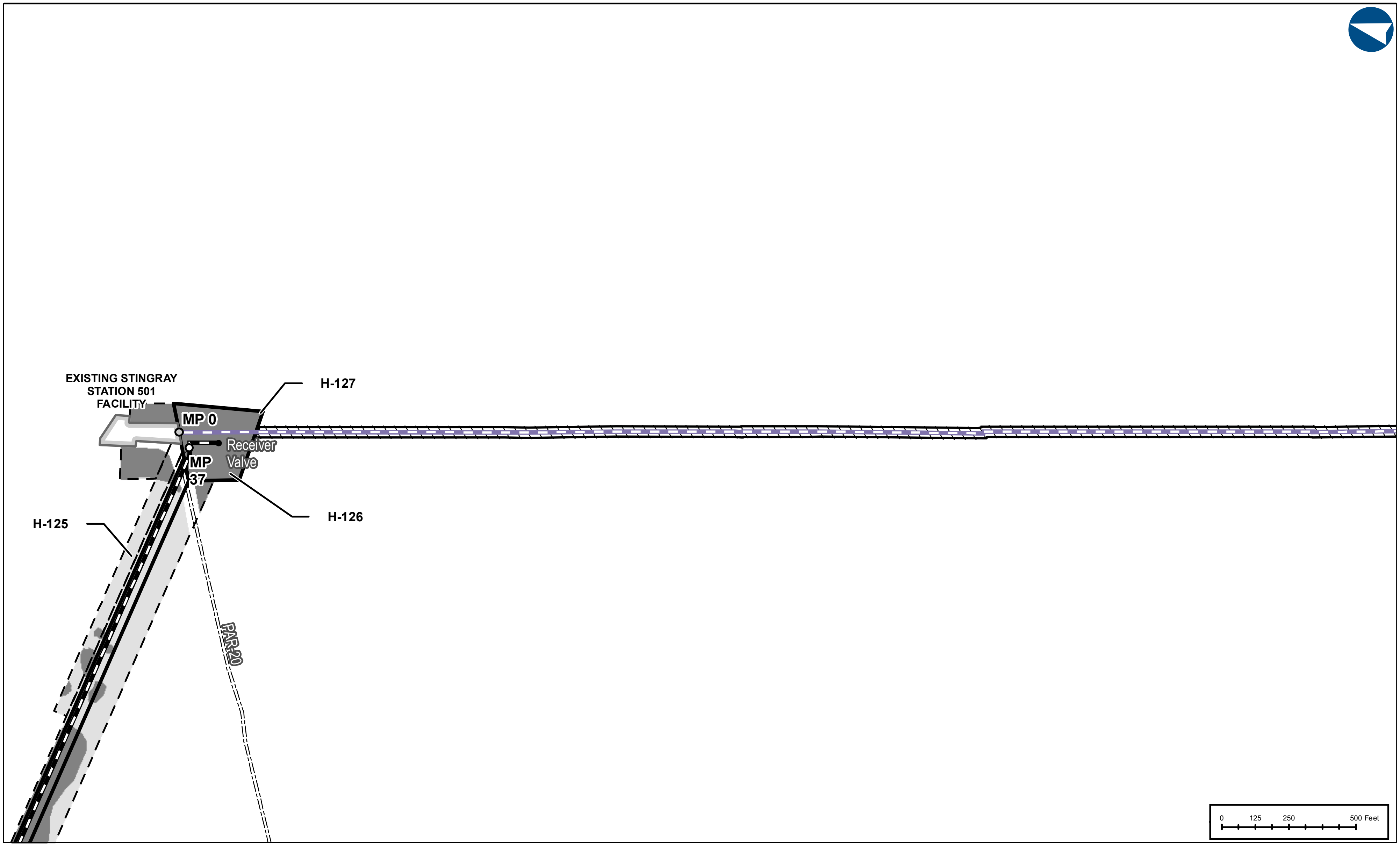
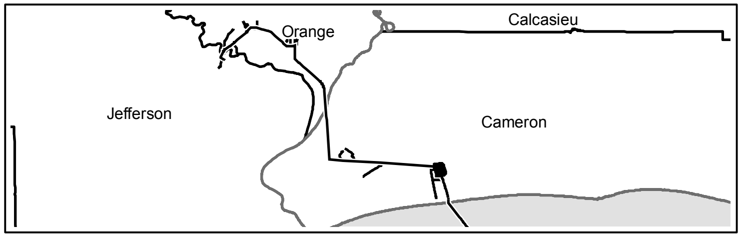
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
○ Existing Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Existing Stingray Pipeline To Be Converted to Oil Service
Project Access Road
Existing Permanent Easement / Facility for Use
Permanent Easement
Temporay Easement
ATWS
▨ Existing Permanent Easement (No Impact)
Estuarine, unvegetated subtidal
Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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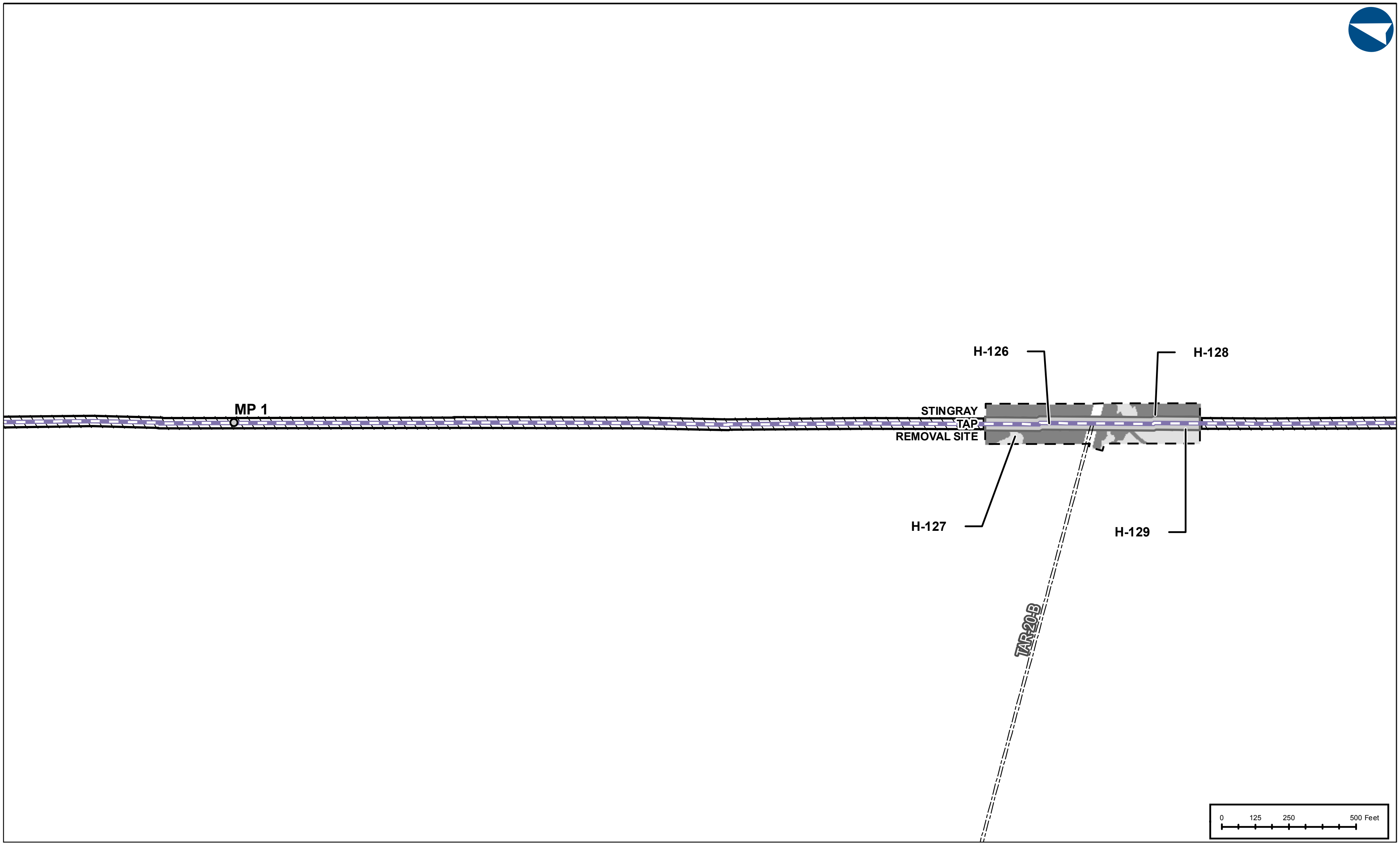
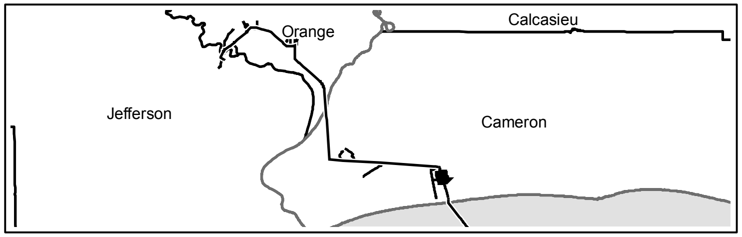
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	42 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Existing Pipeline Milepost
- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ═ Project Access Road
- ▭ Existing Permanent Easement / Facility for Use
- ⌜⌟ ATWS
- ▨ Existing Permanent Easement (No Impact)
- ▢ Estuarine, unvegetated subtidal
- ■ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	***DRAWN BY:***	CW
STATE:	LOUISIANA	***CHECKED BY:***	JZ

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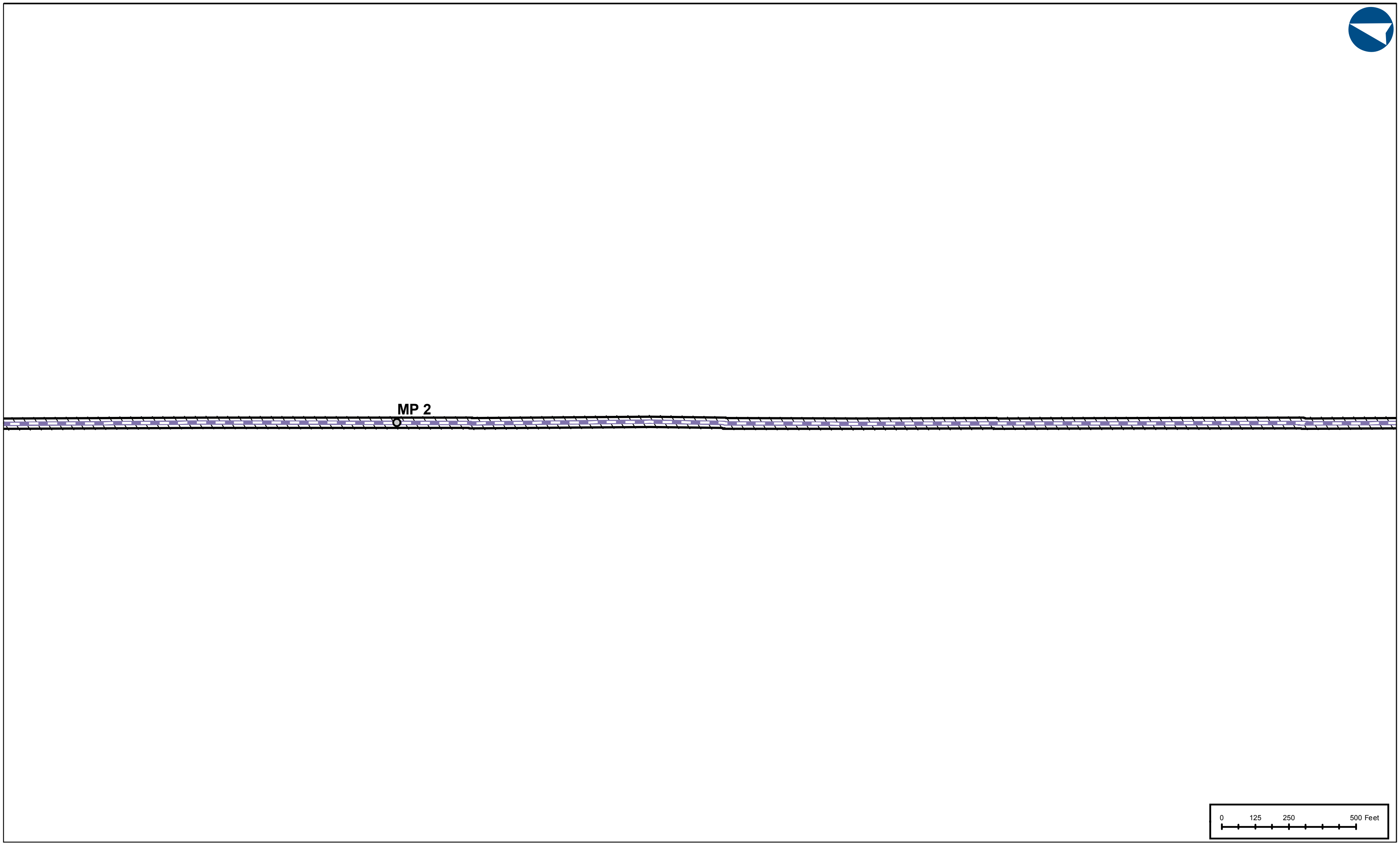
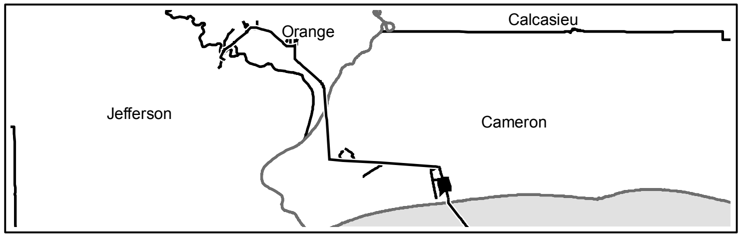
BLUE MARLIN OFFSHORE
PORT PROJECT

DATE:	2020-08-26	***PROJECTION:***	UTM 15 N
DWG:	0801-06-001	***SHEET:***	43 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Existing Pipeline Milepost
- ▬ Existing Stingray Pipeline To Be Converted to Oil Service
- ▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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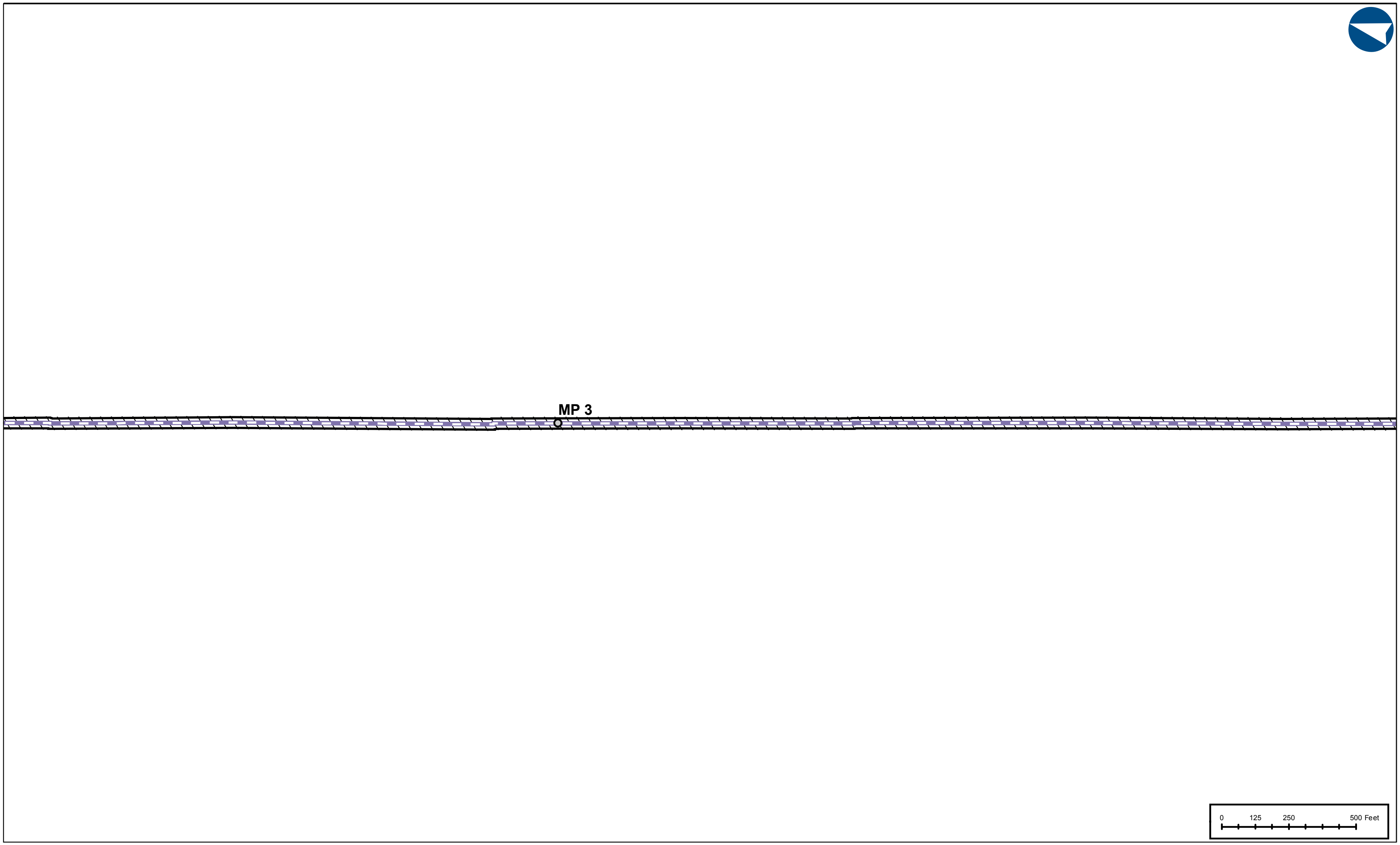
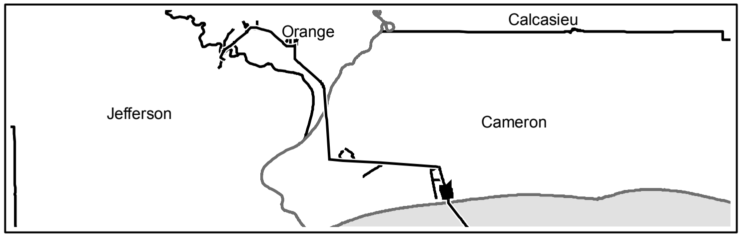
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N	DWG:	0801-06-001	SHEET:	44 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Existing Pipeline Milepost

▬ Existing Stingray Pipeline To Be Converted to Oil Service

▨ Existing Permanent Easement (No Impact)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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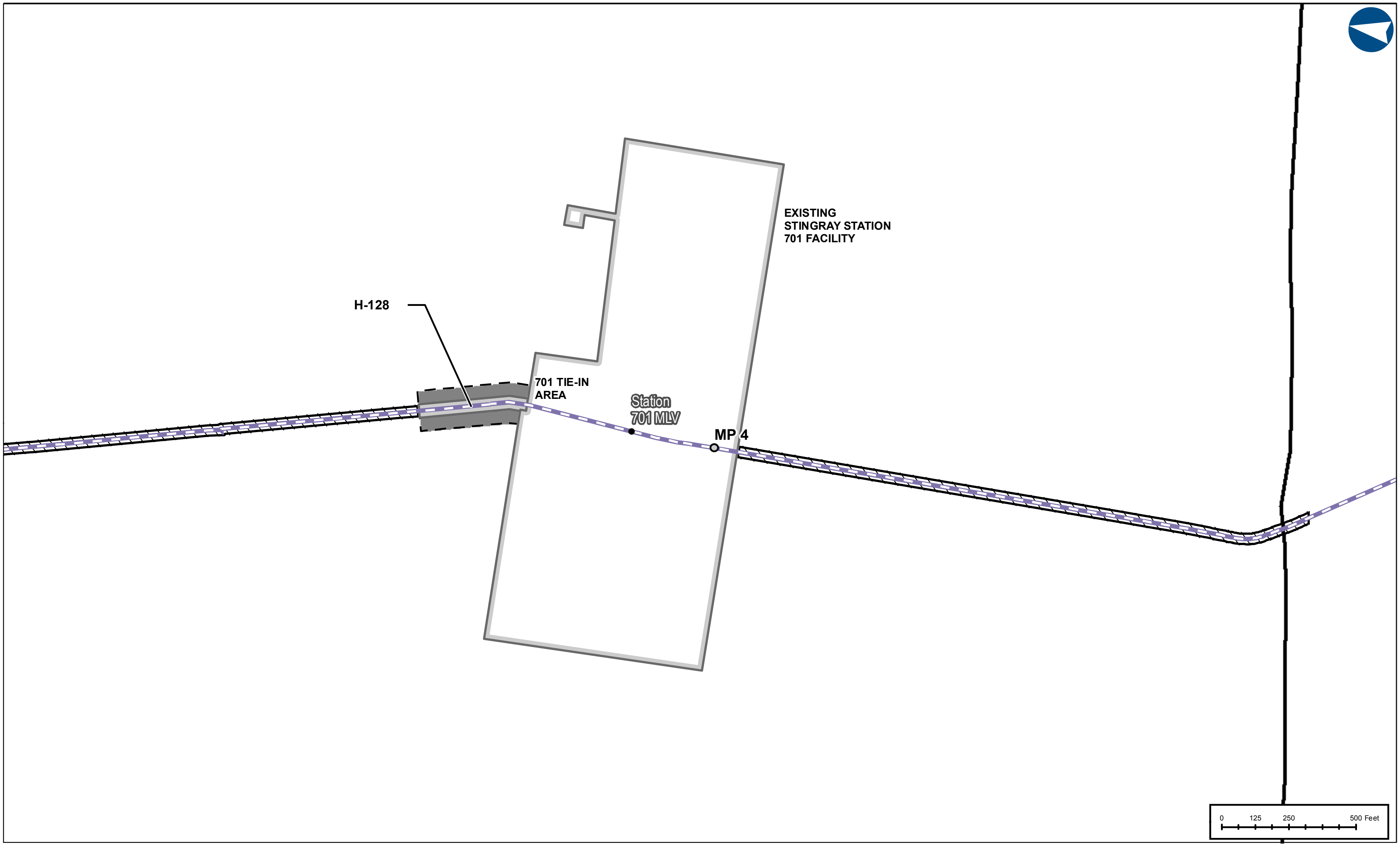
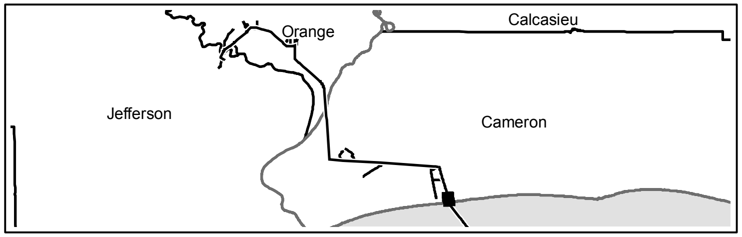
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	45 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Existing Pipeline Milepost
●	Valve Location
▬	Existing Stingray Pipeline To Be Converted to Oil Service
▭	Existing Permanent Easement / Facility for Use
⬚	ATWS
▨	Existing Permanent Easement (No Impact)
■	Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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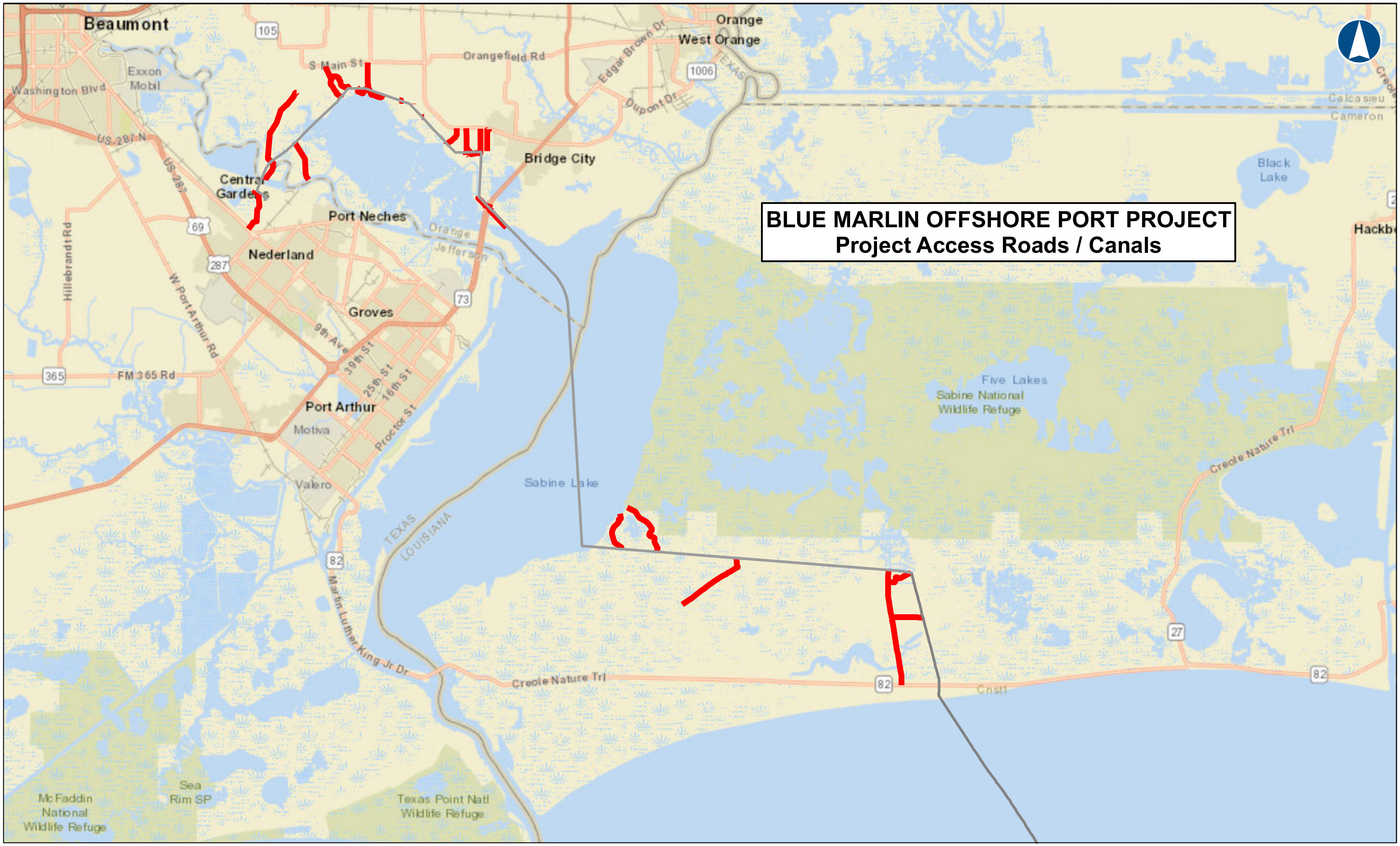
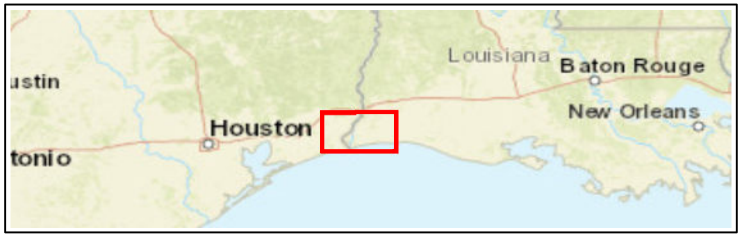
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	46 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT



BLUE MARLIN OFFSHORE PORT PROJECT
Project Access Roads / Canals



BLUE MARLIN OFFSHORE PORT PROJECT

COUNTY/PARISH:	N/A	DRAWN BY:	CW
STATE:	N/A	CHECKED BY:	JZ

PREPARED BY

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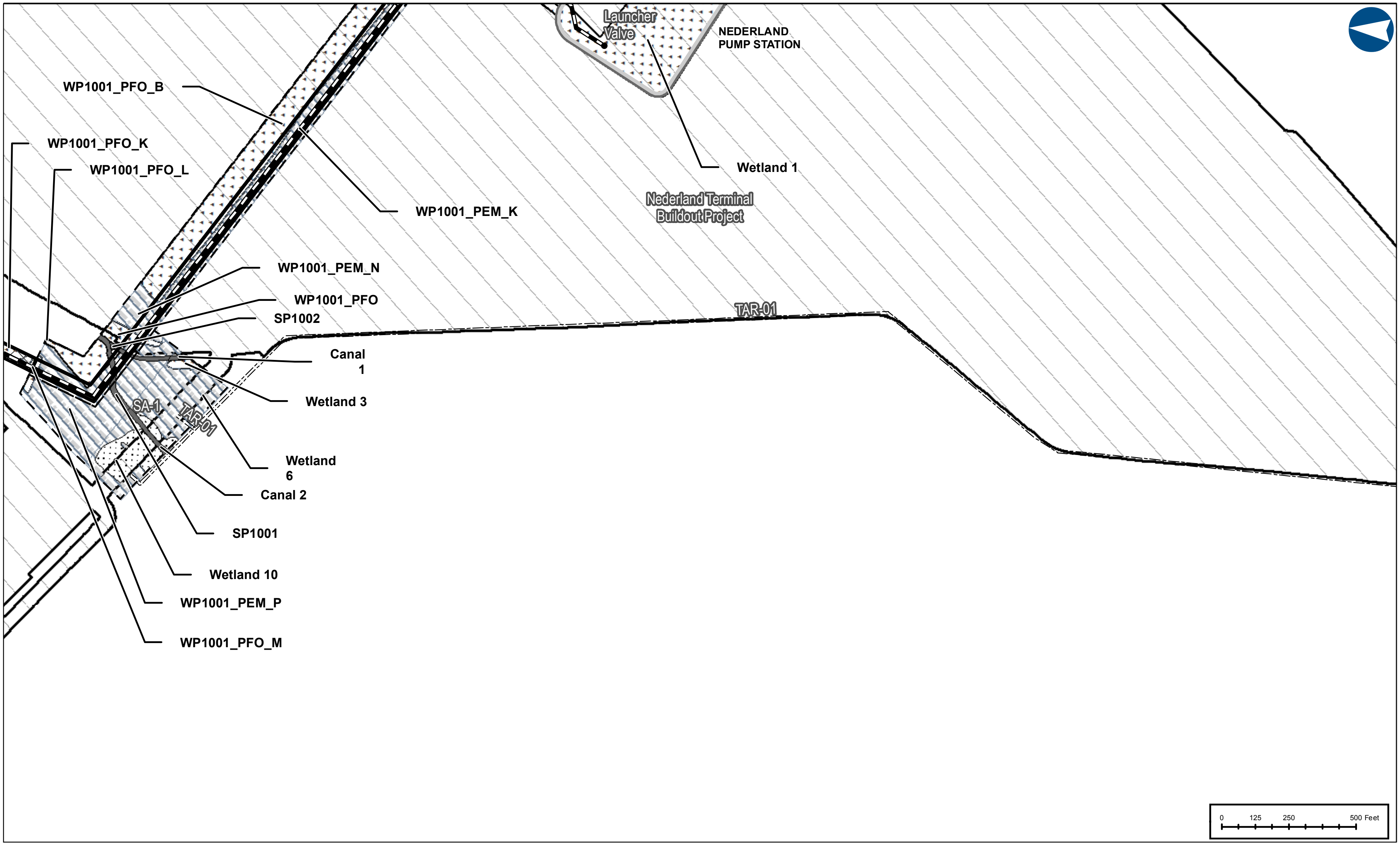
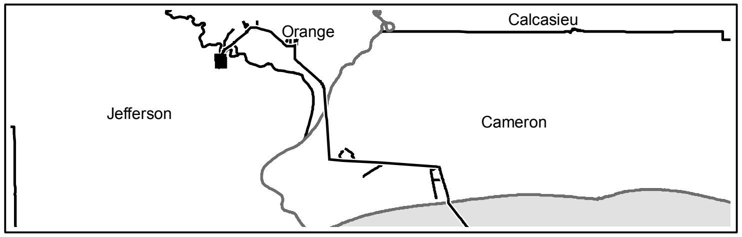
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	1 OF 1

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- ☒ HDD Easement (Avoidance)
- Existing Permanent Easement / Facility for Use
- Permanent Easement
- Temporay Easement
- ATWS
- ■ Waterbody
- ▨ PEM Wetland
- PFO Wetland
- PSS Wetland
- ▨ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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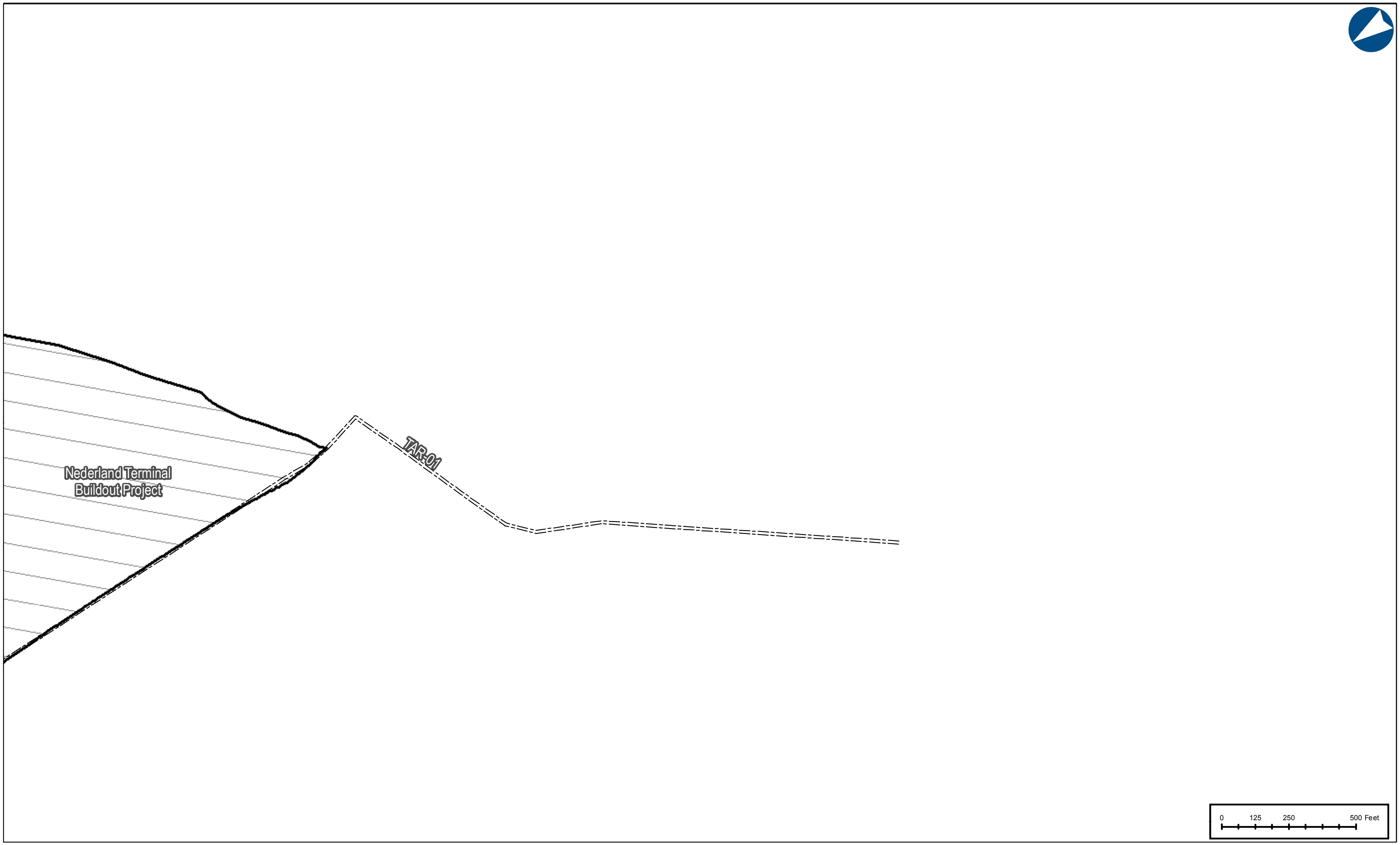
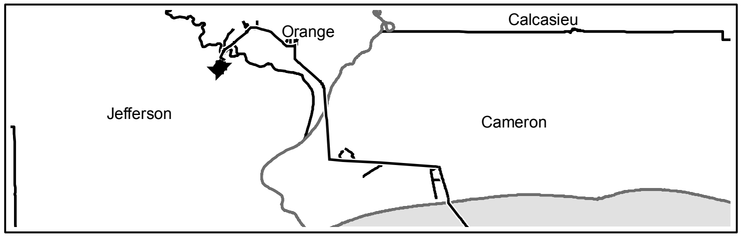
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	47 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





=:=:= Project Access Road

▨ Nederland Terminal Buildout Project

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	JEFFERSON	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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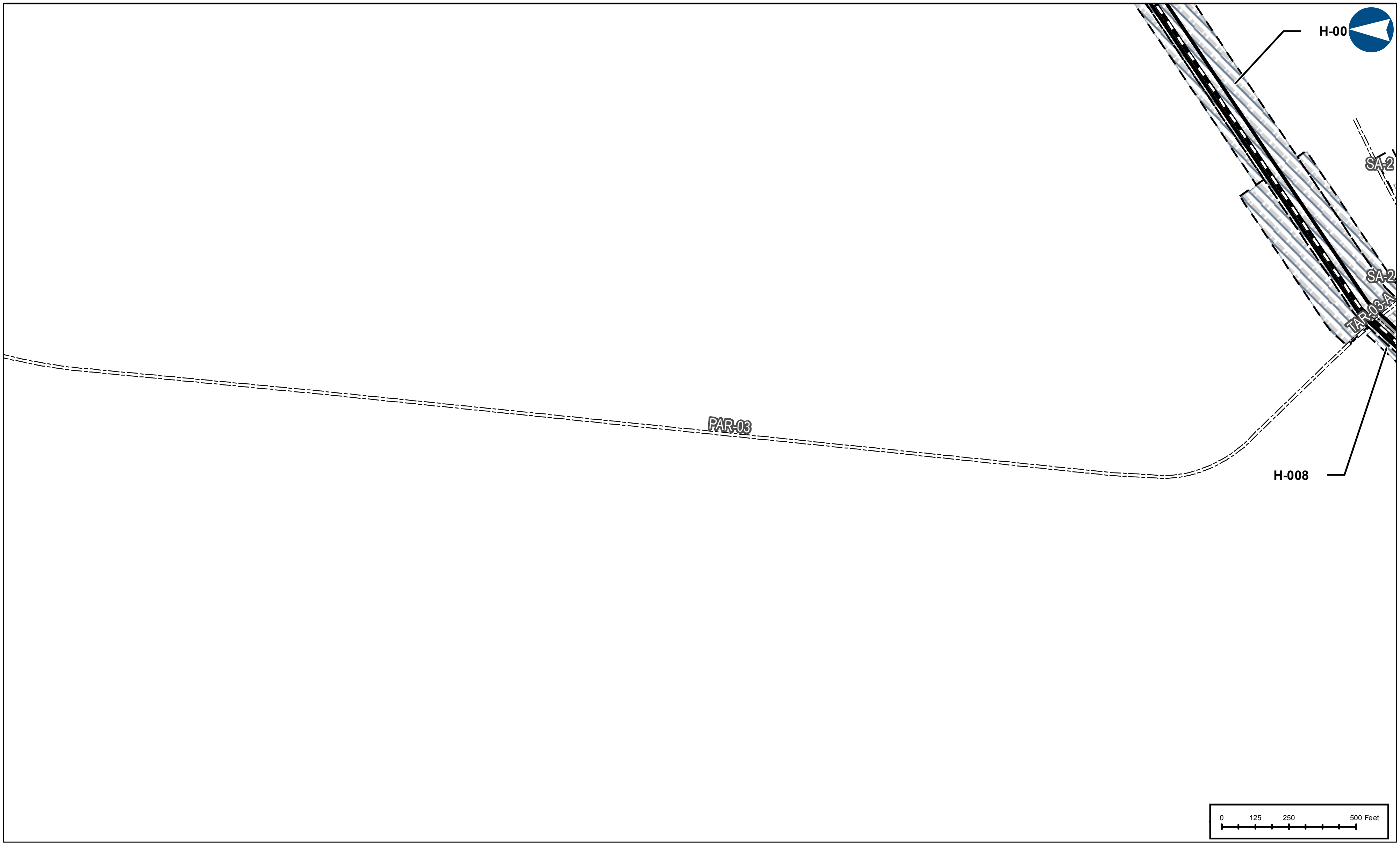
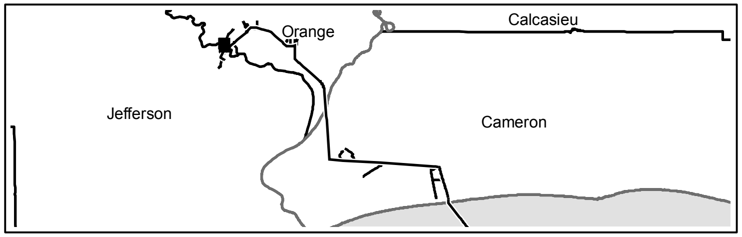
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	48 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





Proposed Onshore Pipeline CL
Project Access Road
Permanent Easement
Temporay Easement
ATWS
Permanent Access Road Easement
PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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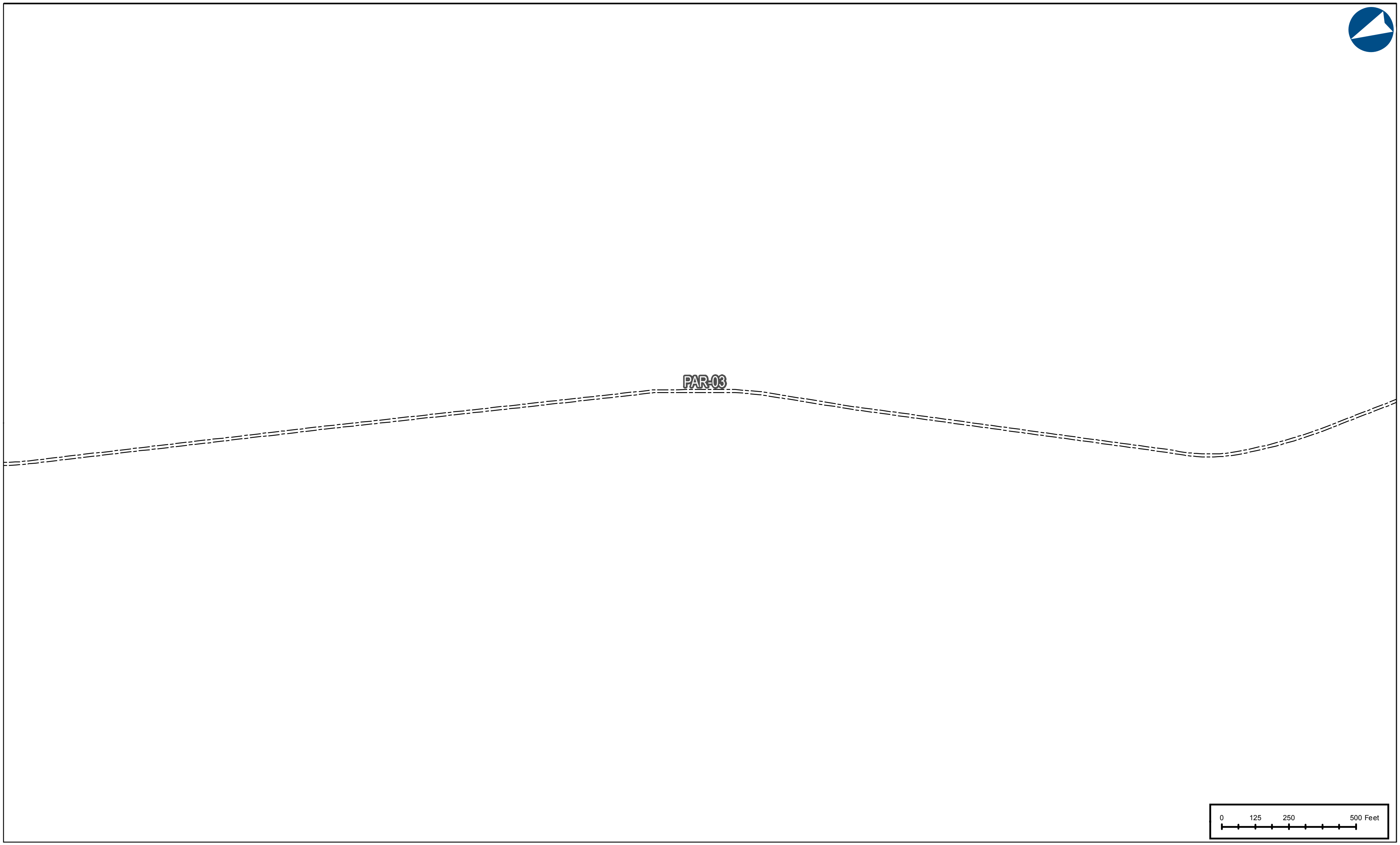
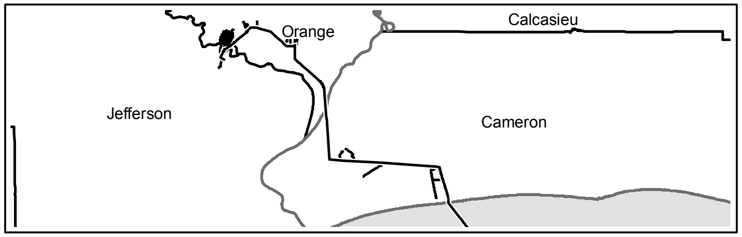
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	49 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	**DRAWN BY:**	CW
STATE:	TEXAS	**CHECKED BY:**	JZ
DATE:	2020-08-26	**PROJECTION:**	UTM 15 N

PREPARED BY

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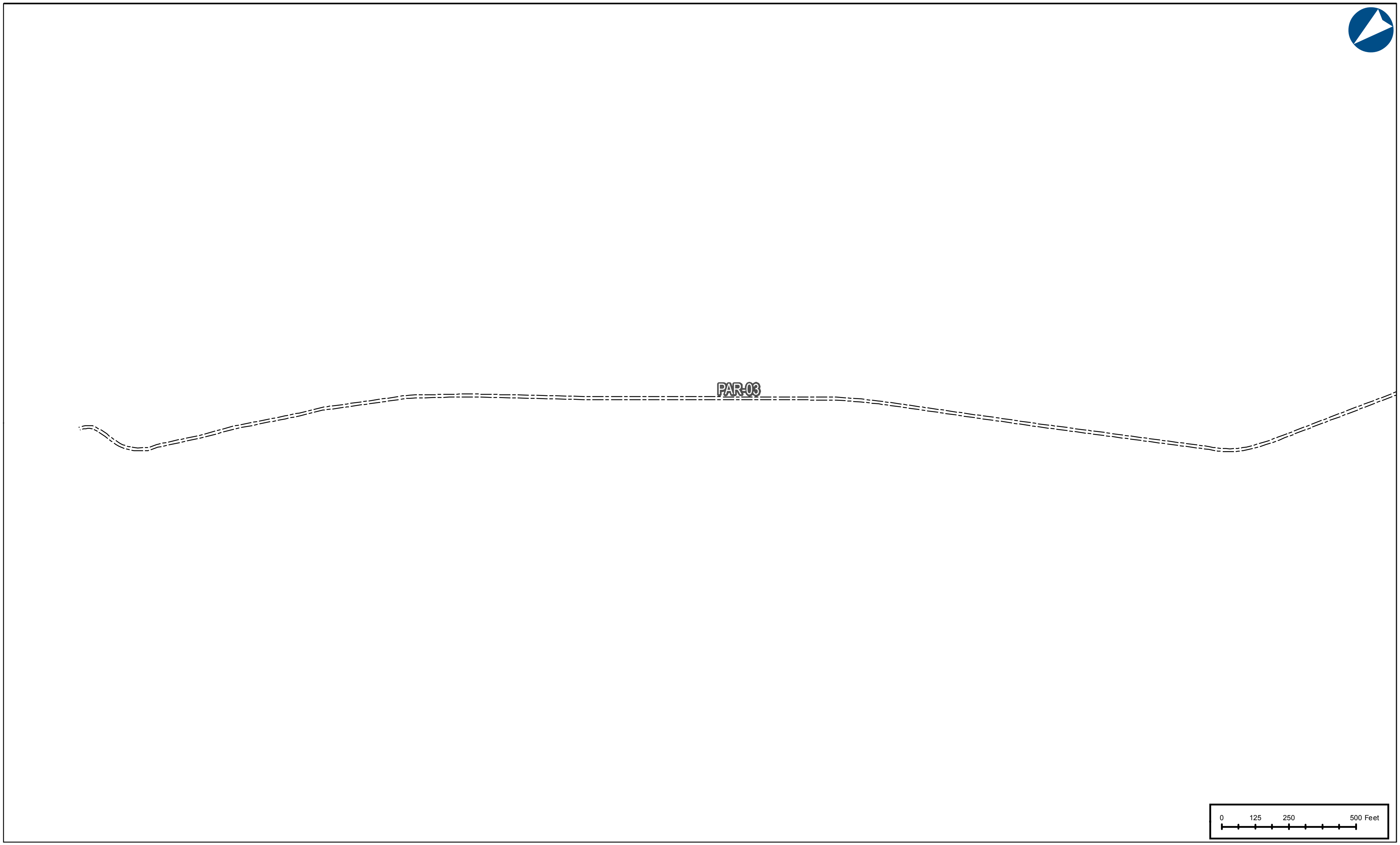
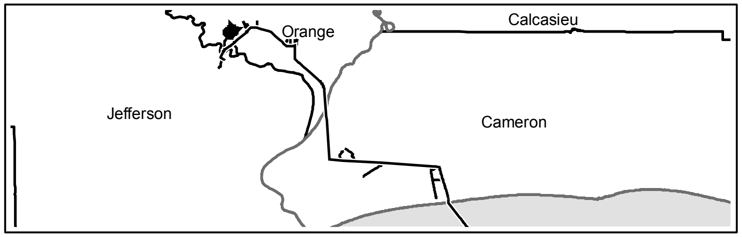
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	**SHEET:**	50 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	**DRAWN BY:**	CW
STATE:	TEXAS	**CHECKED BY:**	JZ

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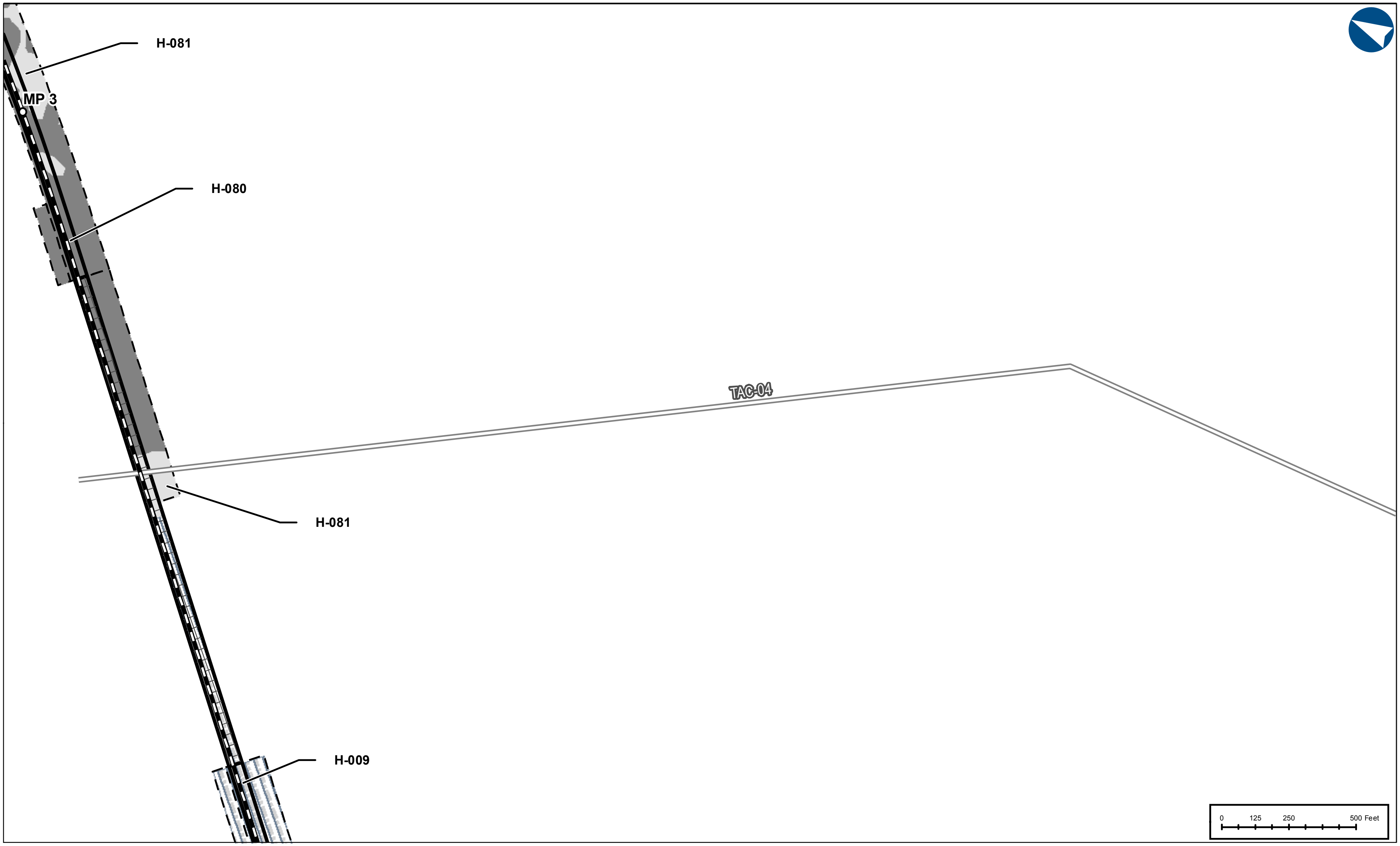
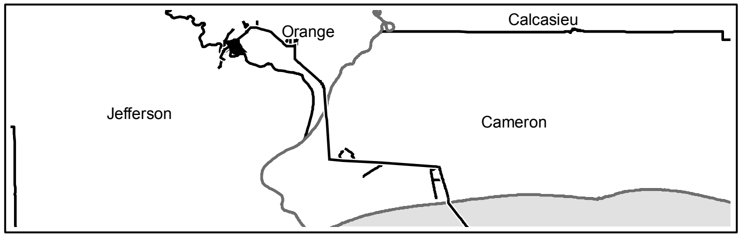
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	**PROJECTION:**	UTM 15 N
DWG:	0801-06-001	**SHEET:**	51 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost	⌜⌟ Temporay Easement
▬ Proposed Onshore Pipeline CL	⌜⌟ ATWS
═ Project Access Canal	░ Estuarine, unvegetated subtidal
☒ HDD Easement (Avoidance)	▓ Estuarine, vegetated intertidal (salt marsh)
☐ Permanent Easement	▨ PEM Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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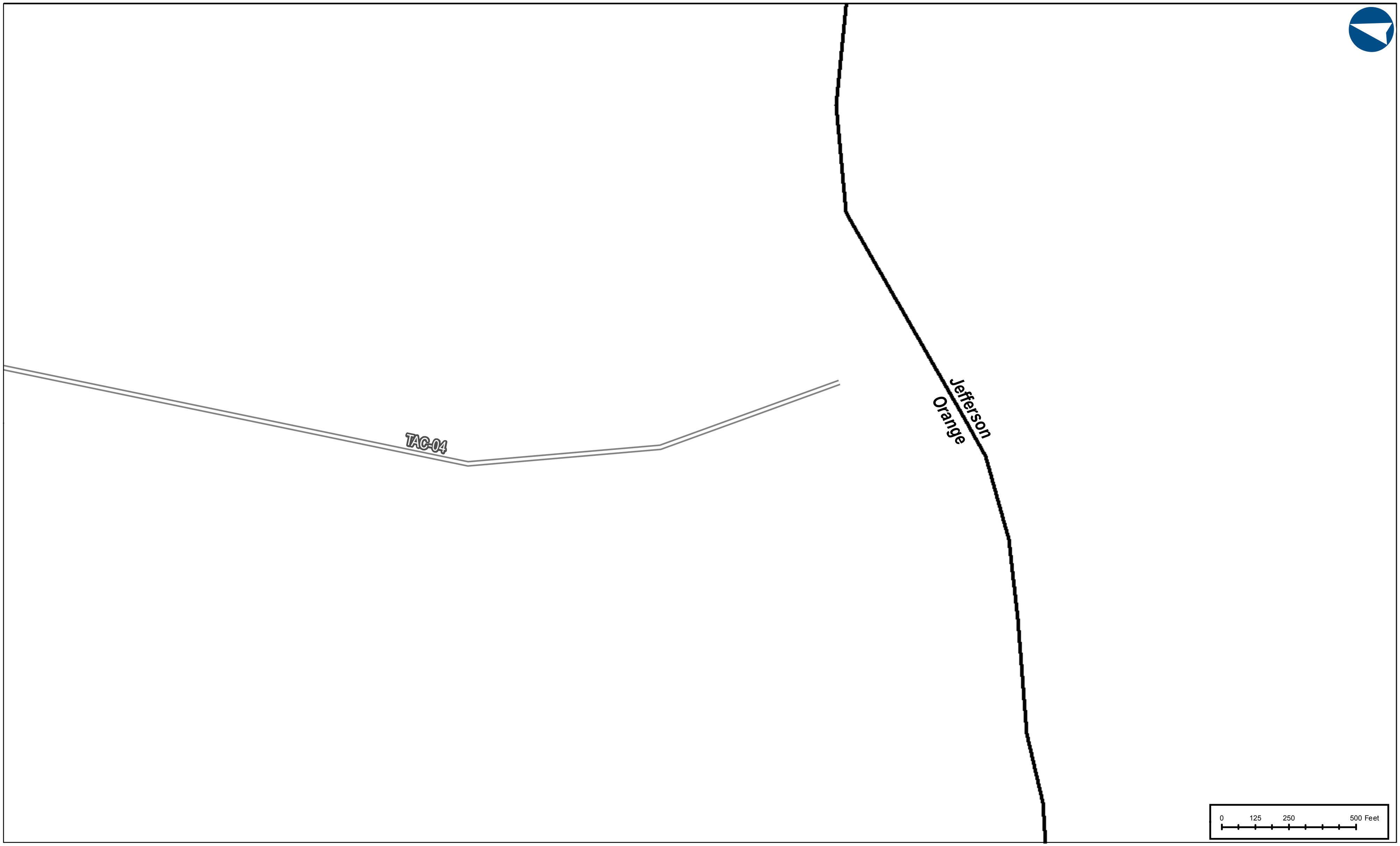
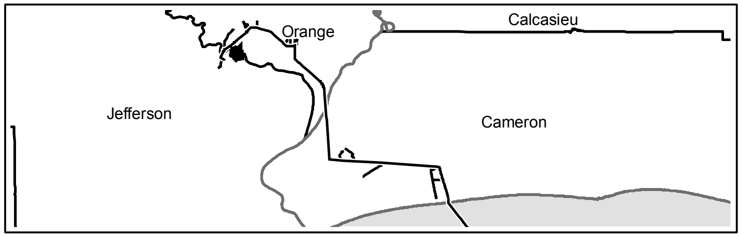
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	52 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





═ Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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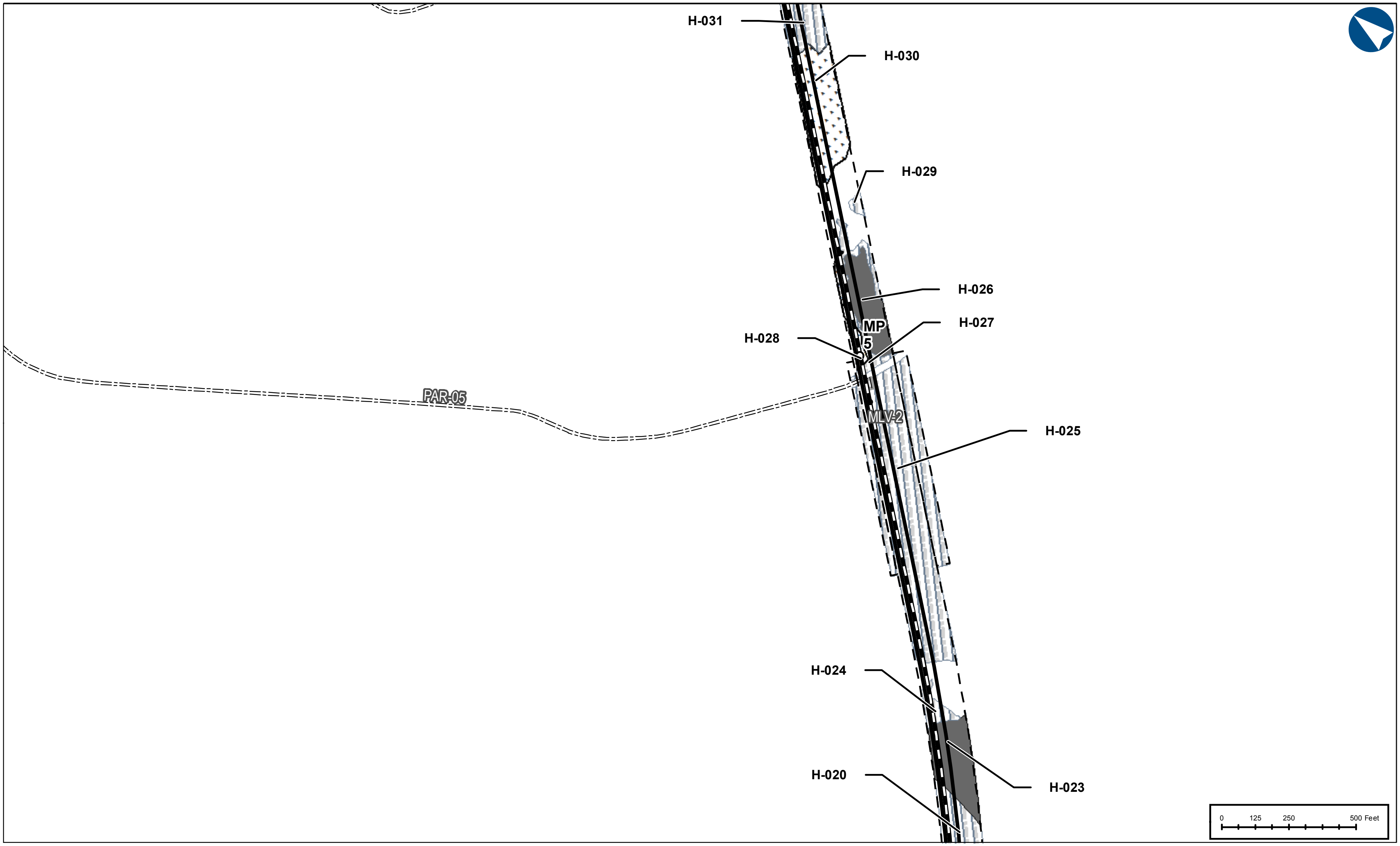
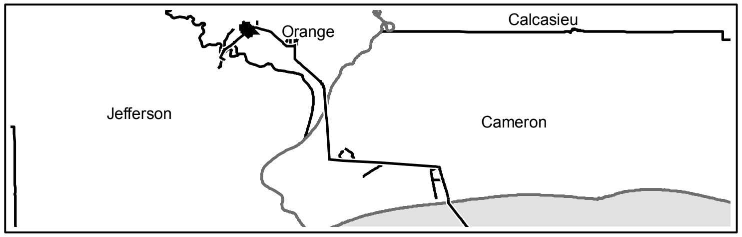
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	53 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Project Access Road
Permanent Easement
Temporay Easement
ATWS
Permanent Access Road Easement
Waterbody
▨ PEM Wetland
PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH: ORANGE	DRAWN BY: CW
STATE: TEXAS	CHECKED BY: JZ

PREPARED BY

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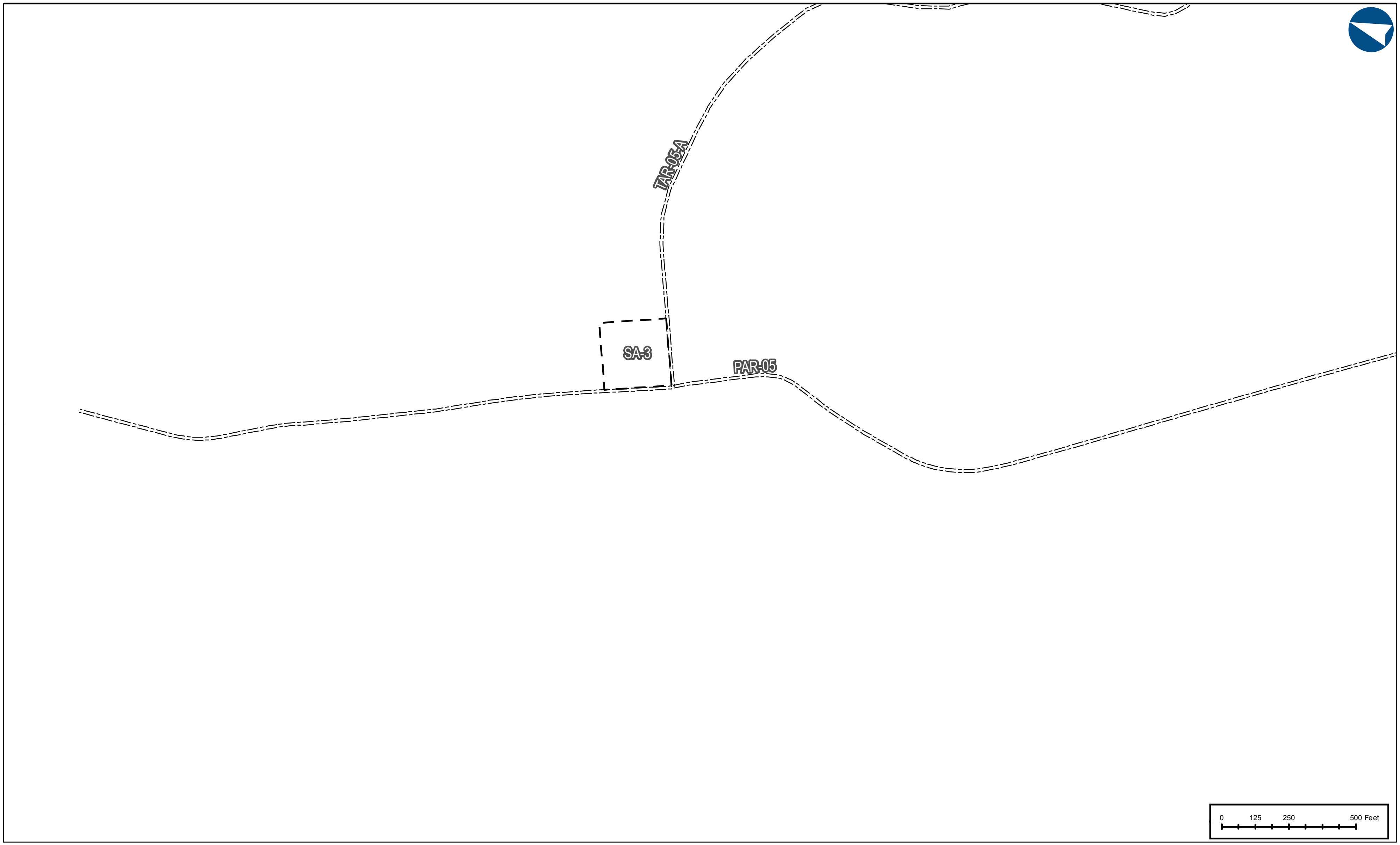
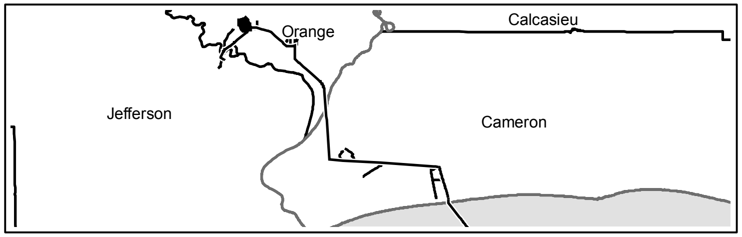
BLUE MARLIN OFFSHORE PORT PROJECT

DATE: 2020-08-26	PROJECTION: UTM 15 N	DWG: 0801-06-001	SHEET: 54 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

▭ ATWS

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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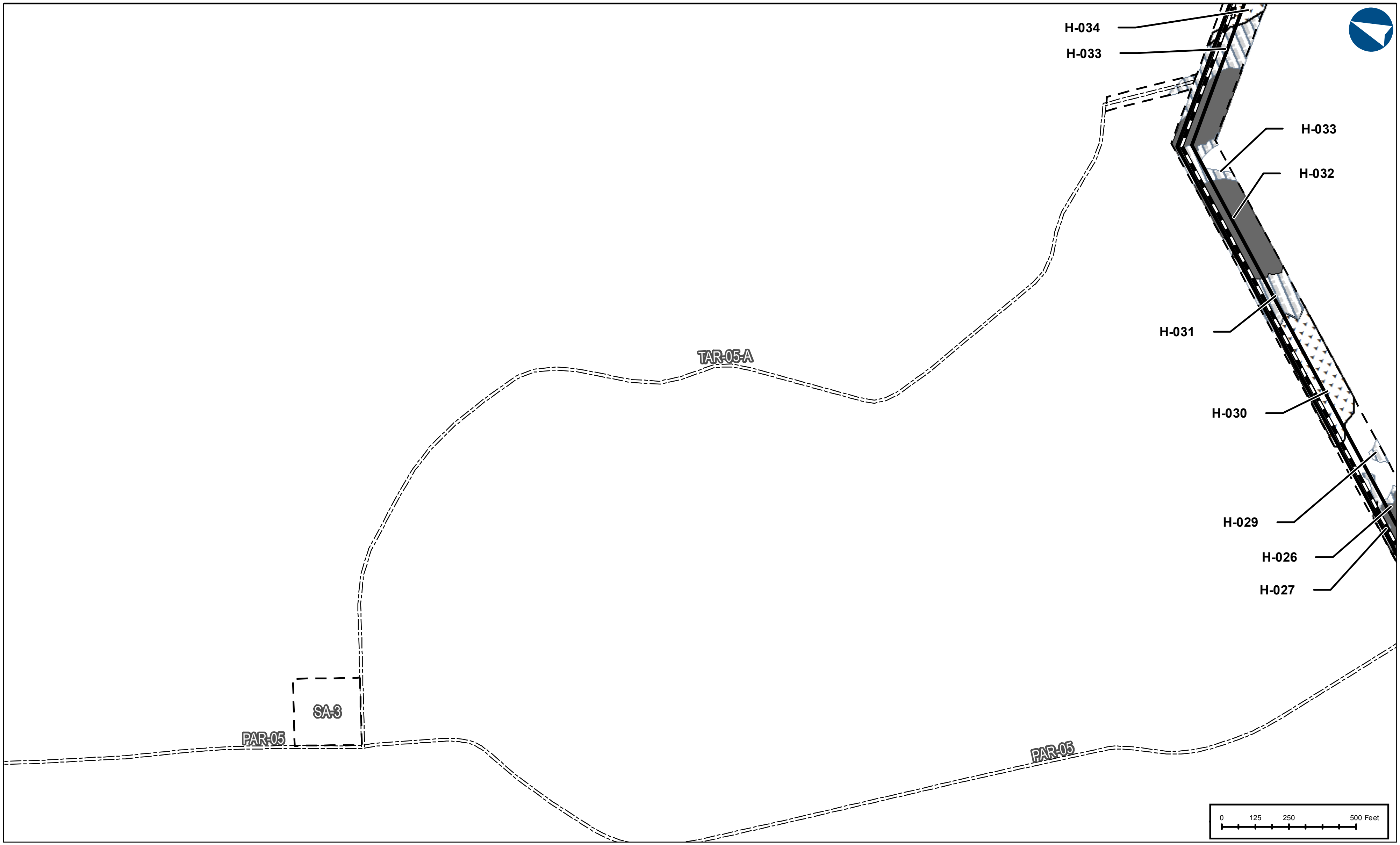
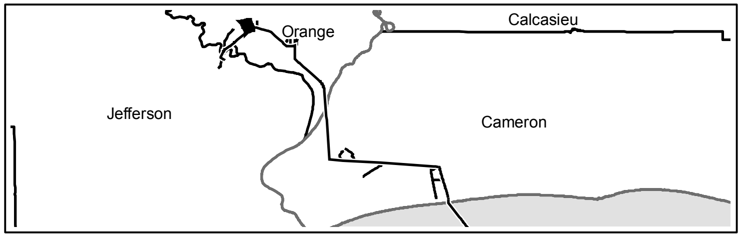
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	55 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





▬	Proposed Onshore Pipeline CL	⬚	ATWS
┄	Project Access Road	■	Waterbody
▭	Permanent Easement	▨	PEM Wetland
⬚	Temporay Easement	▴	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	*DRAWN BY:*	CW
STATE:	TEXAS	*CHECKED BY:*	JZ

PREPARED BY

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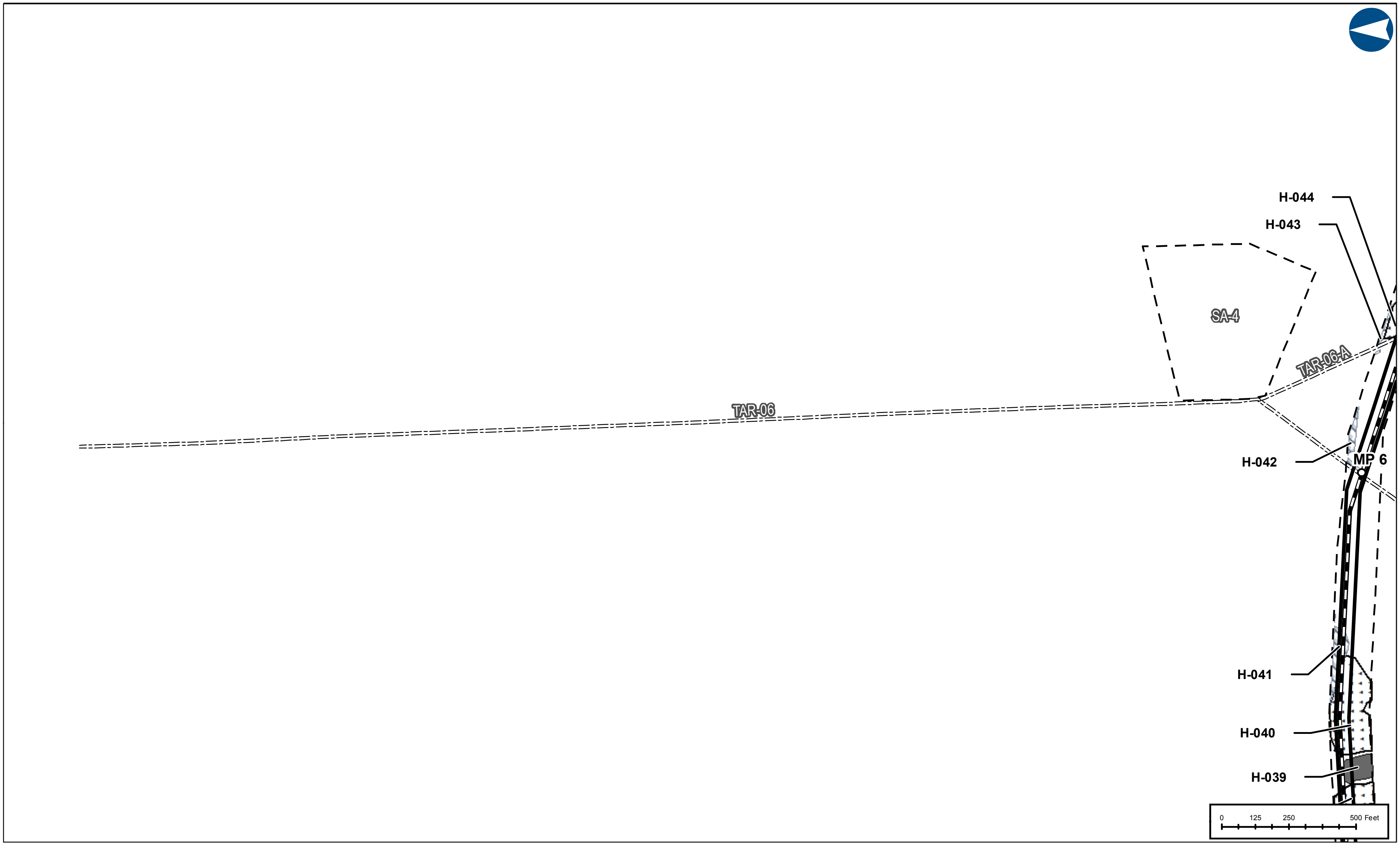
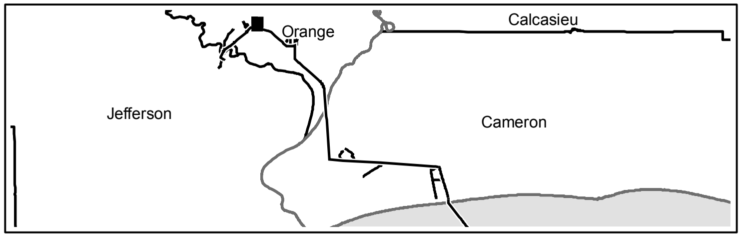
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	*PROJECTION:*	UTM 15 N
DWG:	0801-06-001	*SHEET:*	56 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost

Proposed Onshore Pipeline CL

Project Access Road

Permanent Easement

Temporay Easement

ATWS

■ Waterbody

▨ PEM Wetland

PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	***DRAWN BY:***	CW
STATE:	TEXAS	***CHECKED BY:***	JZ
DATE:	2020-08-26	***PROJECTION:***	UTM 15 N

PREPARED BY

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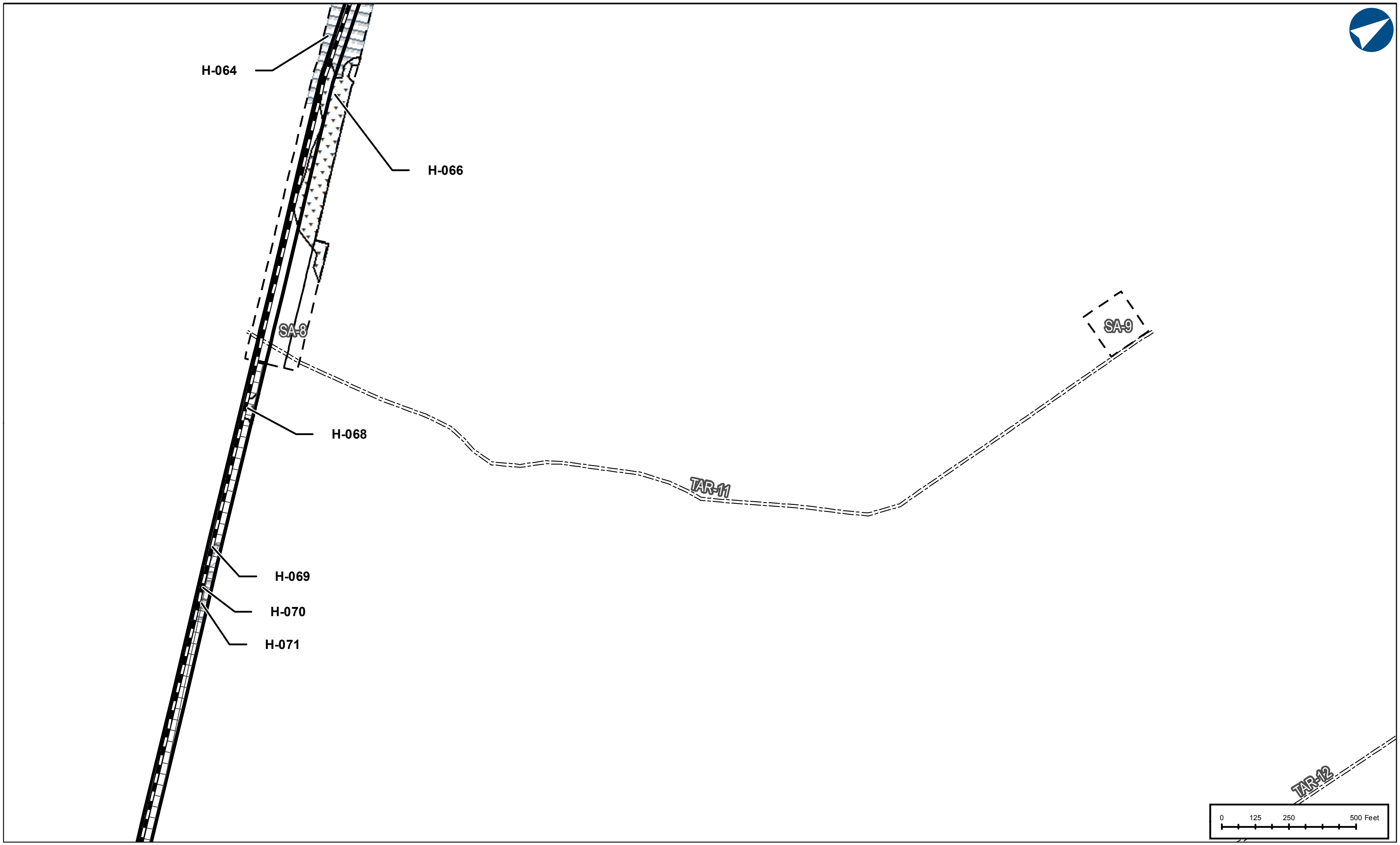
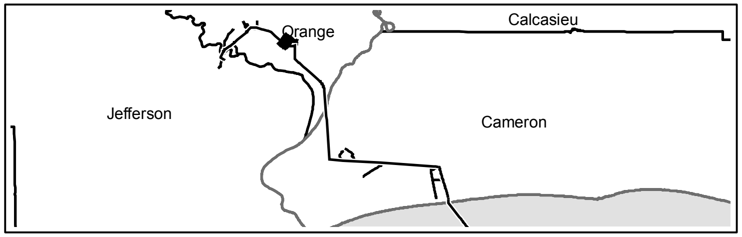
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	***SHEET:***	57 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ▬ Proposed Onshore Pipeline CL
- ═ Project Access Road
- ☒ HDD Easement (Avoidance)
- ▭ Permanent Easement
- ⬚ Temporay Easement
- ⬚ ATWS
- ■ Waterbody
- ▨ PEM Wetland
- ▦ PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

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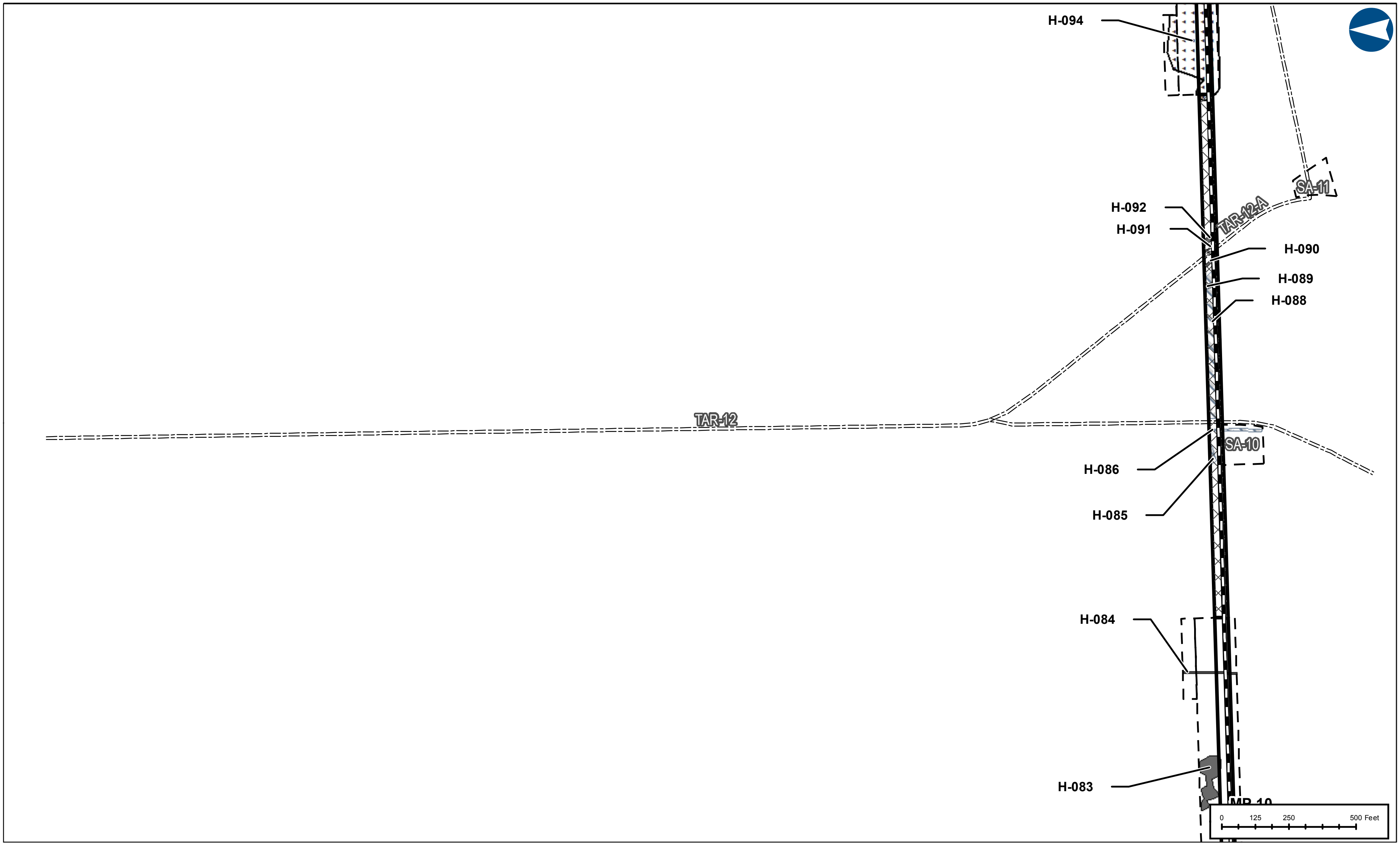
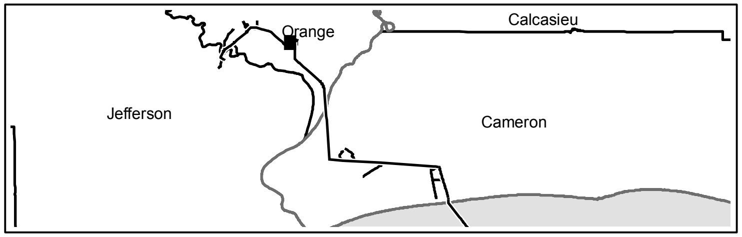
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	58 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost	⌐ ¬	Temporay Easement
━	Proposed Onshore Pipeline CL	⌐ ¬	ATWS
═	Project Access Road	■	Waterbody
⊠	HDD Easement (Avoidance)	▨	PEM Wetland
□	Permanent Easement	▴	PFO Wetland

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ

DATE:	2020-08-26	PROJECTION:	UTM 15 N

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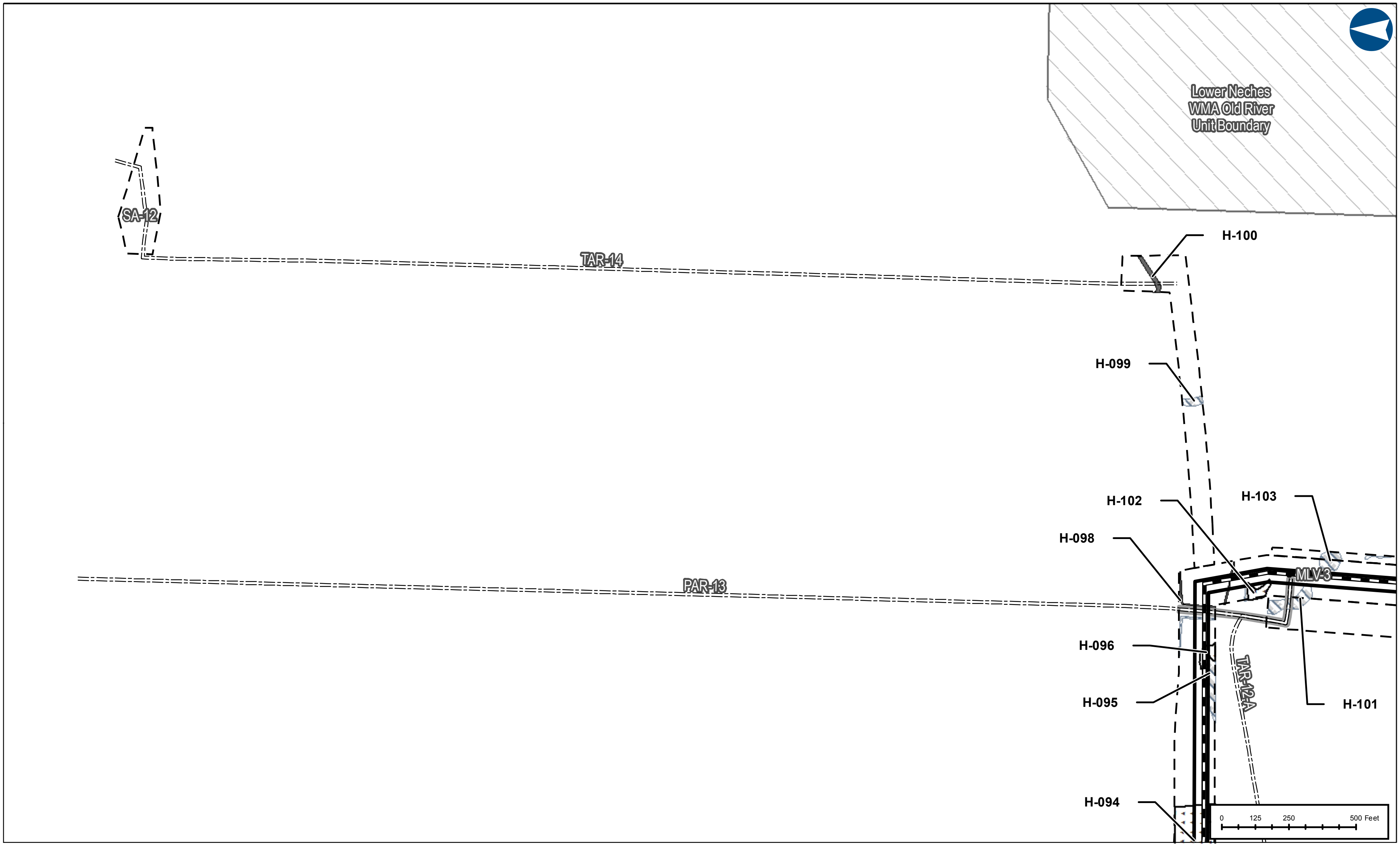
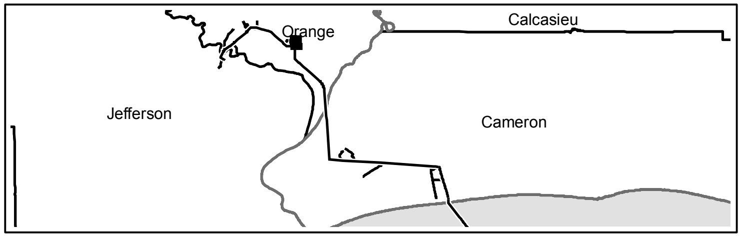
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	59 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- Permanent Easement
- Temporay Easement
- ATWS
- Permanent Access Road Easement
- Waterbody
- ▨ PEM Wetland
- PFO Wetland
- Lower Neches WMA Old River Unit Boundary

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	ORANGE	DRAWN BY:	CW
STATE:	TEXAS	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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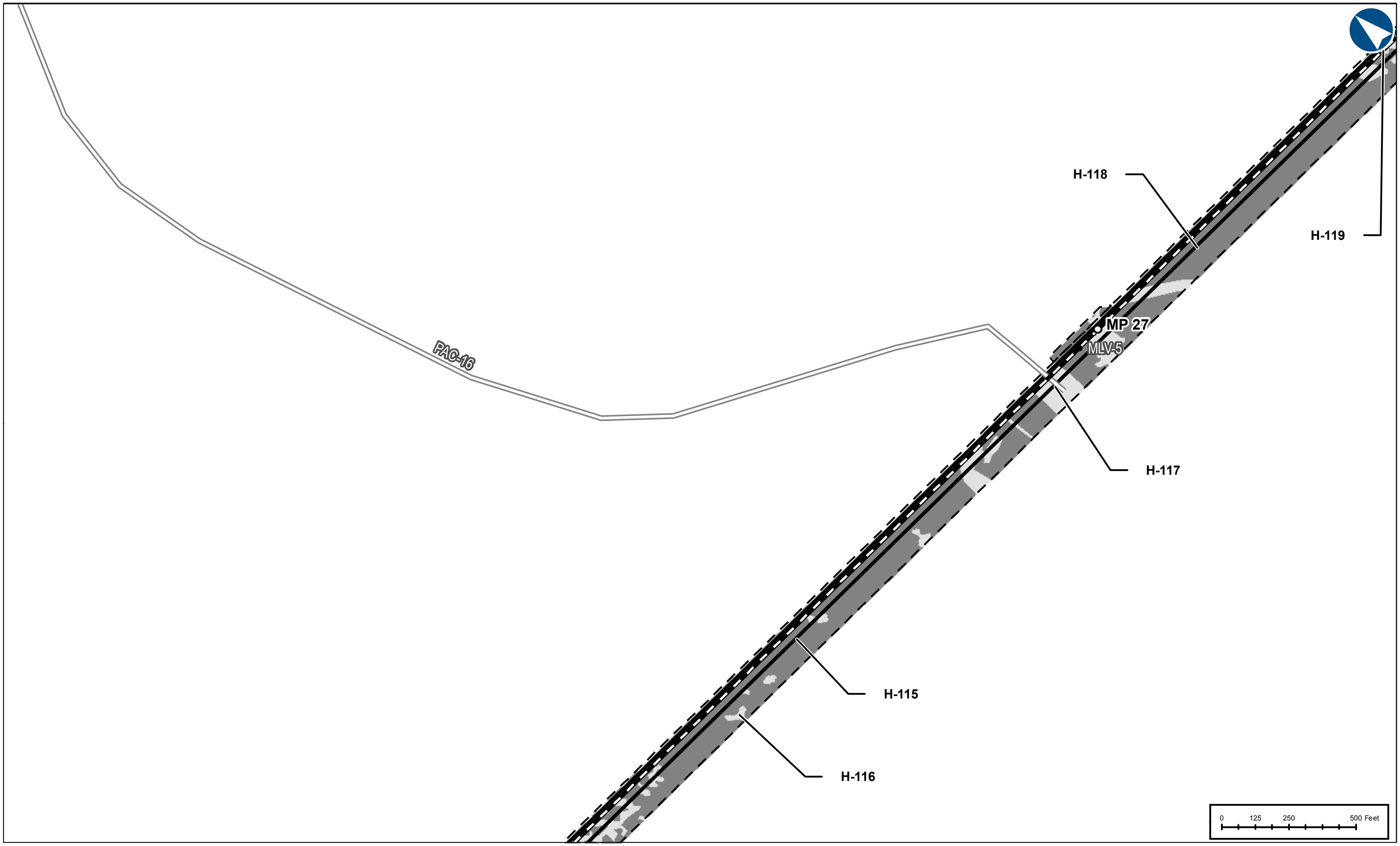
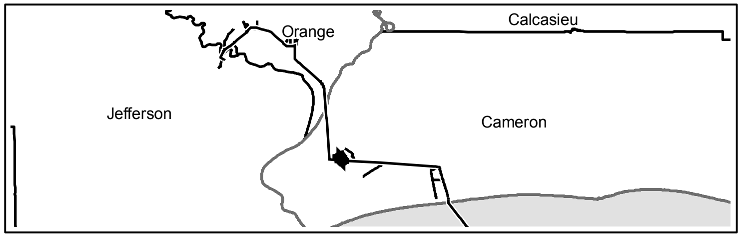
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	60 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○	Proposed Onshore Pipeline Milepost	⌐ ¬	Temporay Easement
●	Valve Location	⌐ ¬	ATWS
━■━	Proposed Onshore Pipeline CL	░	Estuarine, unvegetated subtidal
═	Project Access Canal	▓	Estuarine, vegetated intertidal (salt marsh)
▭	Permanent Easement		

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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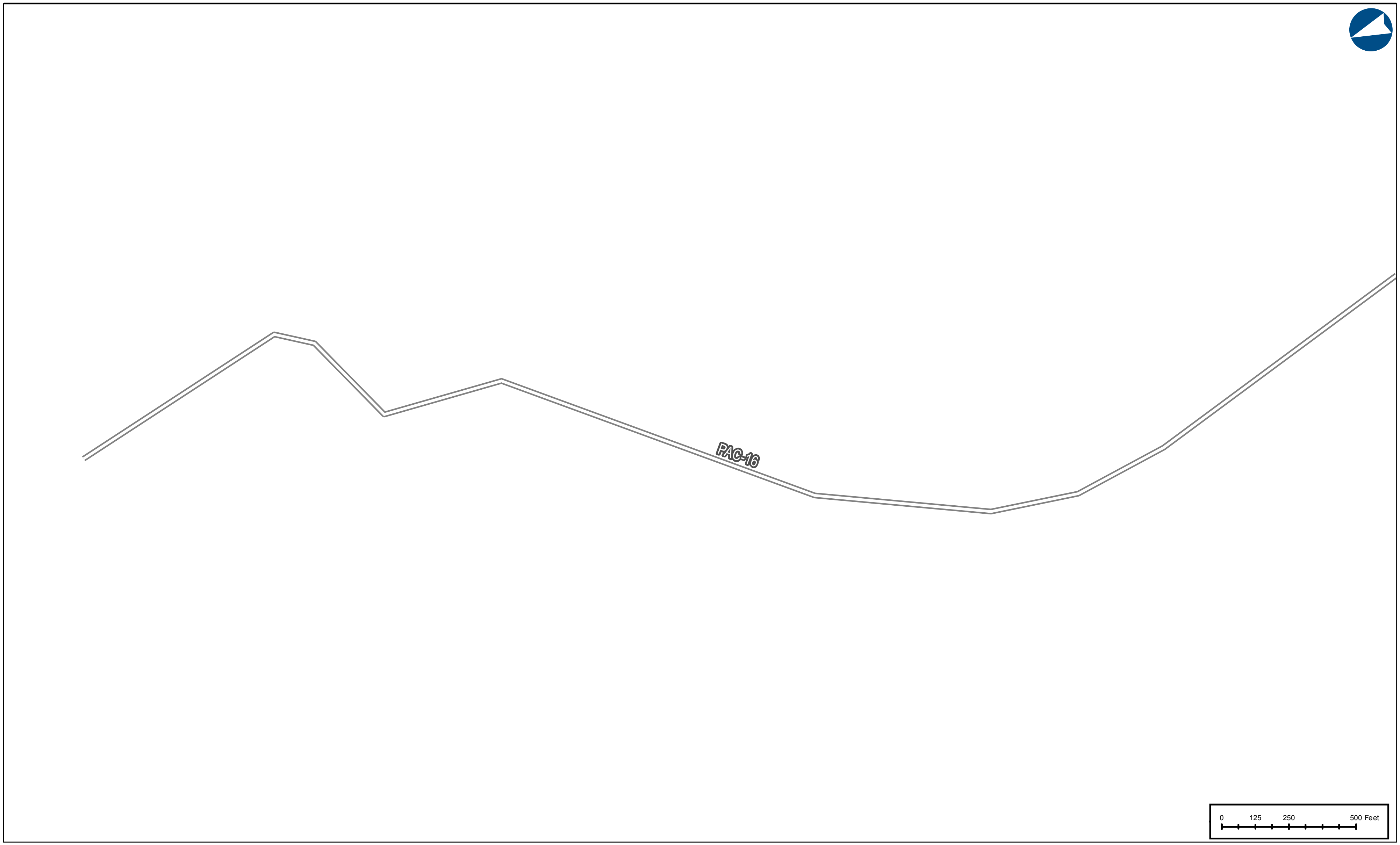
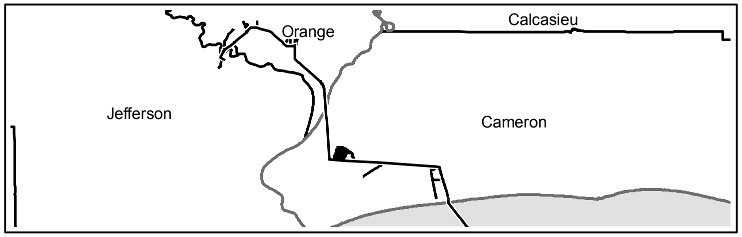
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	61 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





═ Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	**DRAWN BY:**	CW
STATE:	LOUISIANA	**CHECKED BY:**	JZ
DATE:	2020-08-26	**PROJECTION:**	UTM 15 N

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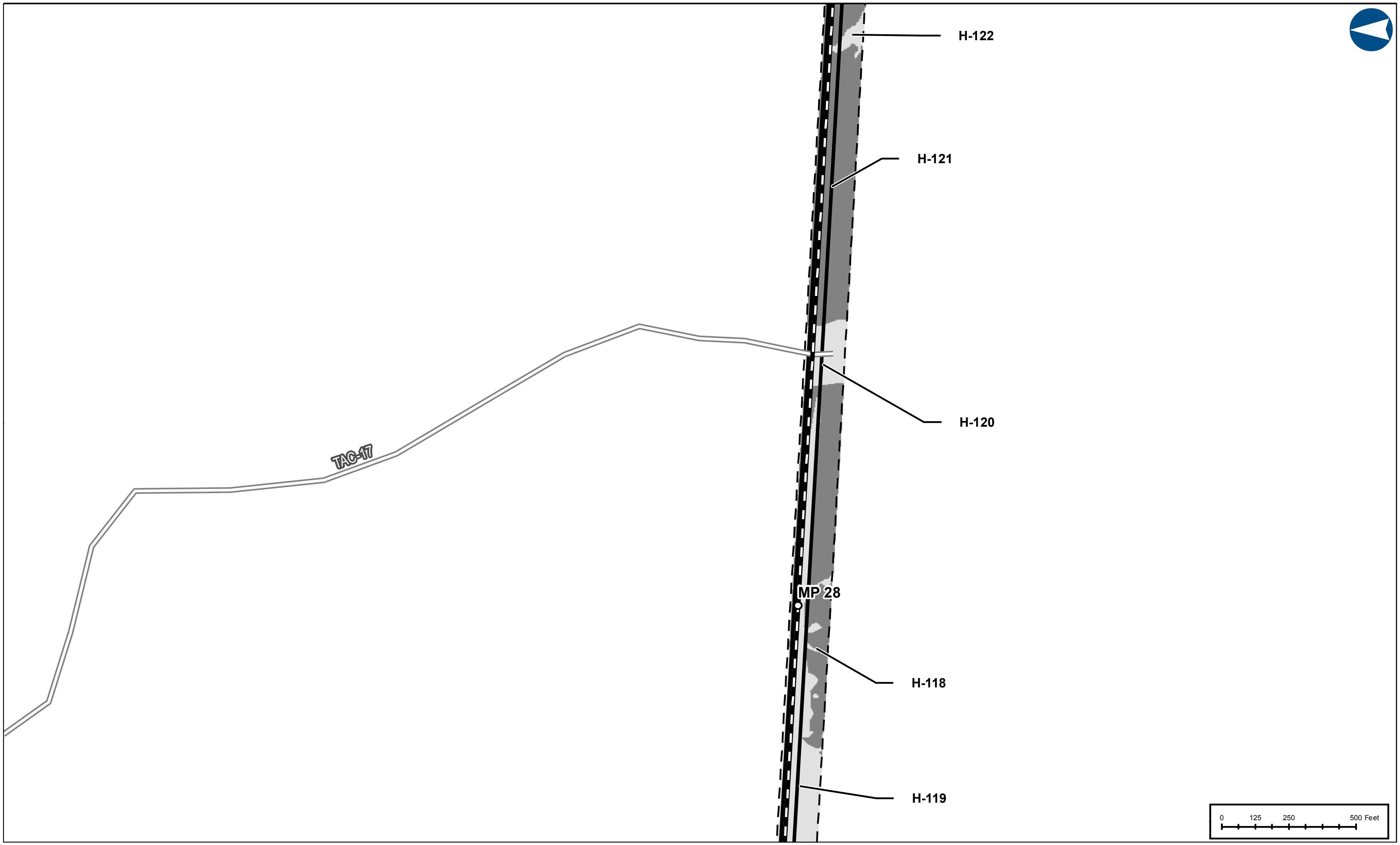
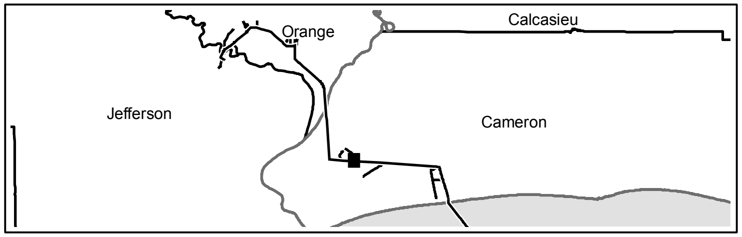
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	**SHEET:**	62 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- Proposed Onshore Pipeline CL
- Project Access Canal
- Permanent Easement
- Temporay Easement
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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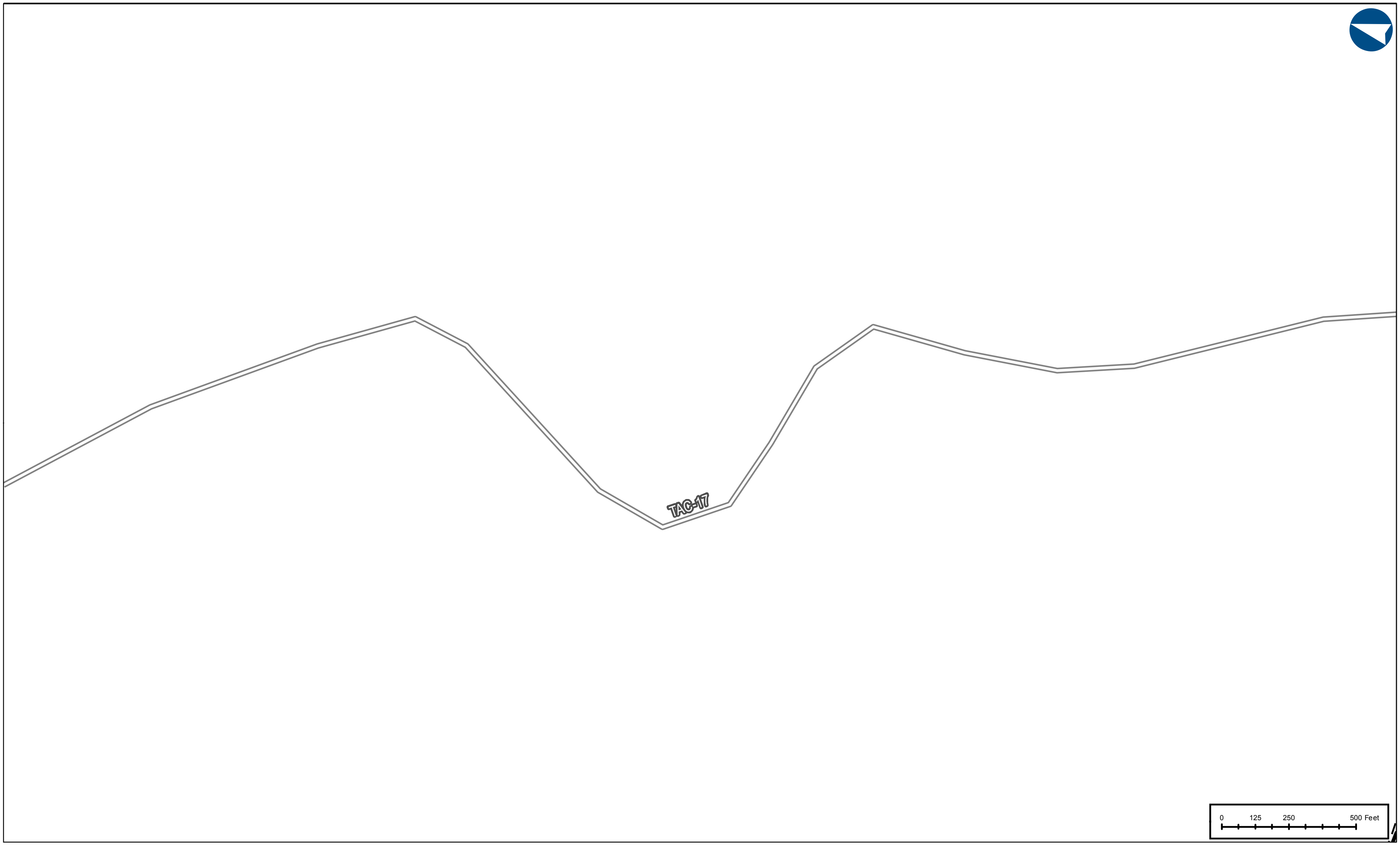
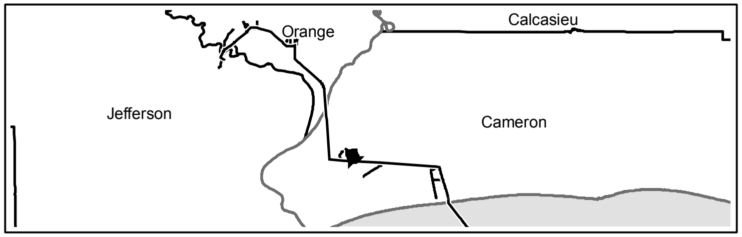
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	63 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





═ Project Access Canal

▭ Permanent Easement

⬚ Temporay Easement

▨ Estuarine, unvegetated subtidal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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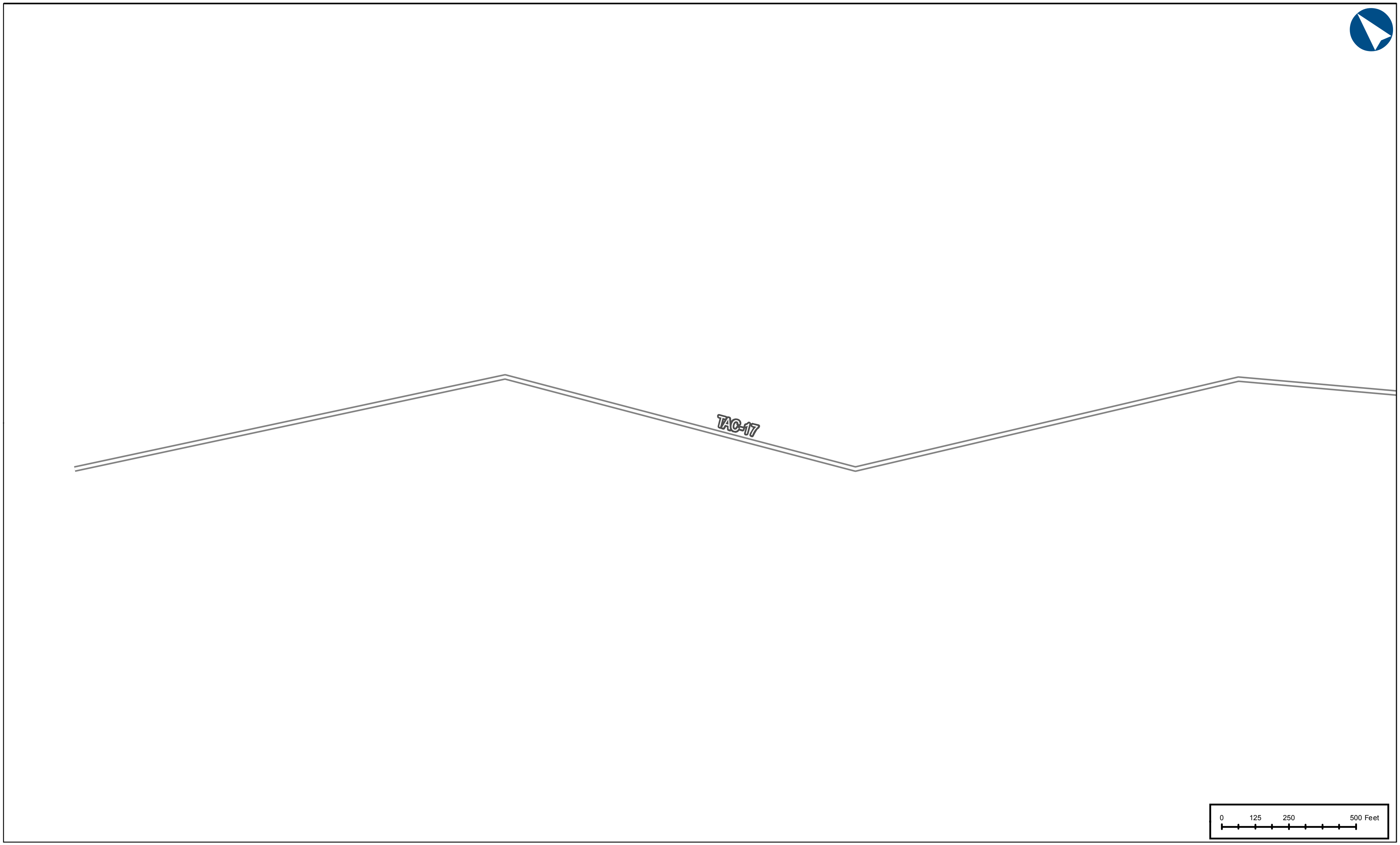
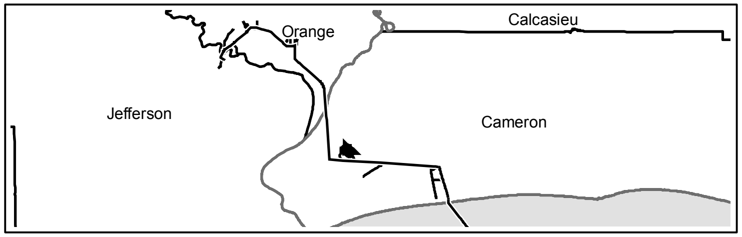
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	64 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





═ Project Access Canal

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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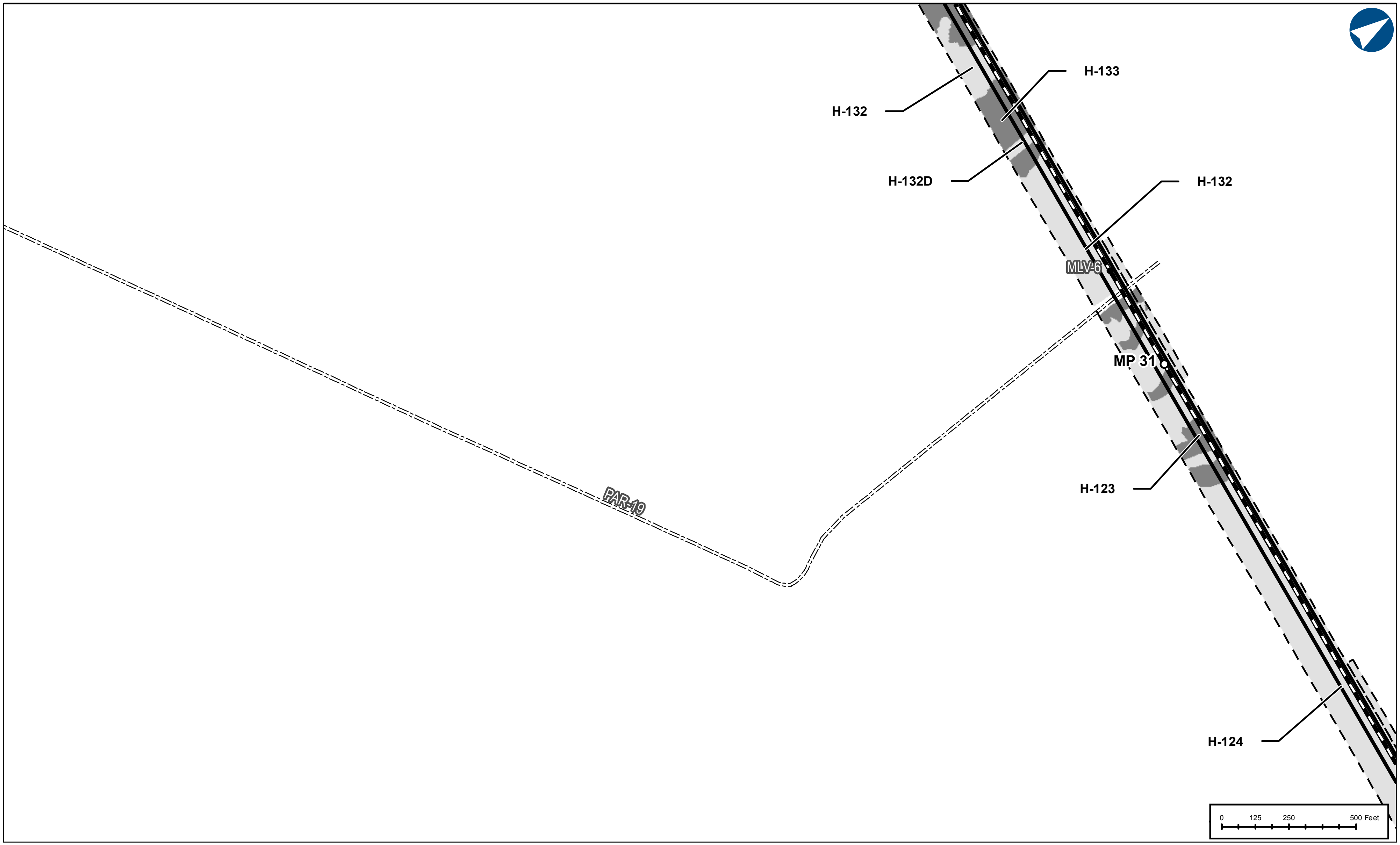
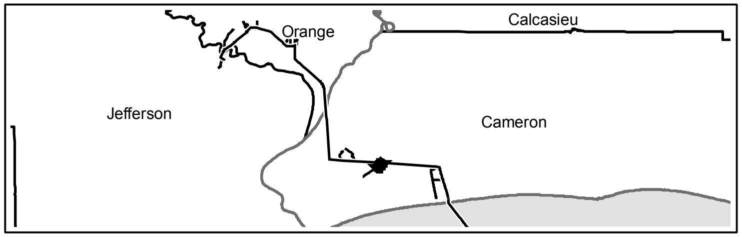
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	65 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- ○ Proposed Onshore Pipeline Milepost
- ● Valve Location
- Proposed Onshore Pipeline CL
- Project Access Road
- Permanent Easement
- Temporay Easement
- ATWS
- ▨ Estuarine, unvegetated subtidal
- ▨ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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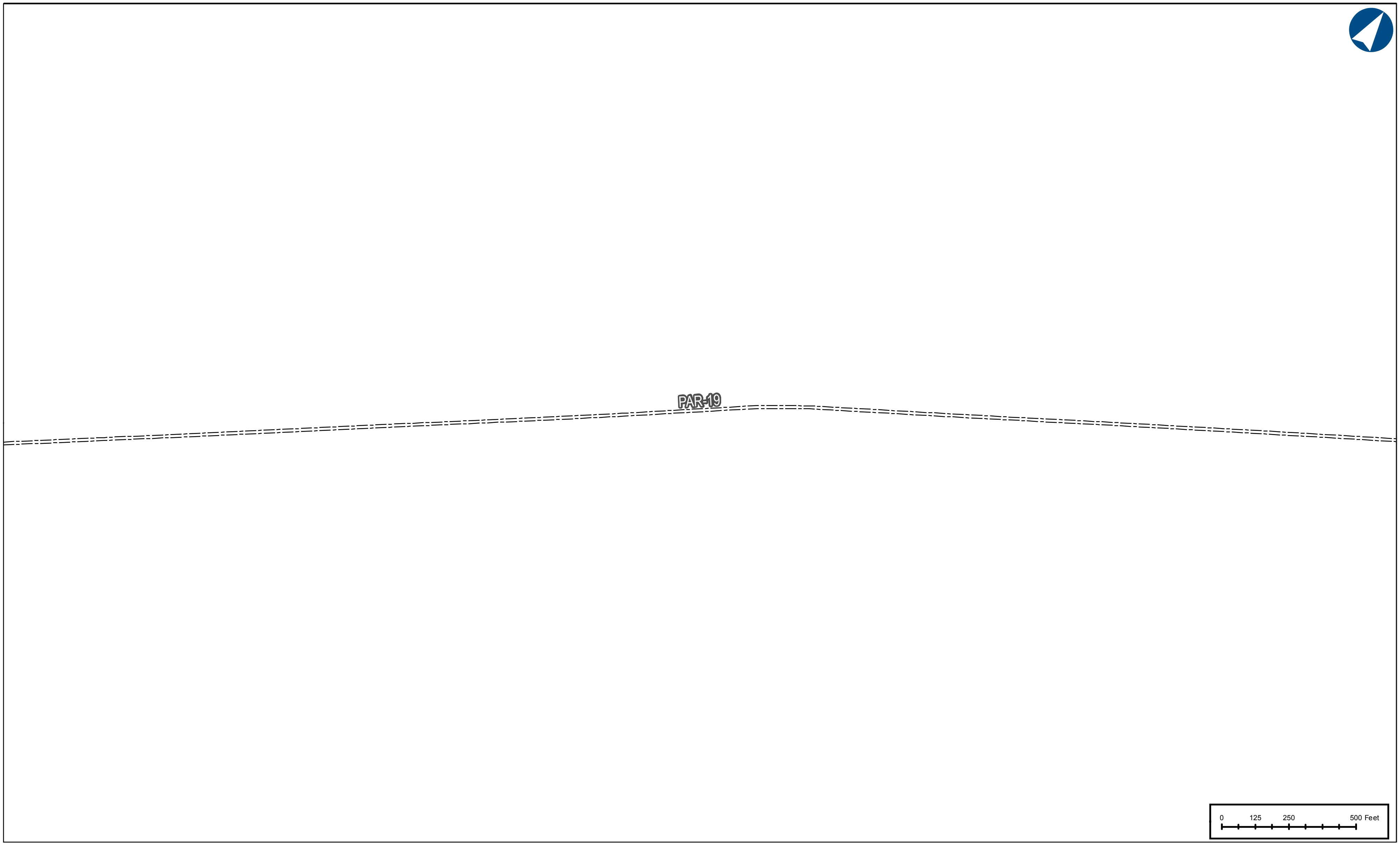
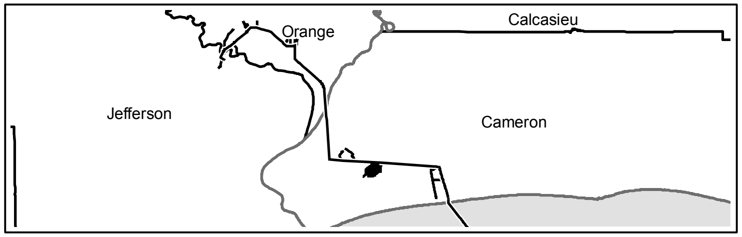
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	66 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





=:=:= Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

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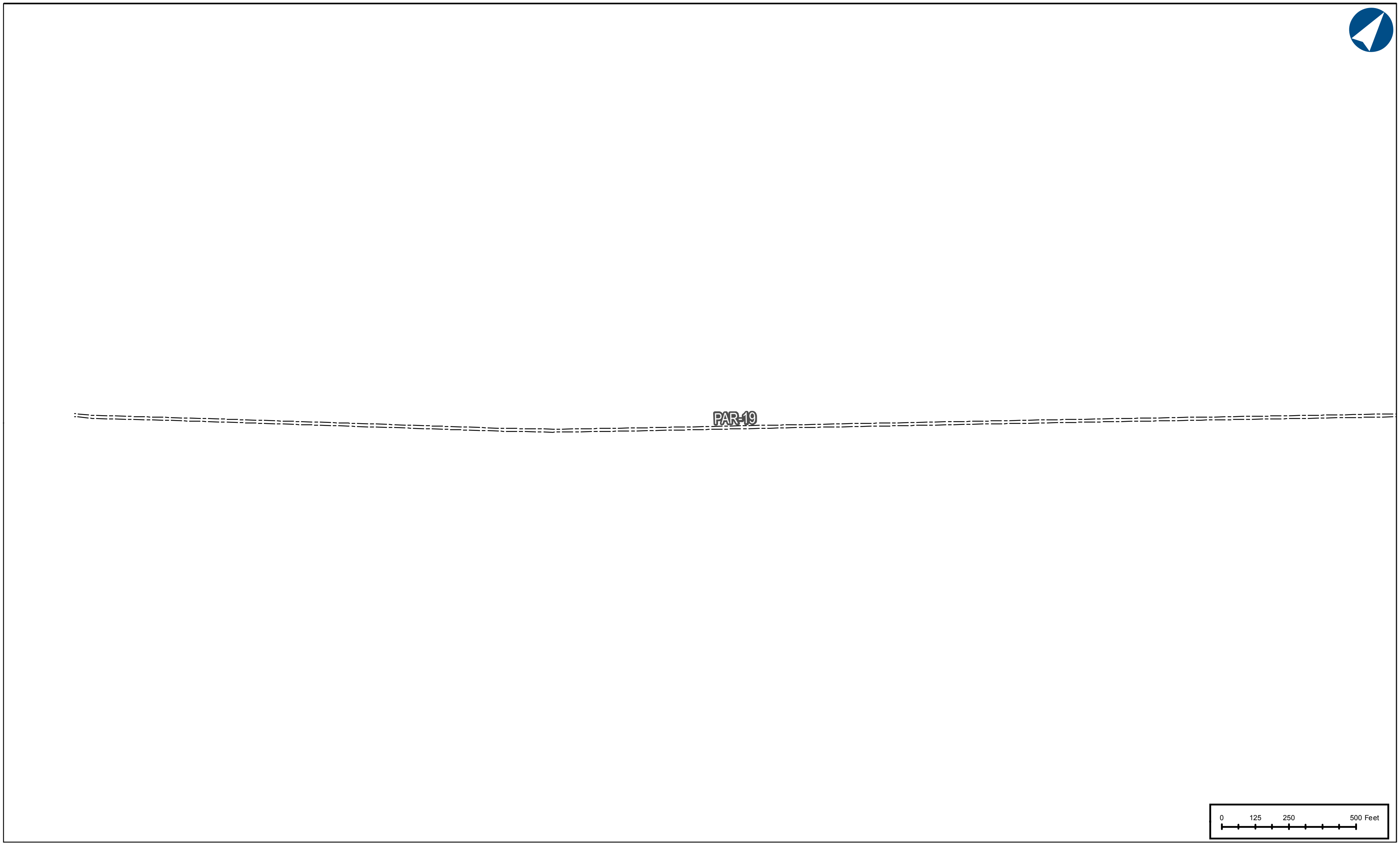
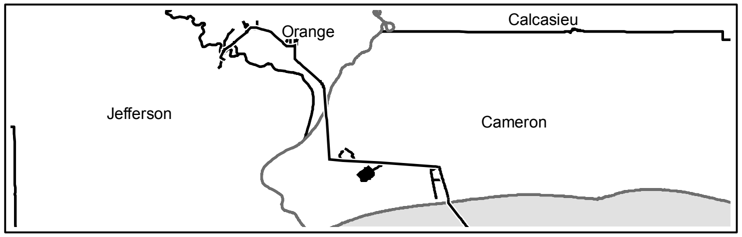
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	67 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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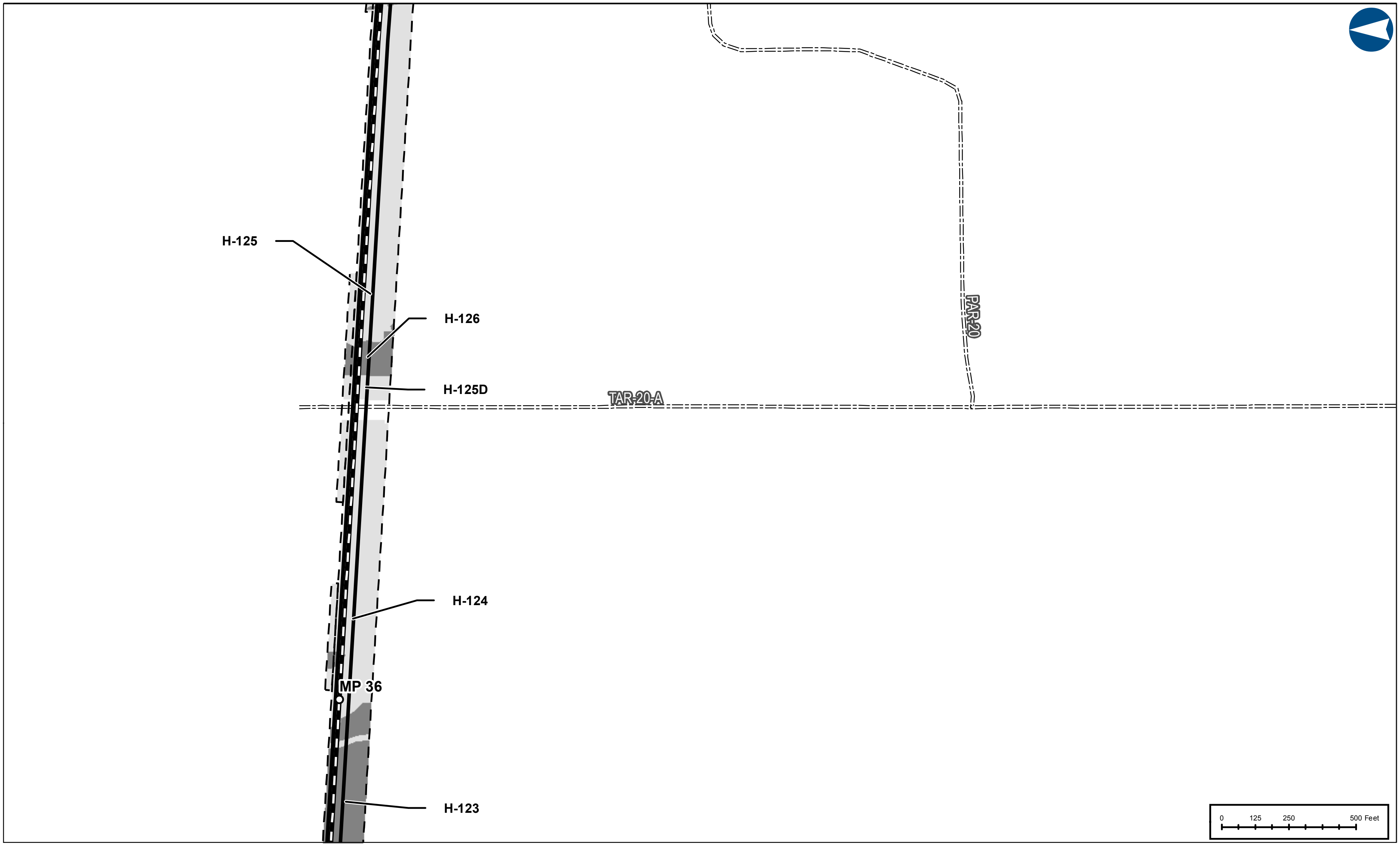
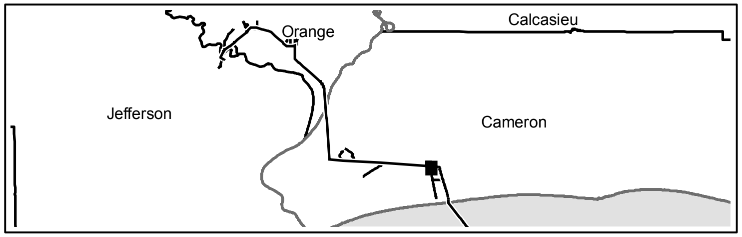
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	68 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
Proposed Onshore Pipeline CL
Project Access Road
Permanent Easement
Temporary Easement
ATWS
░ Estuarine, unvegetated subtidal
▓ Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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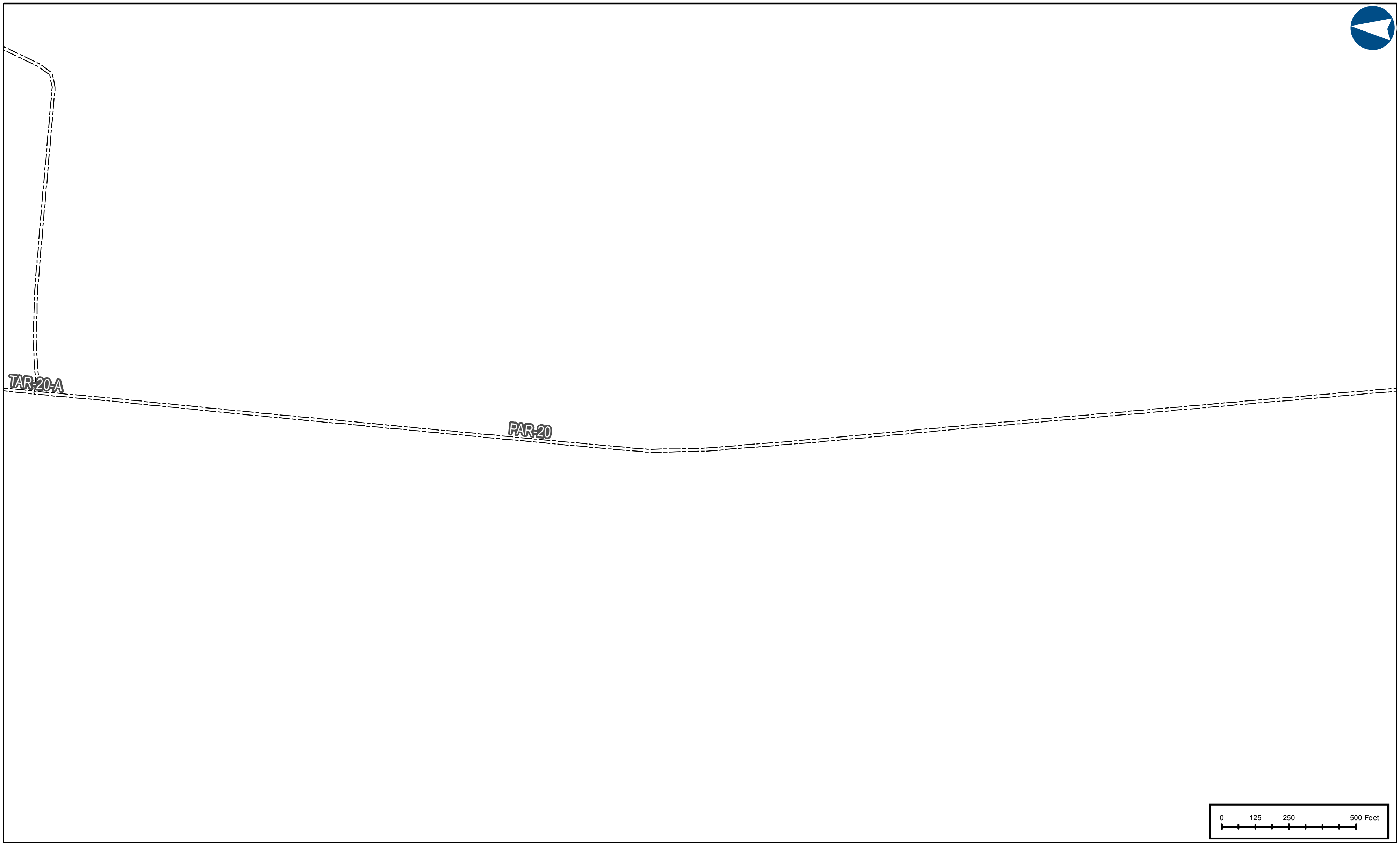
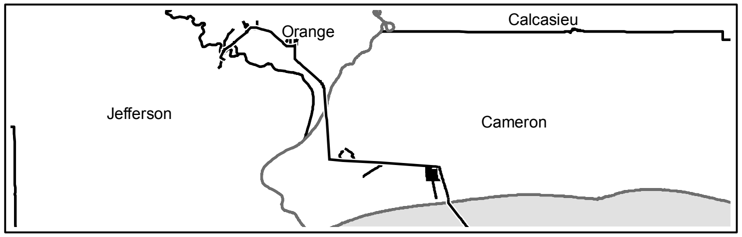
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	69 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

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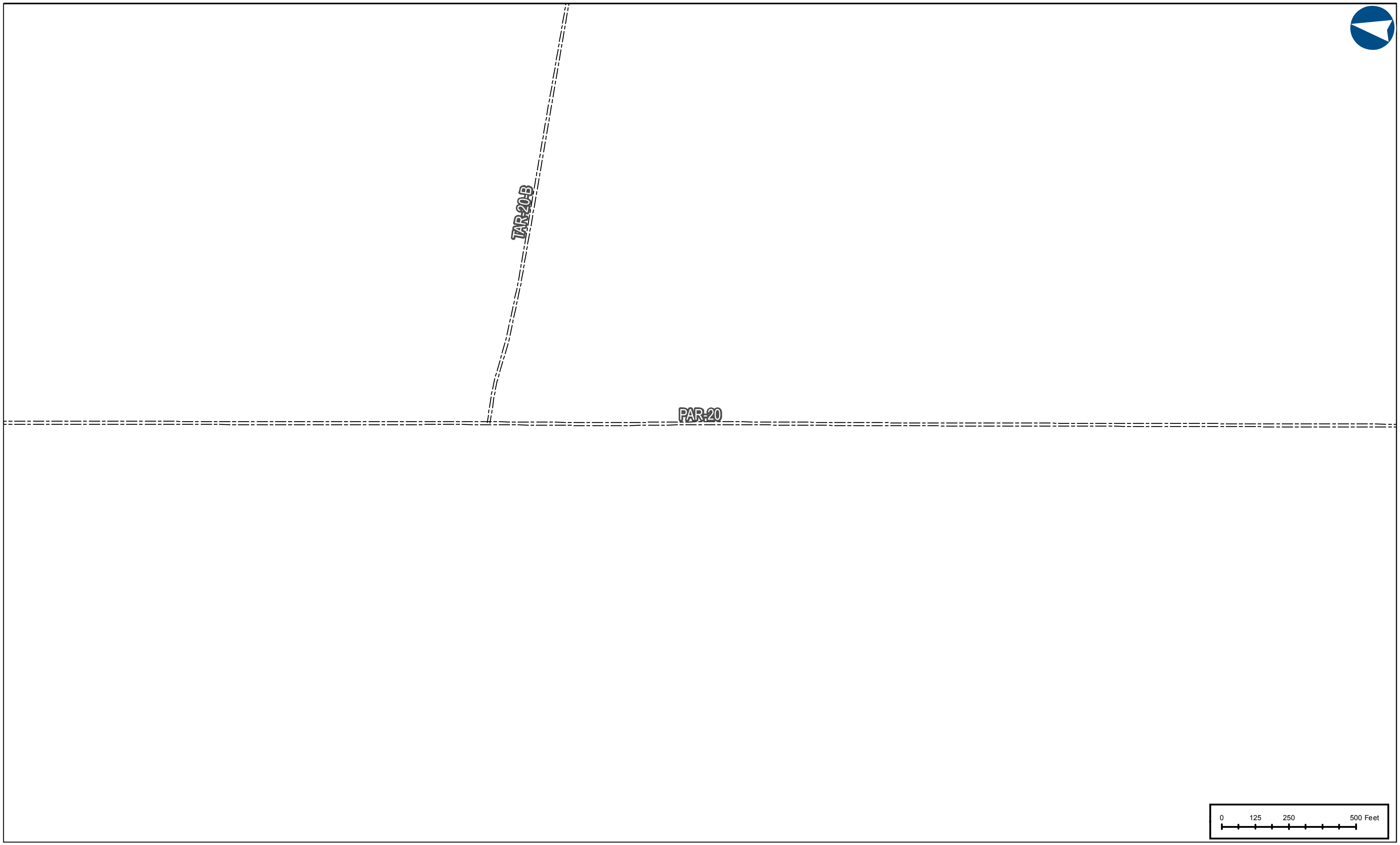
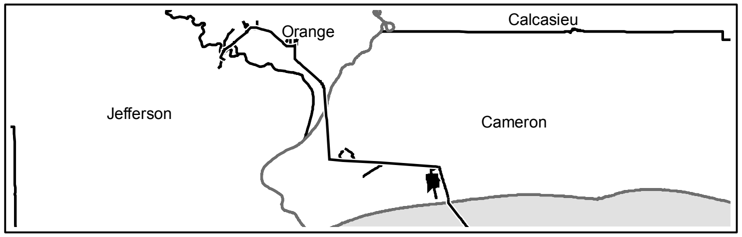
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	70 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	**DRAWN BY:**	CW
STATE:	LOUISIANA	**CHECKED BY:**	JZ
DATE:	2020-08-26	**PROJECTION:**	UTM 15 N

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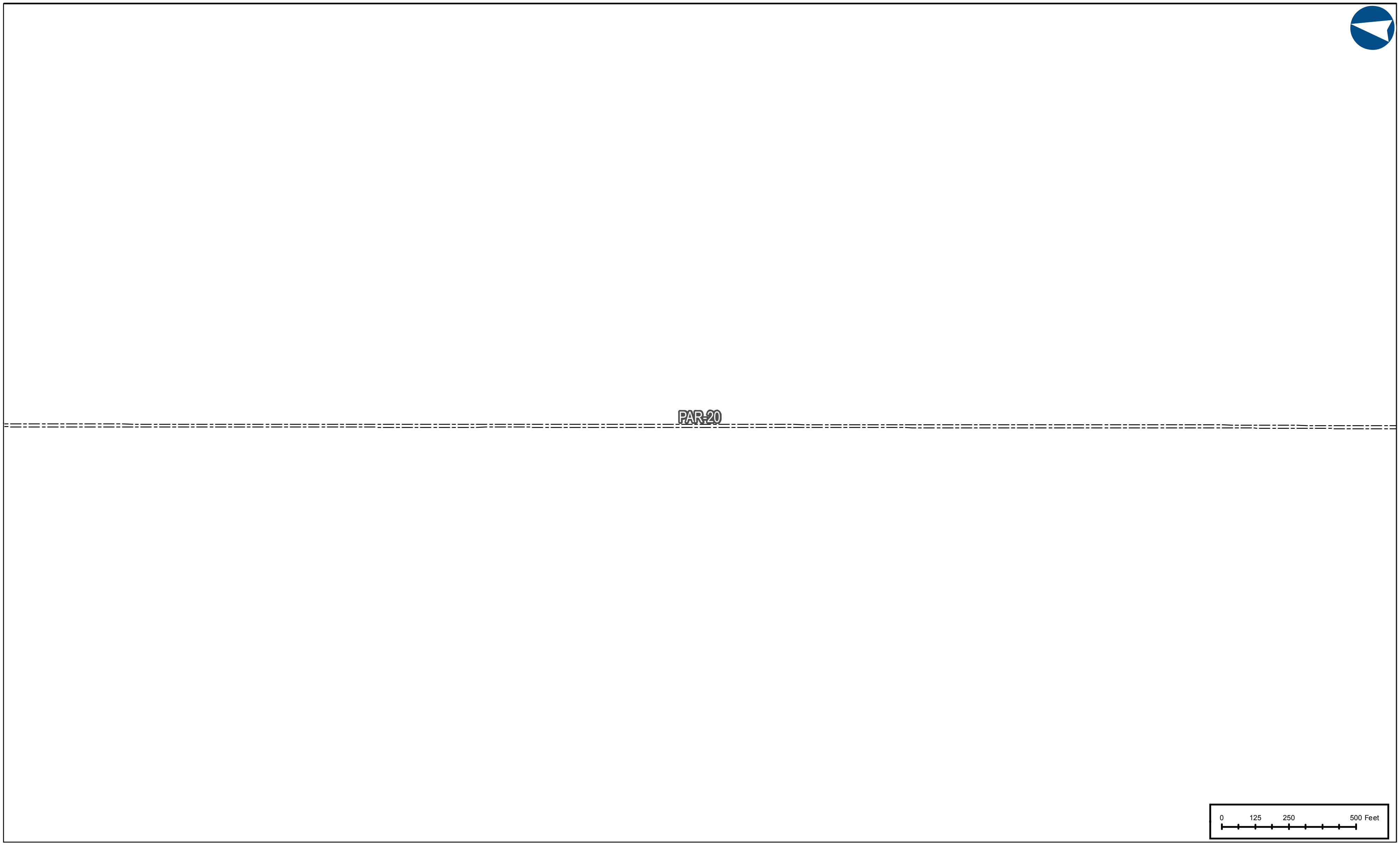
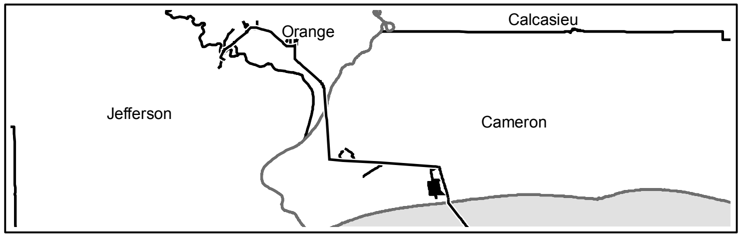
BLUE MARLIN OFFSHORE
PORT PROJECT

DWG:	0801-06-001	**SHEET:**	71 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

PREPARED BY

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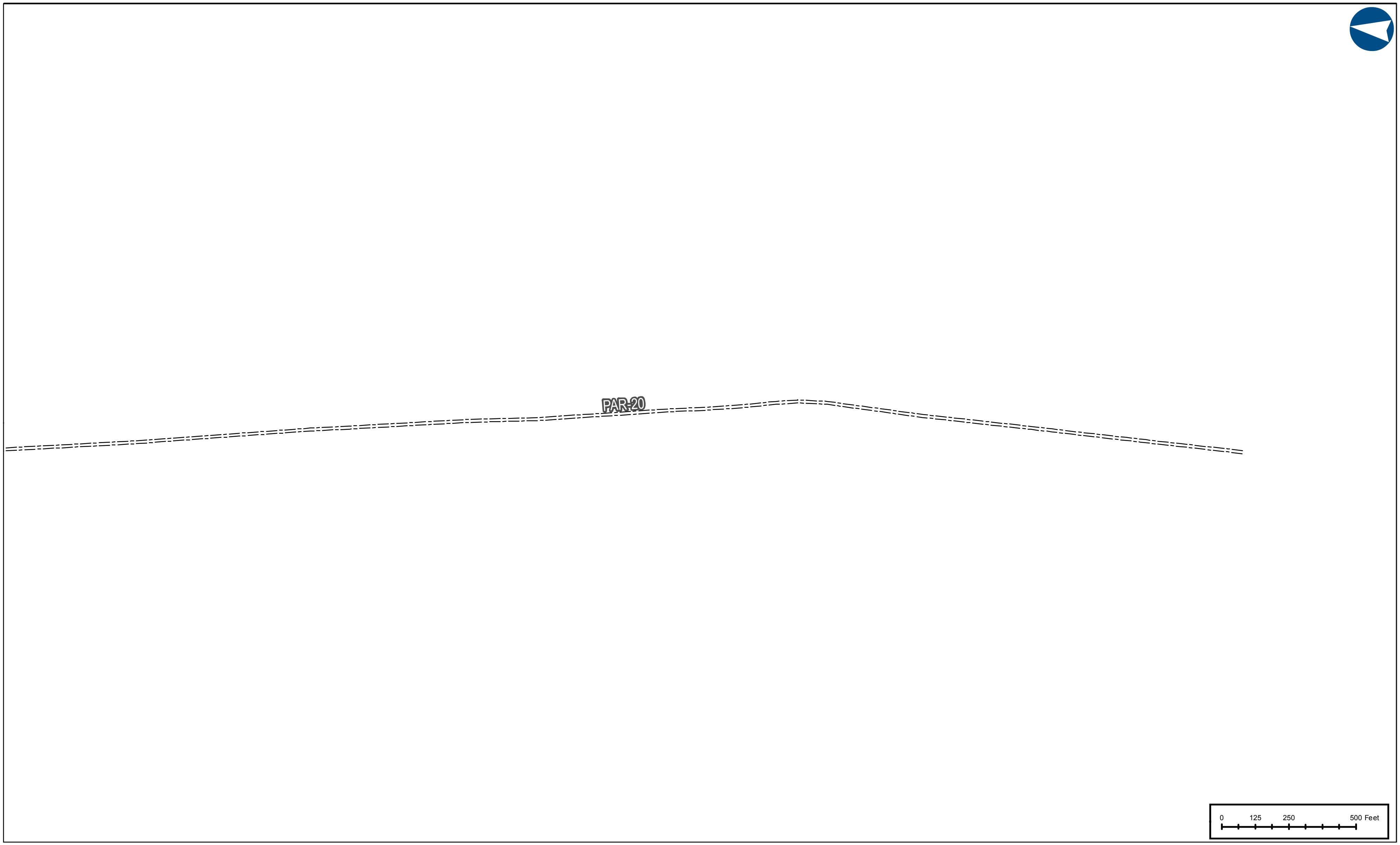
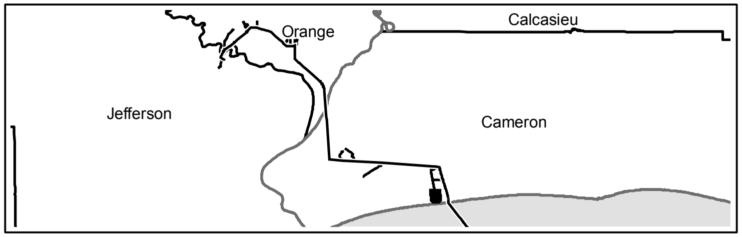
BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	72 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





==== Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	**DRAWN BY:**	CW
STATE:	LOUISIANA	**CHECKED BY:**	JZ

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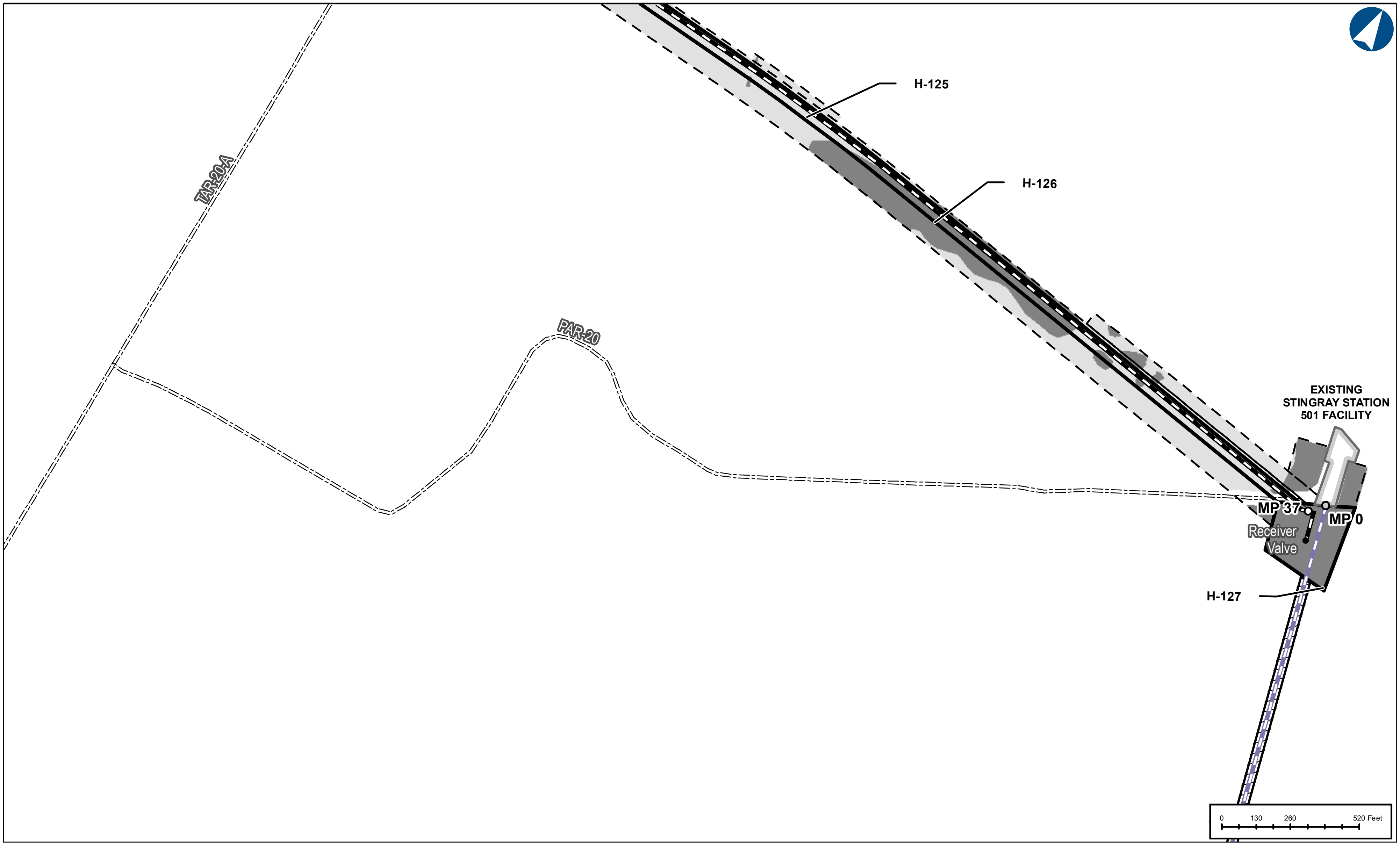
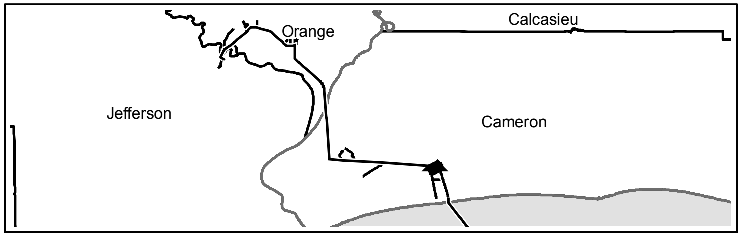
BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	**PROJECTION:**	UTM 15 N
DWG:	0801-06-001	**SHEET:**	73 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





○ Proposed Onshore Pipeline Milepost
○ Existing Pipeline Milepost
● Valve Location
Proposed Onshore Pipeline CL
Existing Stingray Pipeline To Be Converted to Oil Service
Project Access Road
Existing Permanent Easement / Facility for Use
Permanent Easement
Temporay Easement
ATWS
▨ Existing Permanent Easement (No Impact)
Estuarine, unvegetated subtidal
Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ
DATE:	2020-08-26	PROJECTION:	UTM 15 N

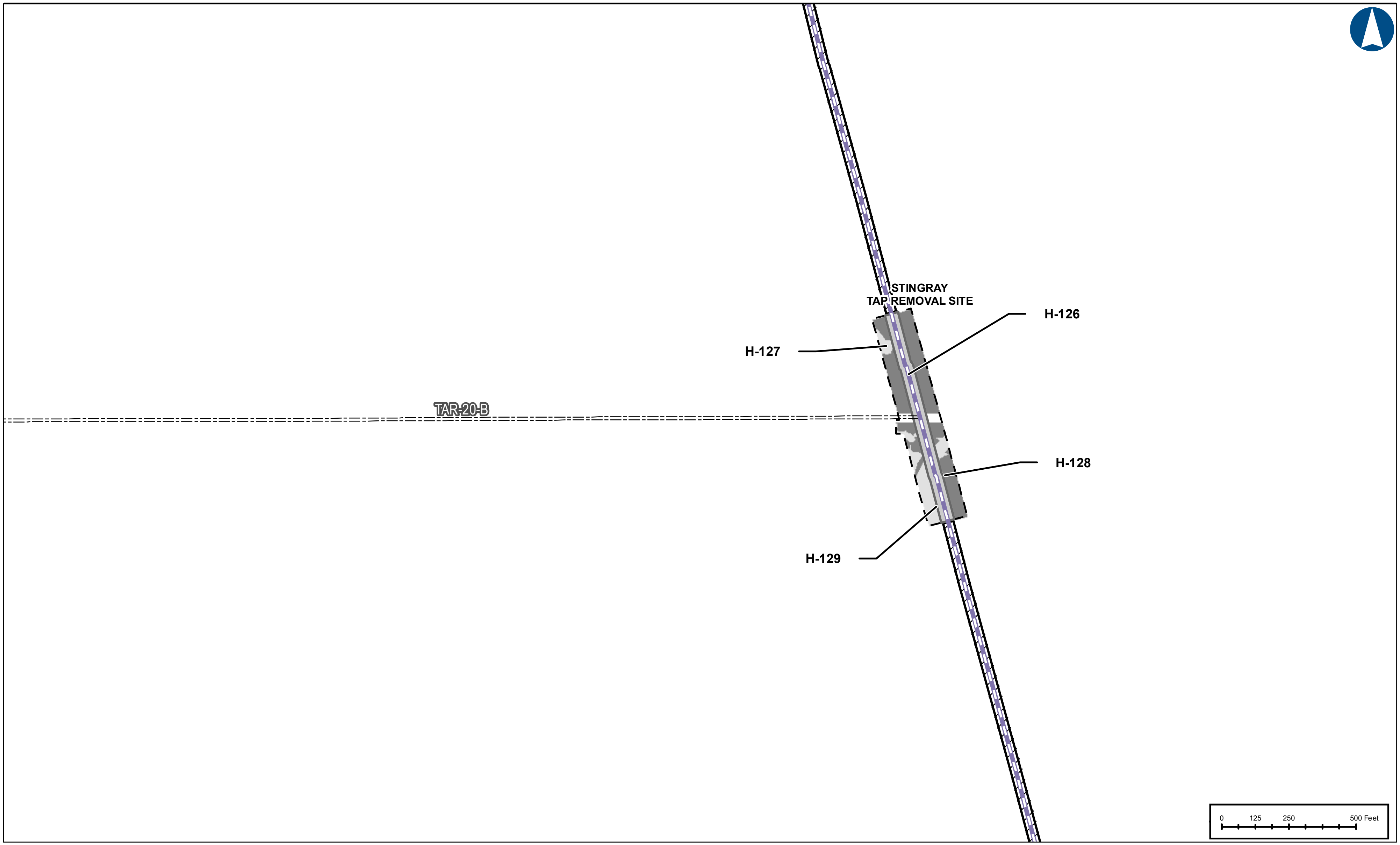
PREPARED BY

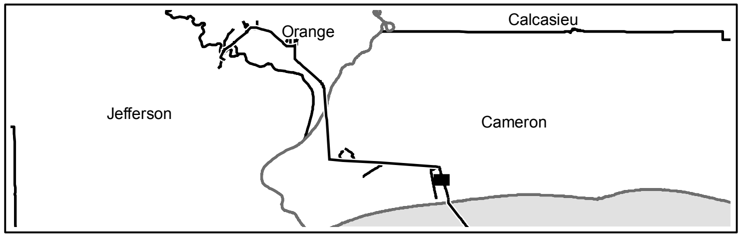
exp Energy Services Inc.
T: +1.713.439.3600
F: +1.713.963.9085
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0801-06-001	SHEET:	74 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





- Existing Stingray Pipeline To Be Converted to Oil Service
- Project Access Road
- Existing Permanent Easement / Facility for Use
- ATWS
- ▨ Existing Permanent Easement (No Impact)
- Estuarine, unvegetated subtidal
- Estuarine, vegetated intertidal (salt marsh)

BLUE MARLIN OFFSHORE PORT PROJECT
PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	DRAWN BY:	CW
STATE:	LOUISIANA	CHECKED BY:	JZ

PREPARED BY

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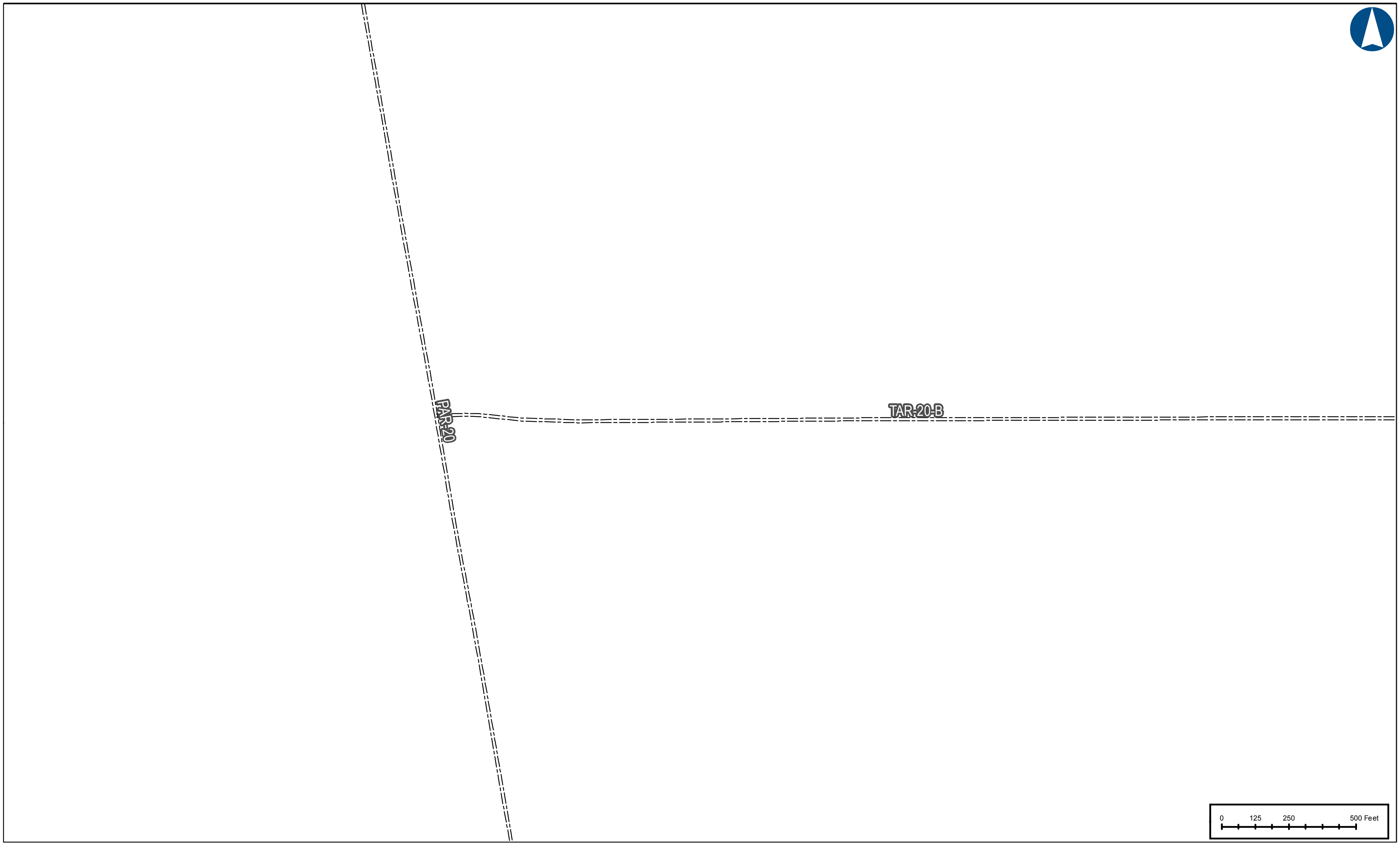
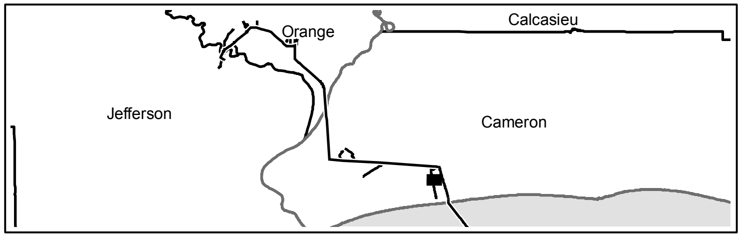
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	PROJECTION:	UTM 15 N
DWG:	0801-06-001	SHEET:	75 OF 76

BLUE MARLIN OFFSHORE PORT PROJECT - APPENDIX G-3 PLAN VIEW MAP





═══ Project Access Road

BLUE MARLIN OFFSHORE PORT PROJECT

PLAN VIEW MAP

COUNTY/PARISH:	CAMERON	**DRAWN BY:**	CW
STATE:	LOUISIANA	**CHECKED BY:**	JZ

PREPARED BY

exp Energy Services Inc.
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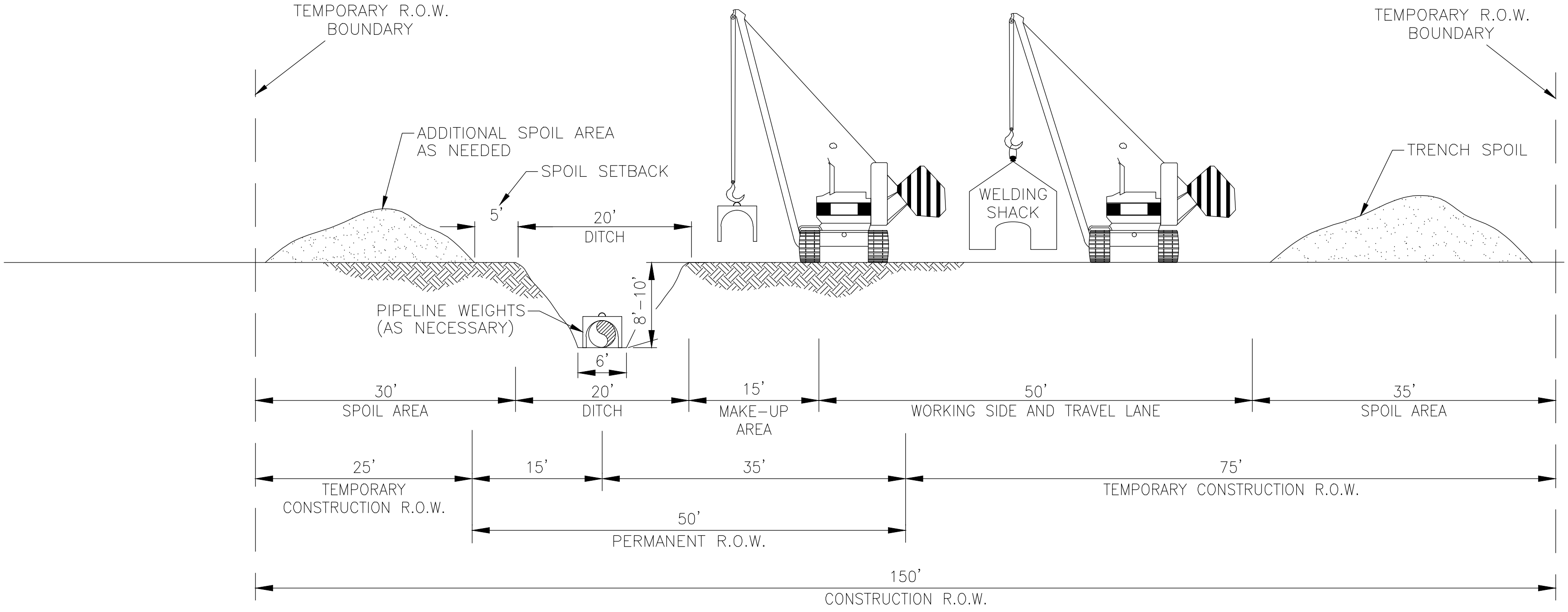
F: +1.713.963.9085
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DATE:	2020-08-26	**PROJECTION:**	UTM 15 N
DWG:	0801-06-001	**SHEET:**	76 OF 76

APPENDIX H –
CONSTRUCTION TYPICALS



PROFILE

1"=20' HOR.
1"=20' VERT.

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE 1"=20'		CONST. YR.	
FILENUMBER	CADD FILENAME	DRAWN KMA	DATE 5-6-20	

REV. NO.	- DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	5-6-20	JHR
B	ISSUED FOR REVIEW	NMS	5-28-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR
D	ISSUED FOR PERMIT	NMS	6-29-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL UPLAND WORKSPACE
CONSTRUCTION AREA

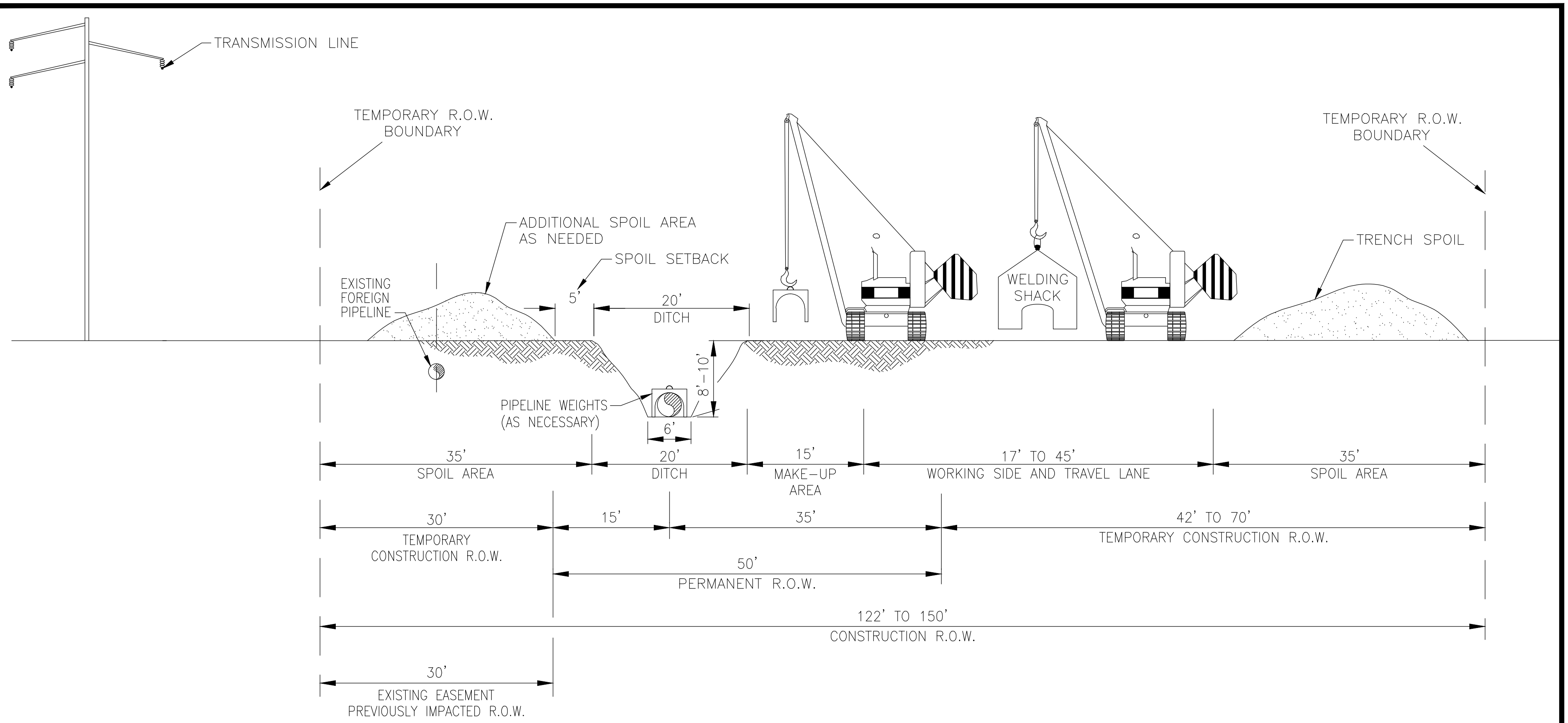
PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-1
D

06-29-20 9:29 9 NMS p:\19187_figure b-1.dwg



PROFILE
1"=20' HOR.
1"=20' VERT.

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. THE OFFSET FROM FOREIGN PIPELINES MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS OR THE FOREIGN PIPELINE/UTILITY TO BE PARALLELED.

PIPELINE, STATION, OR ACCOUNT NUMBER
SCALE 1"=20'
CONST. YR.
FILENUMBER
CADD FILENAME
DRAWN KMA
DATE 5-19-20

REV. NO.	– DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	5-19-20	JHR
B	ISSUED FOR REVIEW	NMS	5-24-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL UPLAND WORKSPACE
CONSTRUCTION AREA
PARALLEL TRANSMISSION LINE & FOREIGN PL

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-2
C

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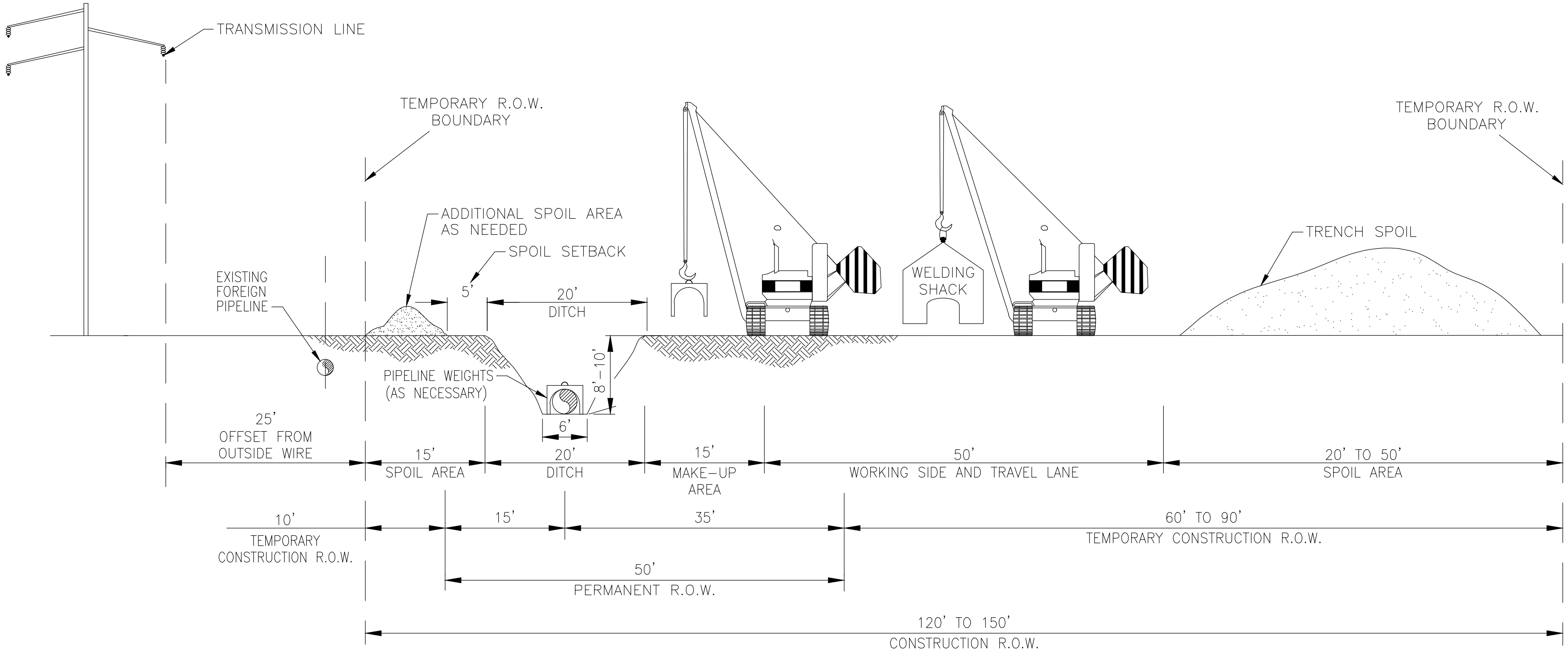

PROFILE
1"=20' HOR.
1"=20' VERT.

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. THE OFFSET FROM FOREIGN PIPELINES MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS OR THE FOREIGN PIPELINE/UTILITY TO BE PARALLELED.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE 1"=20'		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN KMA	DATE 5-18-20

REV. NO.	– DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	5-18-20	JHR
B	ISSUED FOR REVIEW	NMS	5-28-20	JHR
C	ISSUED FOR REVIEW NMS	NMS	6-10-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL UPLAND WORKSPACE
CONSTRUCTION AREA
PARALLEL TRANSMISSION LINE & FOREIGN PL

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-3 C

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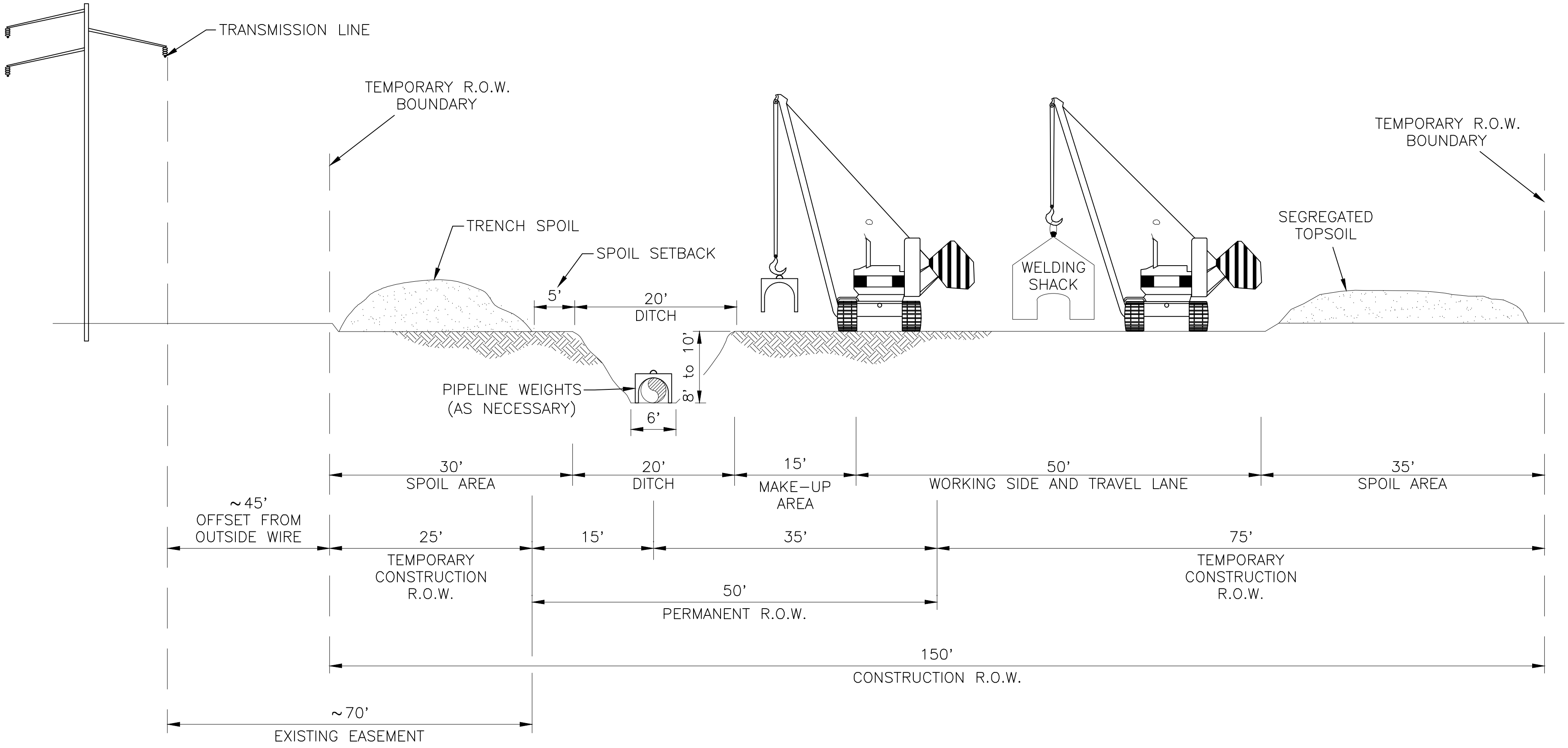

PROFILE
1"=20' HOR.
1"=20' VERT.

* FULL R.O.W. TOPSOIL SEGREGATION

** DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.

PIPELINE, STATION, OR ACCOUNT NUMBER
SCALE 1"=20'
CONST. YR.
FILENUMBER
CADD FILENAME
DRAWN NMS
DATE 5-11-20

REV. NO.	— DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	5-11-20	JHR
B	ISSUED FOR REVIEW	KMA	5-28-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR
D	ISSUED FOR PERMIT	NMS	6-29-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL AGRICULTURAL CROSSING

PARALLELING TRANSMISSION LINE

PROJECT NO.
PREVIOUS DWG. NO.
SHT. OF
DWG. NO.
Figure B1-4
D

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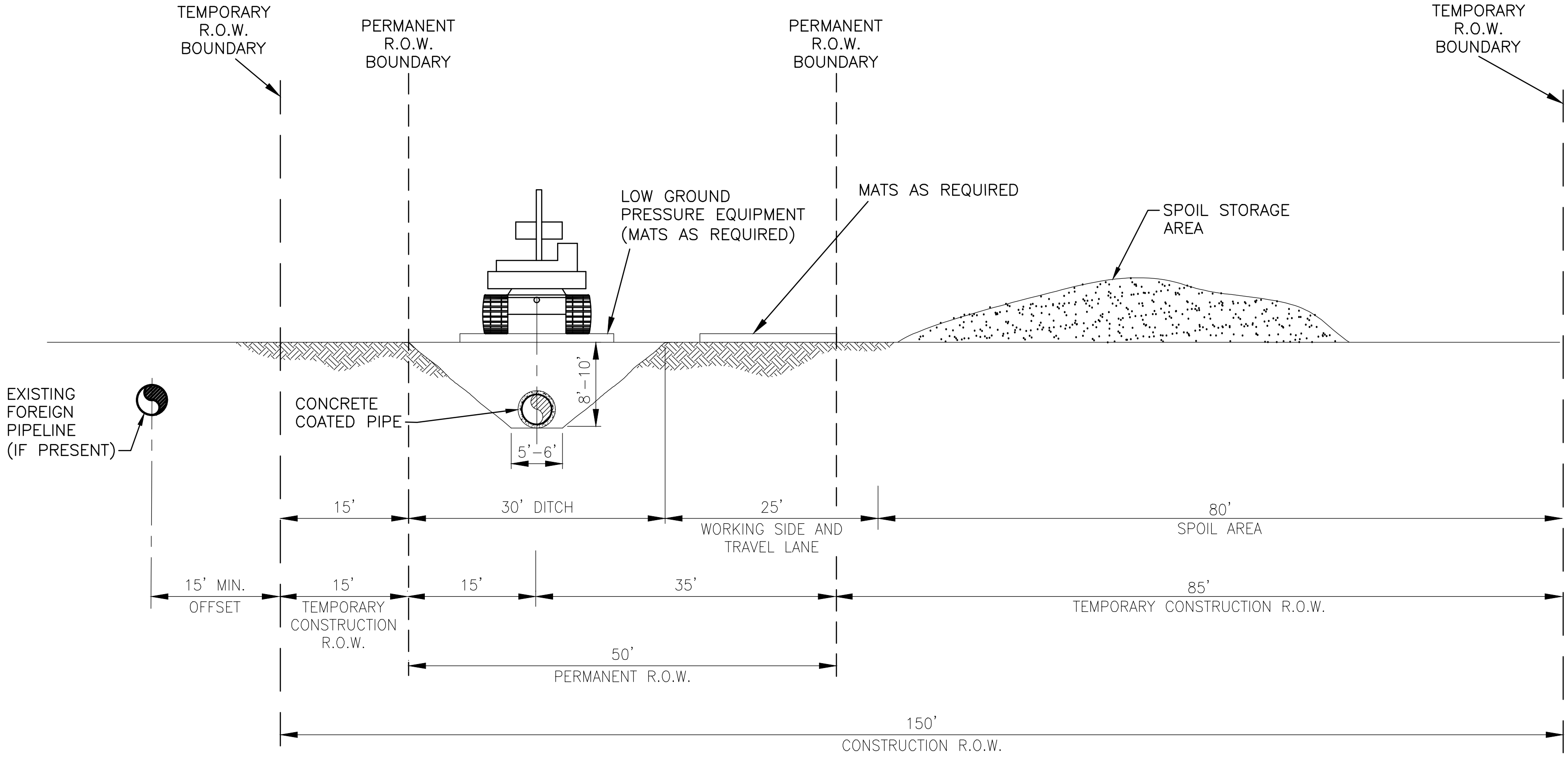

PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.

PIPELINE, STATION, OR ACCOUNT NUMBER
SCALE 1"=20'
CONST. YR.
FILENUMBER
CADD FILENAME
DRAWN KMA
DATE 5-12-20

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	5-12-20	JHR
B	ISSUED FOR REVIEW	NMS	5-28-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR
D	ISSUED FOR PERMIT	NMS	6-29-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL WETLAND CROSSING
PUSH / PULL METHOD
ADJACENT TO PIPELINE

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-5 D

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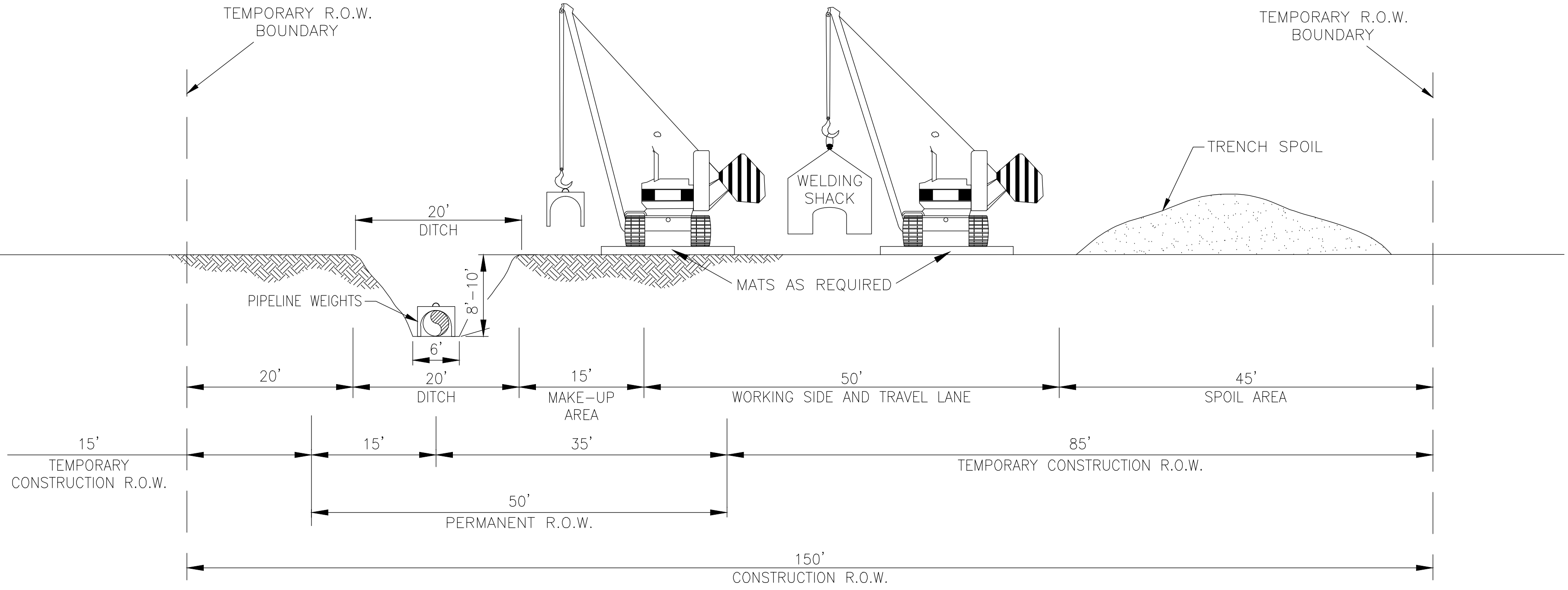

PROFILE
1"=20' HOR.
1"=20' VERT.

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
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3. THE OFFSET FROM POWERLINES MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS OR THE FOREIGN PIPELINE/UTILITY TO BE PARALLELED.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE 1"=20'		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN KMA	DATE 5-12-20

REV. NO.	DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	5-12-20	JHR
B	ISSUED FOR REVIEW	NMS	5-28-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR
D	ISSUED FOR PERMIT	NMS	6-29-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL SATURATED WETLAND WORKSPACE
CONSTRUCTION AREA

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-6
D

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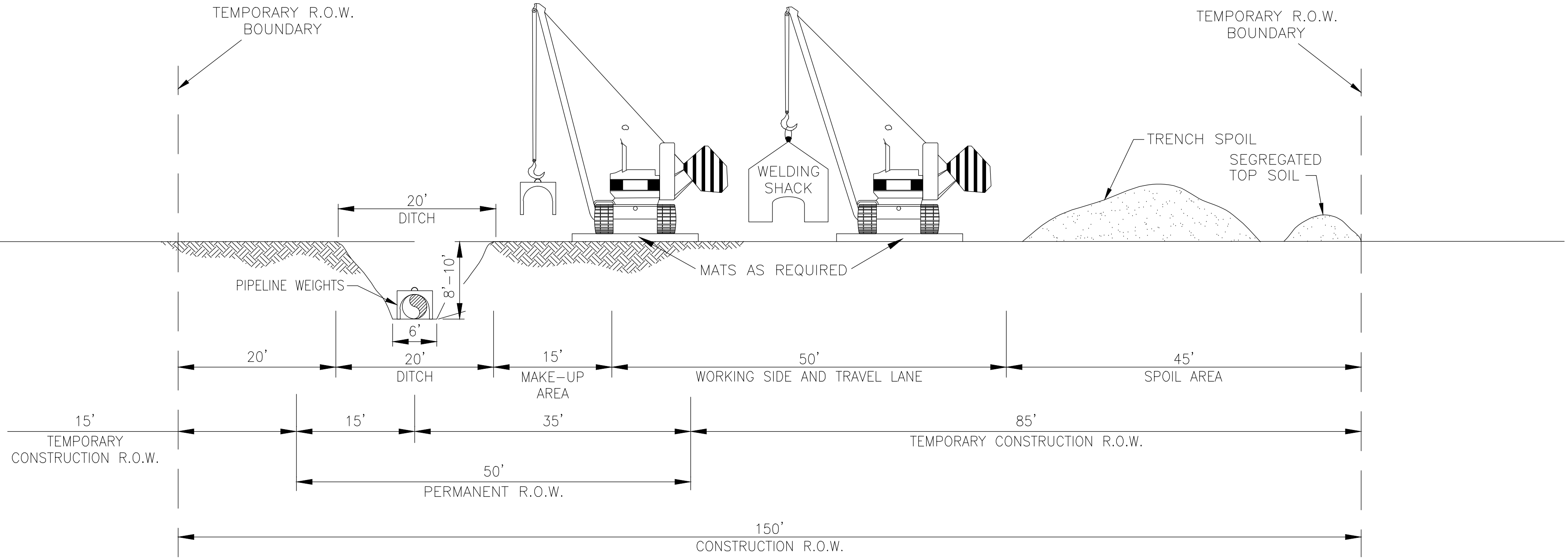


PROFILE

1"=20' HOR.
1"=20' VERT.

* DIMENSIONS ARE TYPICAL, SEE ALIGNMENT SHEETS FOR ACTUAL RIGHT-OF-WAY CONFIGURATIONS AND CLEARING LIMITS.

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 150 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 100 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. LEAVE GAPS IN SPOIL PILES WHERE APPLICABLE TO AVOID POTENTIAL DISRUPTION AND IMPEDIMENT TO NATURAL WATERCOURSES OR HYDROLOGIC EXCHANGE. DO NOT PUSH UPLAND SOILS INTO CANALS OR WETLANDS.
3. THE OFFSET FROM POWERLINES MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS OR THE FOREIGN PIPELINE/UTILITY TO BE PARALLELED.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE 1"=20'		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN KMA	DATE 5-12-20

REV. NO.	- DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	5-12-20	JHR
B	ISSUED FOR REVIEW	NMS	5-28-20	JHR
C	ISSUED FOR REVIEW	NMS	6-10-20	JHR
D	ISSUED FOR PERMIT	NMS	6-29-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL UNSATURATED WETLAND WORKSPACE
CONSTRUCTION AREA

PROJECT NO.

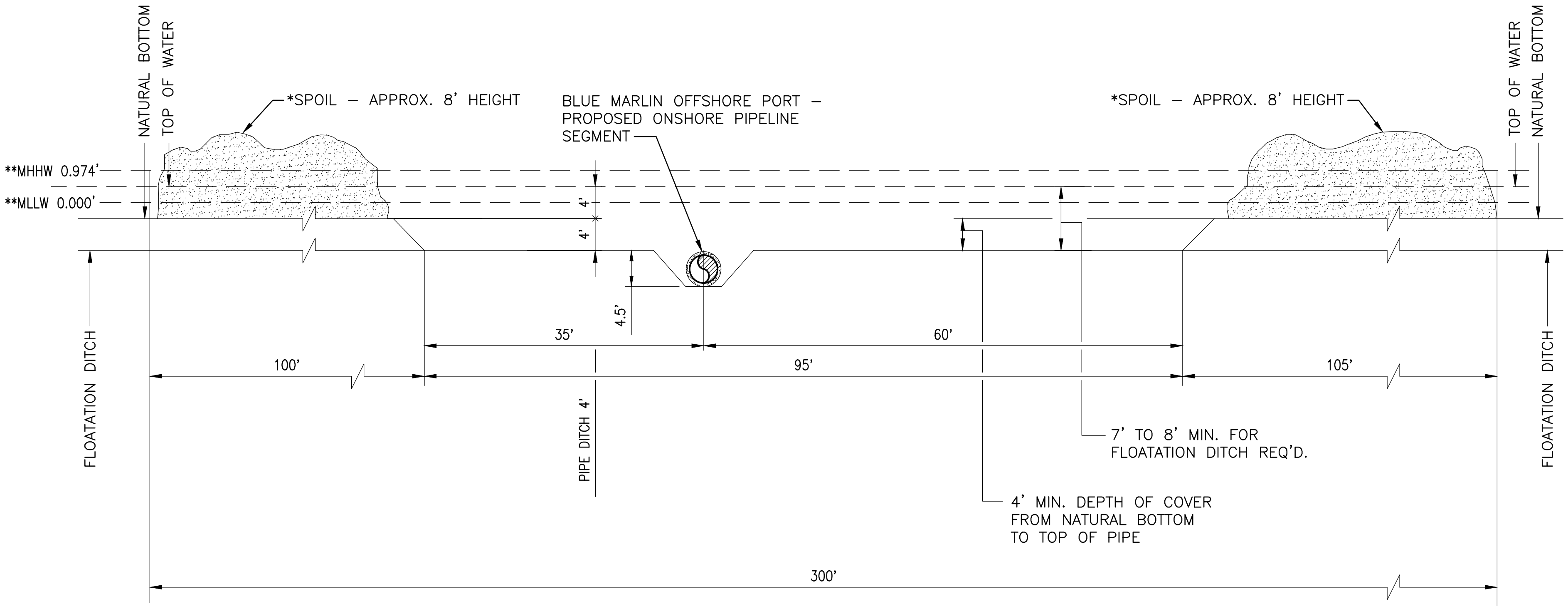
PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-7

D

p:\19187_figure b-5.dwg 6 NMS 06-30-20 9:31



* EXCAVATED AND SIDE–CAST SPOIL MATERIAL WILL BE USED TO BACKFILL THE TRENCH.
** REFERENCE: NOAA TIDE STATION 8770570 SABINE PASS NORTH – NAVD88.

PIPELINE, STATION, OR ACCOUNT NUMBER
SCALE 1"=20'
CONST. YR.
FILENUMBER
CADD FILENAME
DRAWN NMS
DATE 5–12–20

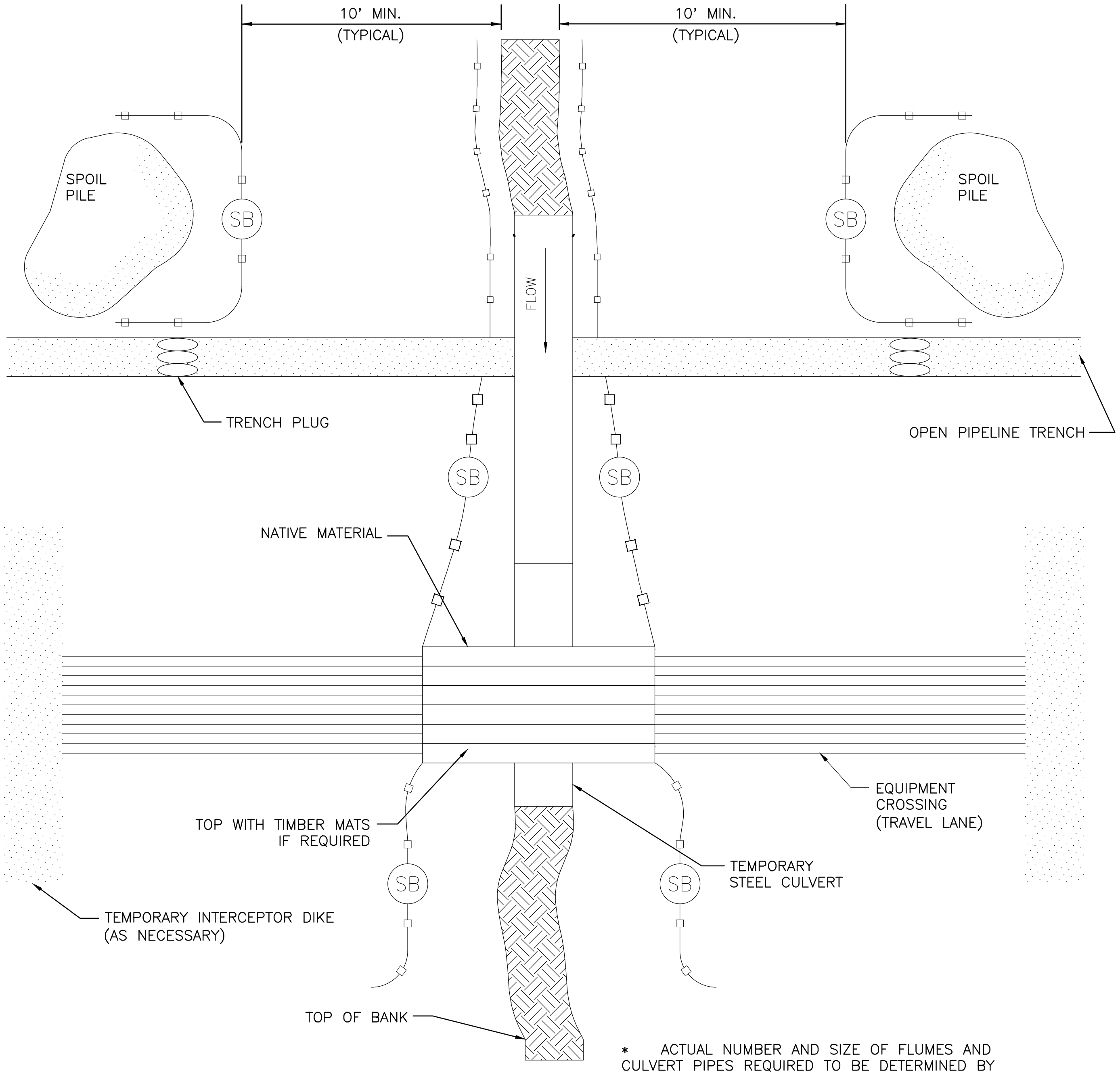
REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	5–12–20	JHR
B	ISSUED FOR REVIEW	NMS	5–28–20	JHR
C	ISSUED FOR REVIEW	NMS	6–10–20	JHR
D	ISSUED FOR PERMIT	NMS	6–29–20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
300' LAKE CONSTRUCTION CORRIDOR

PROJECT NO.
PREVIOUS DWG. NO.
SHT. OF
DWG. NO.
Figure B1-8
D

06–30–20 9:29 19187 8 NMS p:\19187_figure b-6.dwg



* ACTUAL NUMBER AND SIZE OF FLUMES AND CULVERT PIPES REQUIRED TO BE DETERMINED BY STREAM WIDTH AND POTENTIAL FLOW VOLUME.

NOTES:

1. SB–TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/OR STRAW BALES, OR APPROPRIATE MATERIALS.
2. TRENCH EXCAVATION AND PIPE INSTALLATION SHALL BE CONDUCTED AS EXPEDIENTLY AS PRACTICAL TO REDUCE THE DURATION OF INSTREAM CONSTRUCTION ACTIVITIES.
3. STABILIZE STREAM BANKS AND INSTALL TEMPORARY SEDIMENT BARRIERS FOLLOWING COMPLETION OF INSTREAM CONSTRUCTION ACTIVITIES.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS		CONST. YR.
FILENUMBER	CADD FILENAME FIGURE B–9.dwg	DRAWN KMA	DATE 6–29–20

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	6–29–20	JHR
B	ISSUED FOR REVIEW	NMS	7–8–20	JHR
C	ISSUED FOR PERMIT	NMS	7–9–20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
OPEN CUT
WET CROSSING

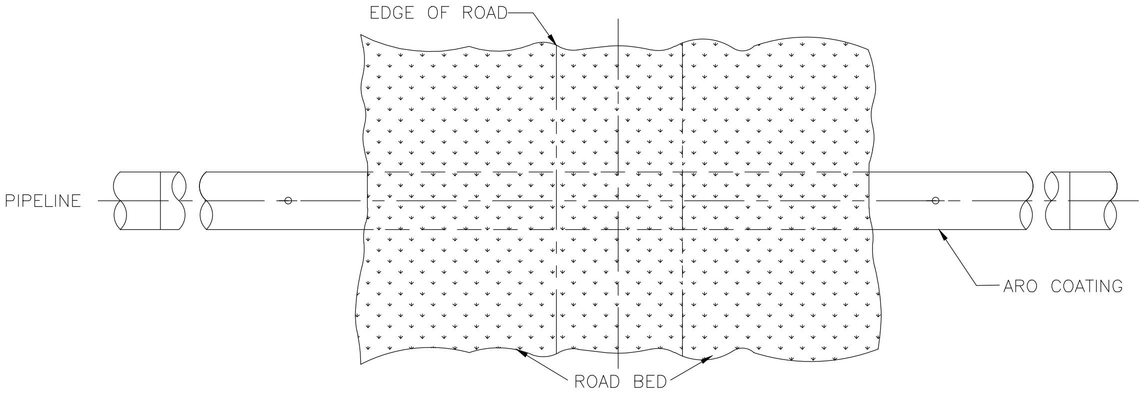
PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

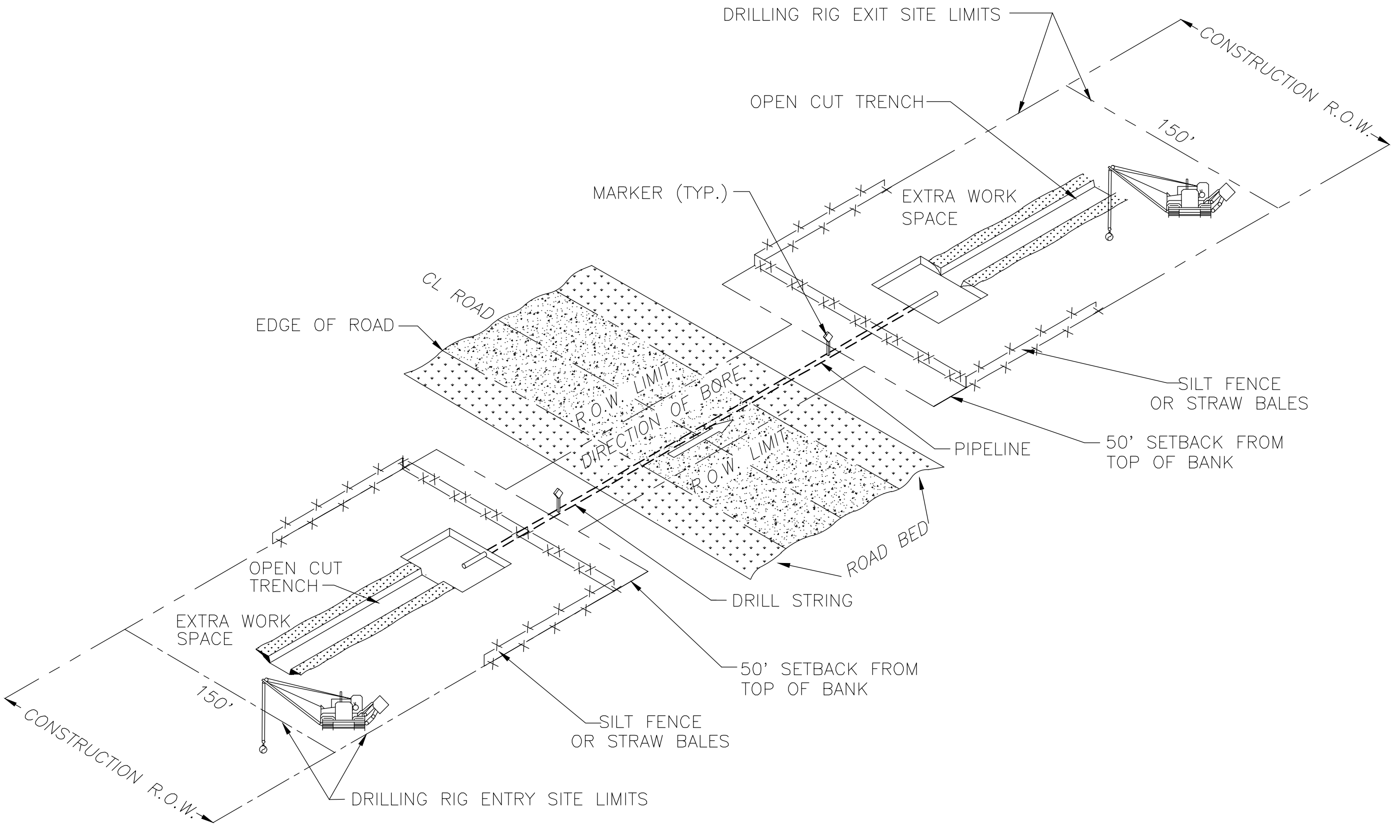
DWG. NO.
Figure B1-9
C

07–09–20 17:07 2 NMS



PLAN VIEW

SCALE: NOT TO SCALE



PLAN VIEW 'A'

SCALE: NOT TO SCALE

NOTES:

1. EXTRA WORK SPACE NOT LOCATED IN WETLAND WHEN POSSIBLE AND PRACTICAL.
2. RIGHT-OF-WAY LIMITS AS SHOWN ON ALIGNMENT SHEETS.
3. WORK AREA WILL BE TEMPORARILY MATTED WITHIN WETLANDS.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS	CONST. YR.	
FILENUMBER	CADD FILENAME	DRAWN NMS	DATE 6-29

Appendix B1

PROJECT NO.

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	6-29-20	JHR
B	ISSUED FOR REVIEW	NMS	7-8-20	JHR
C	ISSUED FOR PERMIT	NMS	7-9-20	JHR

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
BORED ROAD CROSSING

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.

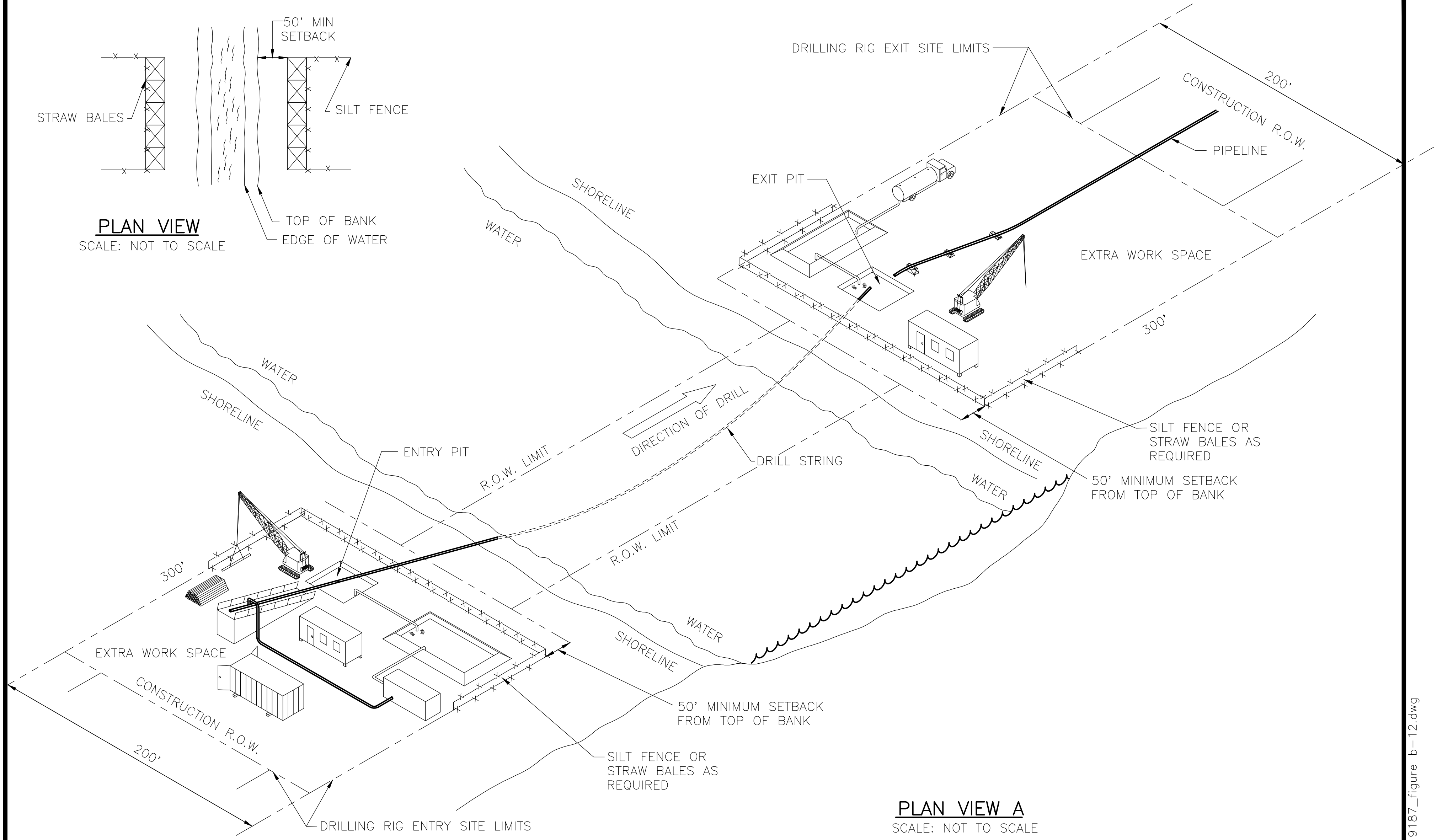
Figure B1-10

C

p:\19187_figure b-10.dwg

4 NMS

07-09-20 17:15



PLAN VIEW
SCALE: NOT TO SCALE

PLAN VIEW A
SCALE: NOT TO SCALE

NOTES:

1. EXTRA WORK SPACE NOT LOCATED IN WETLANDS WHEN POSSIBLE.
2. RIGHT-OF-WAY LIMITS AS SHOWN ON ALIGNMENT SHEETS.

PIPELINE, STATION, OR ACCOUNT NUMBER
SCALE
CONST. YR.
FILENUMBER
CADD FILENAME
DRAWN NMS
DATE 6-29-20

REV. NO.	DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	6-29-20	JHR
B	ISSUED FOE REVIEW	NMS	7-8-20	JHR
C	ISSUED FOR PERMIT	NMS	7-9-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
SHORE TO SHORE HDD

PROJECT NO.
PREVIOUS DWG. NO.
SHT. OF
DWG. NO.
Figure B1-11
C

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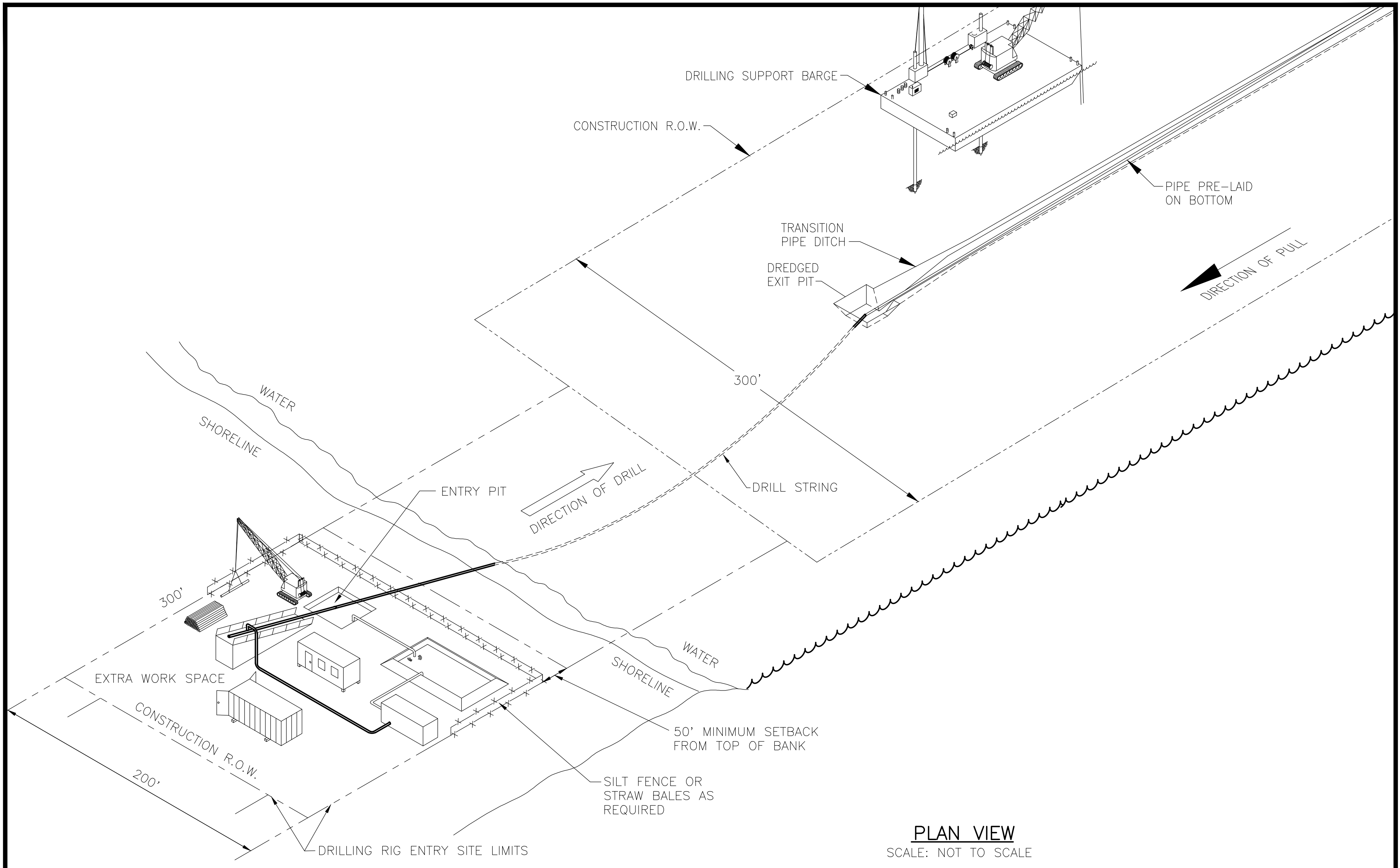


PLAN VIEW

SCALE: NOT TO SCALE

NOTES:

1. EXTRA WORK SPACE NOT LOCATED IN WETLANDS WHEN POSSIBLE.
2. RIGHT-OF-WAY LIMITS AS SHOWN ON ALIGNMENT SHEETS.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE			CONST. YR.	
FILENUMBER	CADD FILENAME		DRAWN NMS	DATE 6-29-20	

REV. NO.	DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	7-20-20	JHR
B	ISSUED FOR PERMIT	NMS	7-21-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
SHORE TO WATER HDD

PROJECT NO.

PREVIOUS DWG. NO.

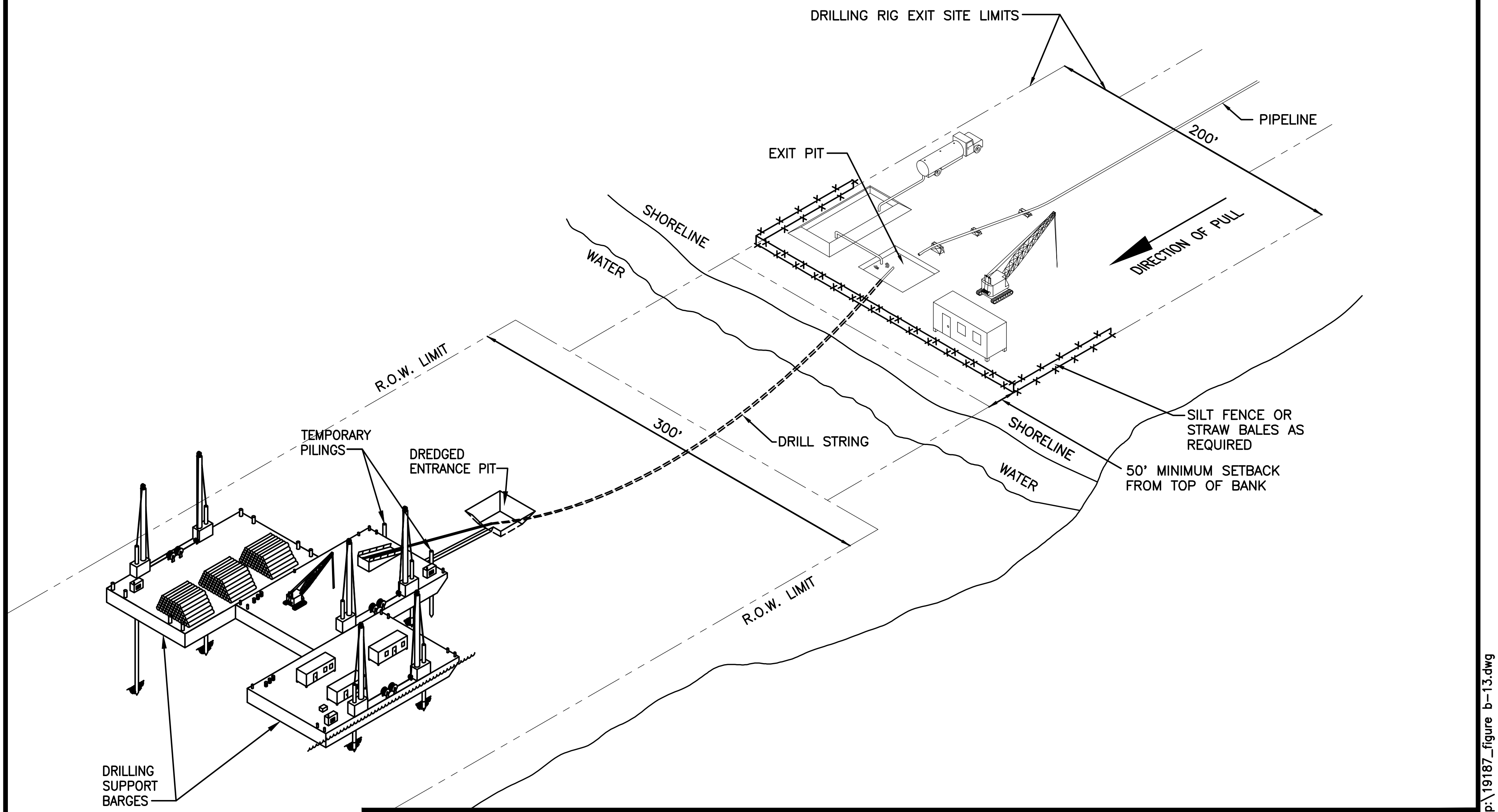
SHT. OF

DWG. NO.
Figure B1-12

p:\19187_figure b-22.dwg 3 NMS 07-21-20 9:20

HORIZONTAL DIRECTIONAL DRILL LAYOUT: WATER TO SHORE

NOT TO SCALE



PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN NMS	DATE 6–29–20

REV. NO.	– DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	6–29–20	JHR
B	ISSUED FOR REVIEW	NMS	7–8–20	JHR
C	ISSUED FOR PERMIT	NMS	7–9–20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
WATER TO SHORE HDD

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

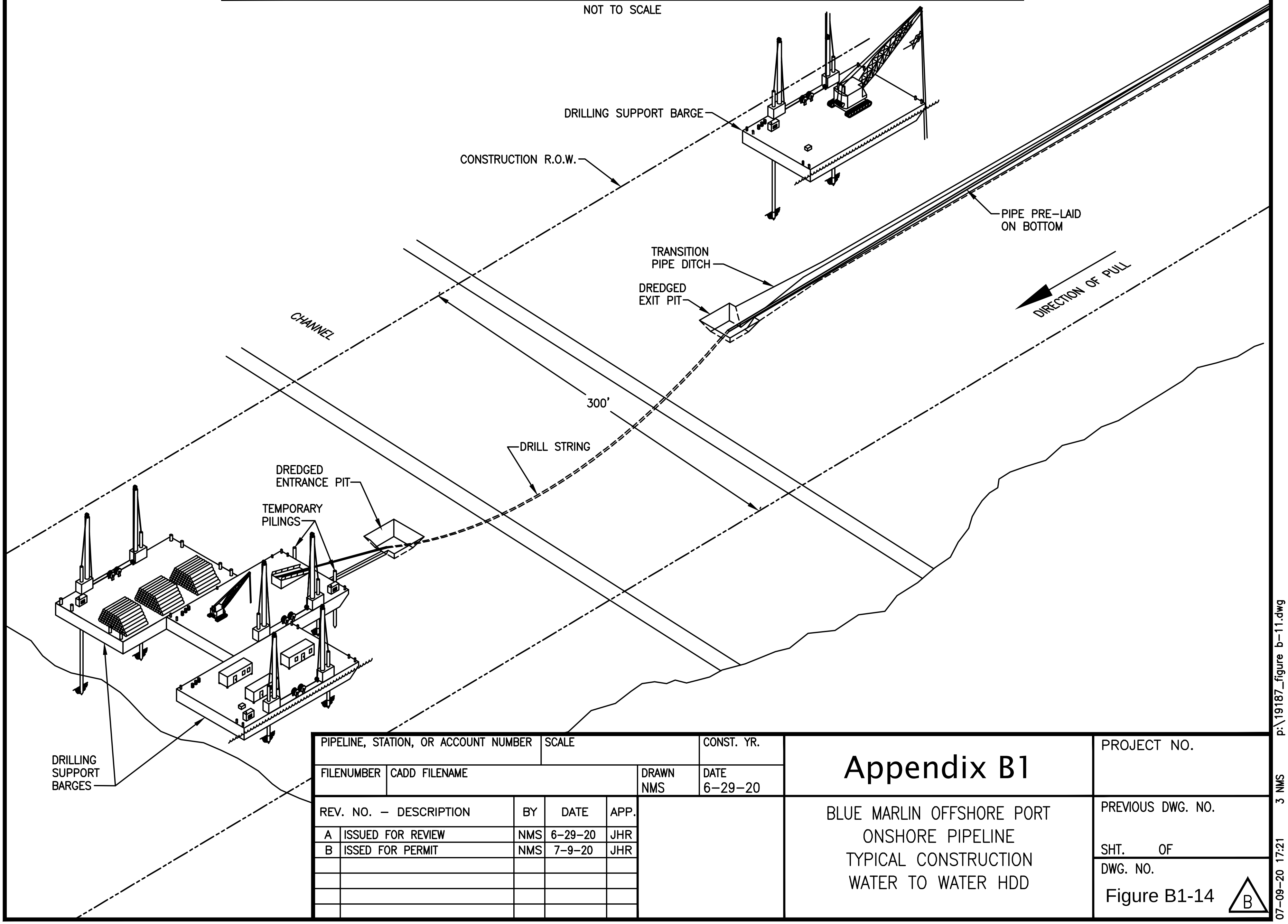
DWG. NO.
Figure B1-13

C

p:\19187_figure b–13.dwg 5 NMS 07–09–20 17:46

HORIZONTAL DIRECTIONAL DRILL LAYOUT: WATER TO WATER

NOT TO SCALE



PIPELINE, STATION, OR ACCOUNT NUMBER

SCALE

CONST. YR.

FILENUMBER

CADD FILENAME

DRAWN
NMS

DATE
6–29–20

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	6–29–20	JHR
B	ISSED FOR PERMIT	NMS	7–9–20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
WATER TO WATER HDD

PROJECT NO.

PREVIOUS DWG. NO.

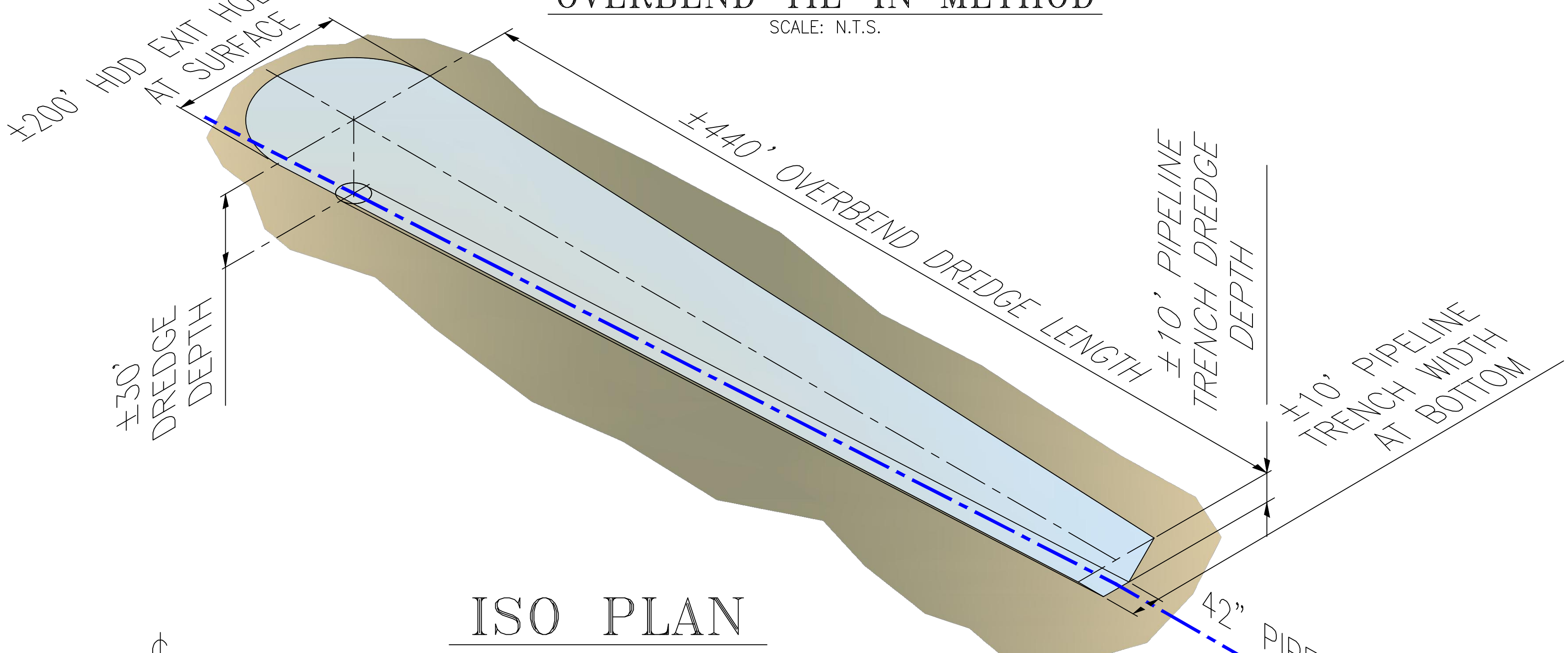
SHT. OF

DWG. NO.
Figure B1-14 B

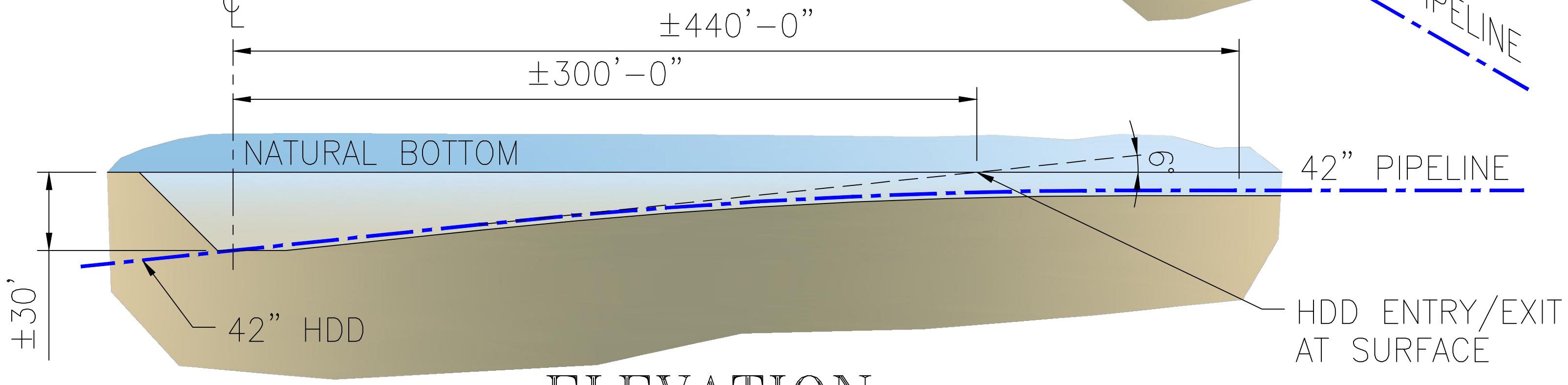
07–09–20 17:21 3 NMS p:\19187_figure b–11.dwg

42" PIPELINE DREDGED HDD HOLE
OVERBEND TIE-IN METHOD

SCALE: N.T.S.



ISO PLAN



ELEVATION

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE **N.T.S.**		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN **NMS**	DATE **7-9-20**

REV. NO.	— DESCRIPTION	BY	DATE	APP.
A	**ISSUED FOR REVIEW**	**NMS**	**7-9-20**	**JHR**
B	**ISSUED FOR PERMIT**	**NMS**	**7-9-20**	**JHR**

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
42" PIPELINE DREDGED HDD HOLE
OVERBEND TIE-IN METHOD

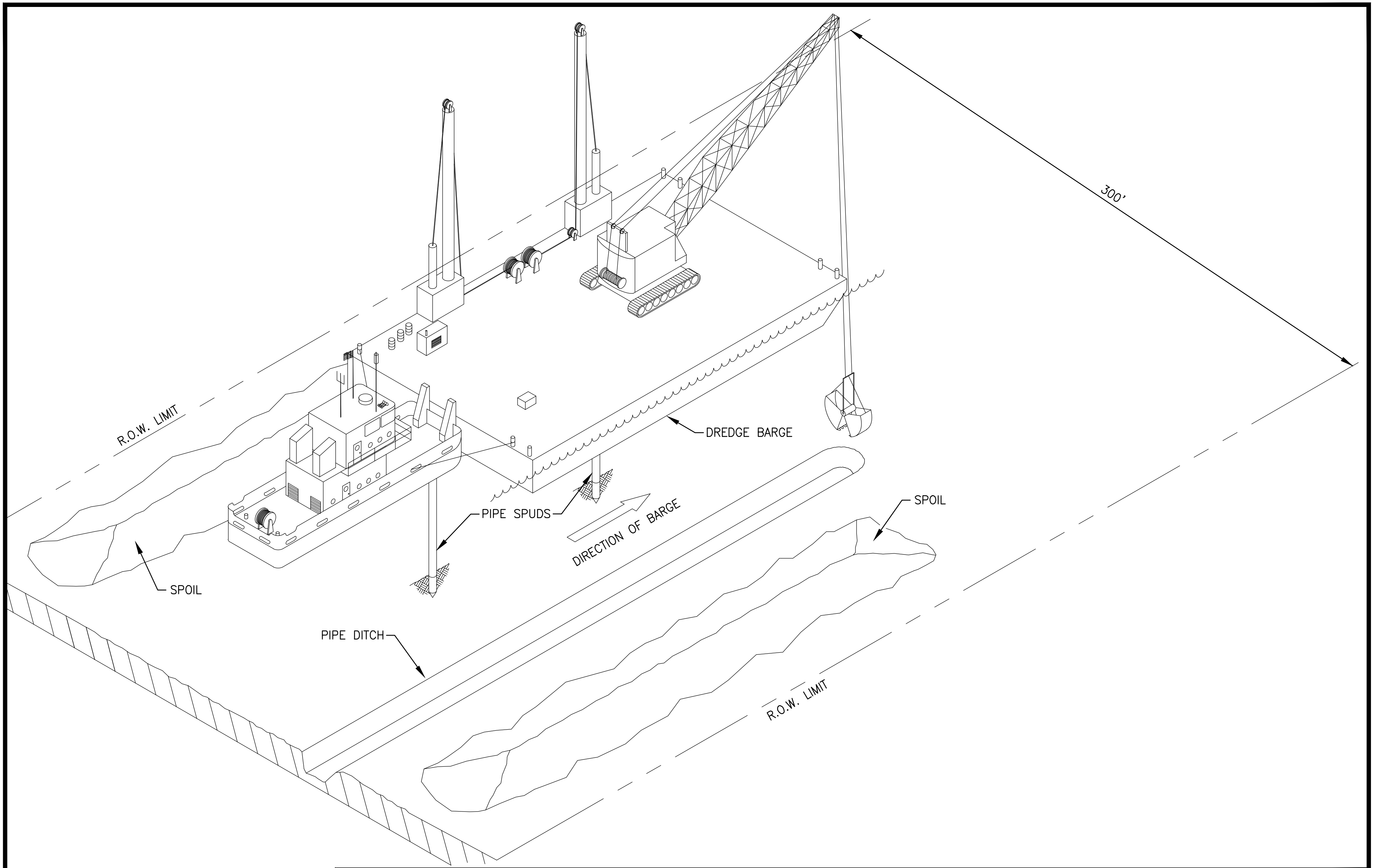
PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-15
B

p:\19187_figure b-21.dwg
2 NMS
07-10-20 8:57



PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS		CONST. YR.
FILENUMBER	CADD FILENAME FIGURE B-14	DRAWN KMA	DATE 6-29-20

Appendix B1

REV. NO.	– DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	6-29-20	JHR
B	ISSUED FOR REVIEW	NMS	7-8-20	JHR
C	ISSUED FOR PERMIT	NMS	7-9-20	JHR

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL LAKE
BARGE DREDGING

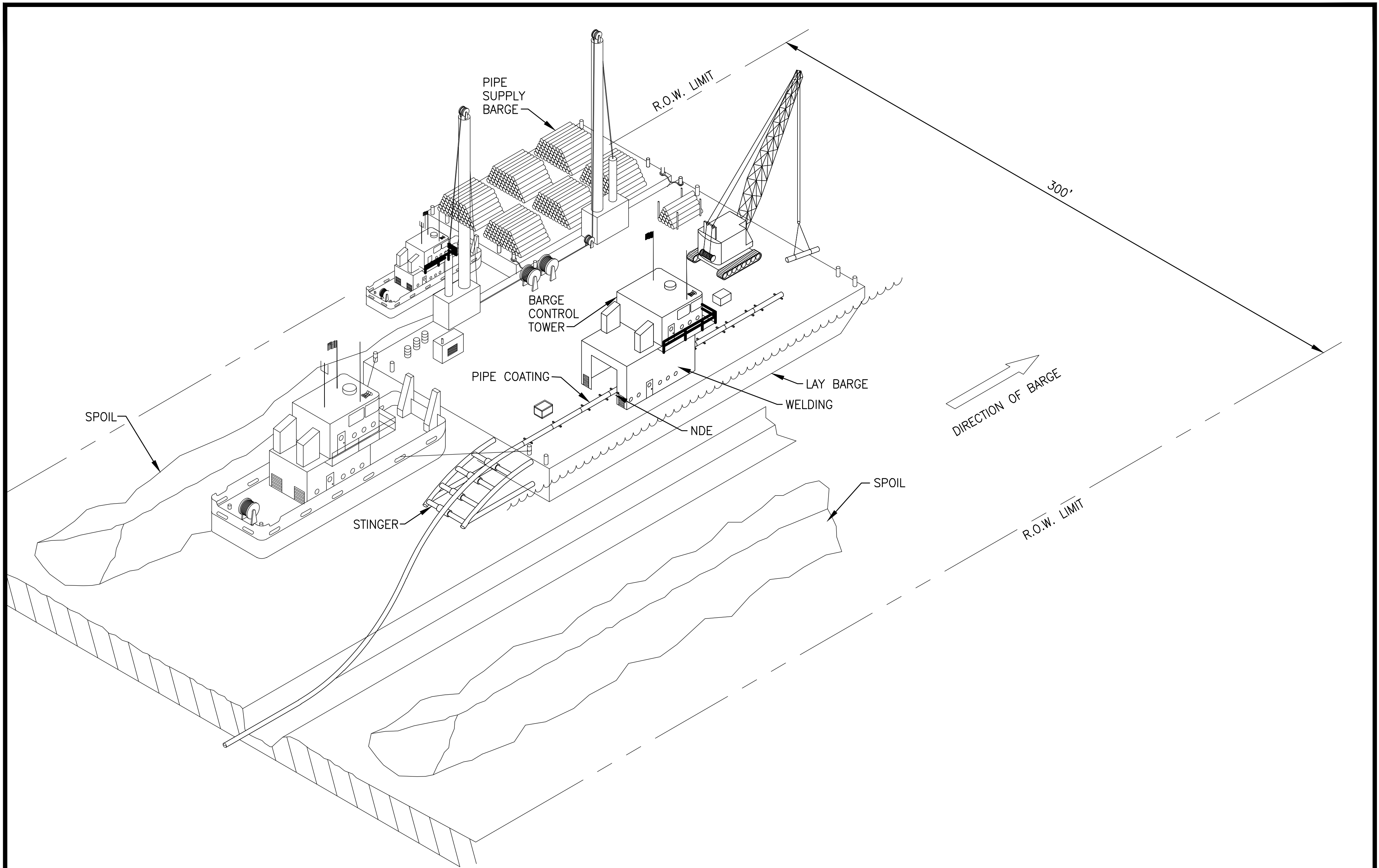
PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-16
C

p:\19187_figure b-14.dwg 4 NMS 07-09-20 17:52



PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS		CONST. YR.
FILENUMBER	CADD FILENAME FIGURE B-15	DRAWN KMA	DATE 6-29-20

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	6-29-20	JHR
B	ISSUED FOR PERMIT	NMS	7-9-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL LAKE
BARGE PIPELAY

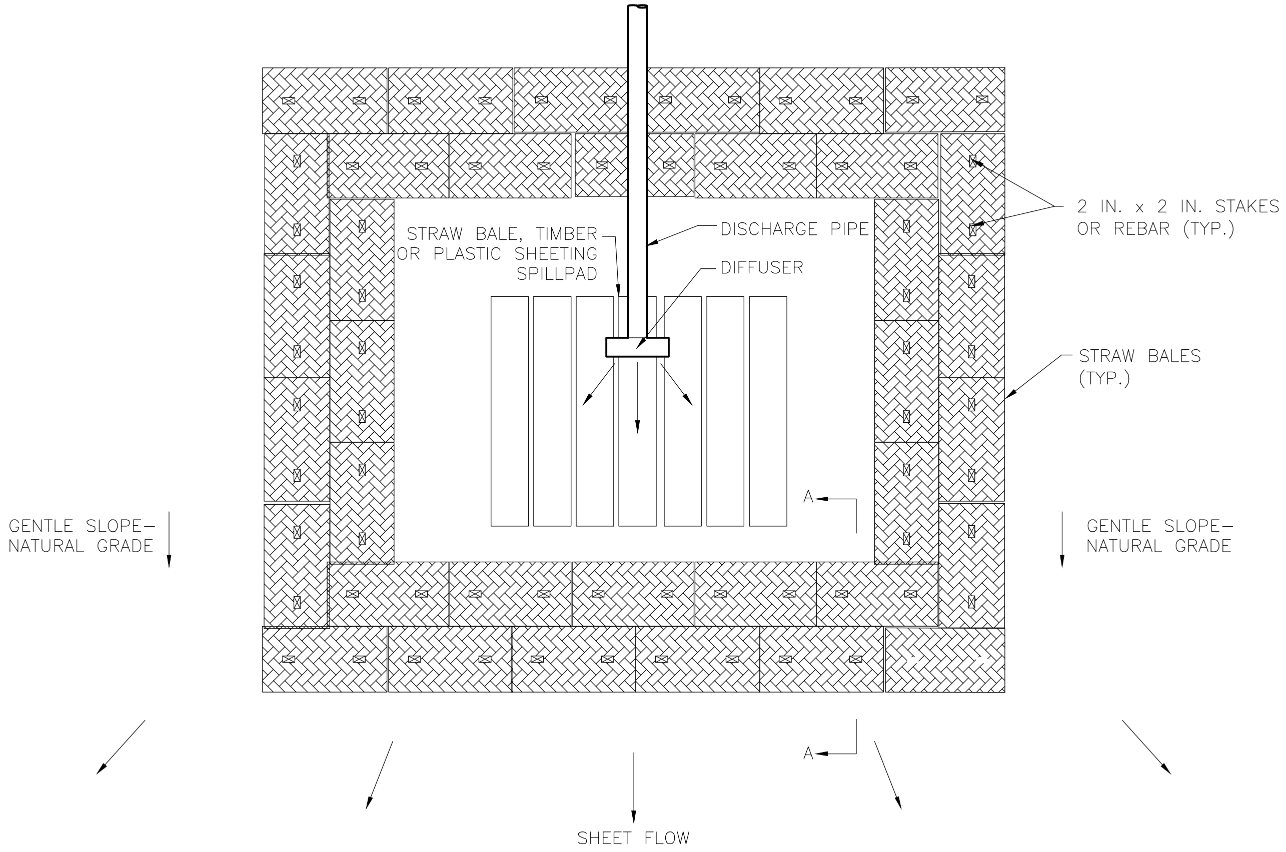
PROJECT NO.

PREVIOUS DWG. NO.

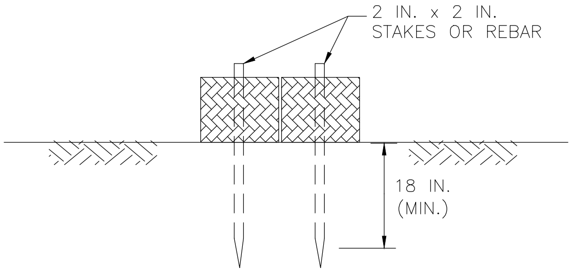
SHT. OF

DWG. NO.
Figure B1-17 B

p:\19187_figure b-15.dwg 3 NMS 07-09-20 17:55



PLAN
SCALE: NOT TO SCALE



SECTION–"A"–"A"
SCALE: NOT TO SCALE

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS. ALL DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH ENVIRONMENTAL SPECIFICATION AND RELEVANT PERMITS.

2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERCOURSE. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.

3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD.

4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.

5. MANUFACTURED FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER. DISPOSE OF FULL FILTER BAGS AT AN APPROVED OFF-SITE FACILITY.

p:\19187_figure b-16.dwg

3 NMS

07-09-20 18:01

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS		CONST. YR.
FILENUMBER	CADD FILENAME	DRAWN NMS	DATE 6-29

REV. NO. – DESCRIPTION		BY	DATE	APP.
A	ISSUED FOR REVIEW	NMS	6-29-20	JHR
B	ISSUED FOR REVIEW	NMS	7-8-20	JHR
C	ISSUED FOR PERMIT	NMS	7-9-20	JHR

Appendix B1

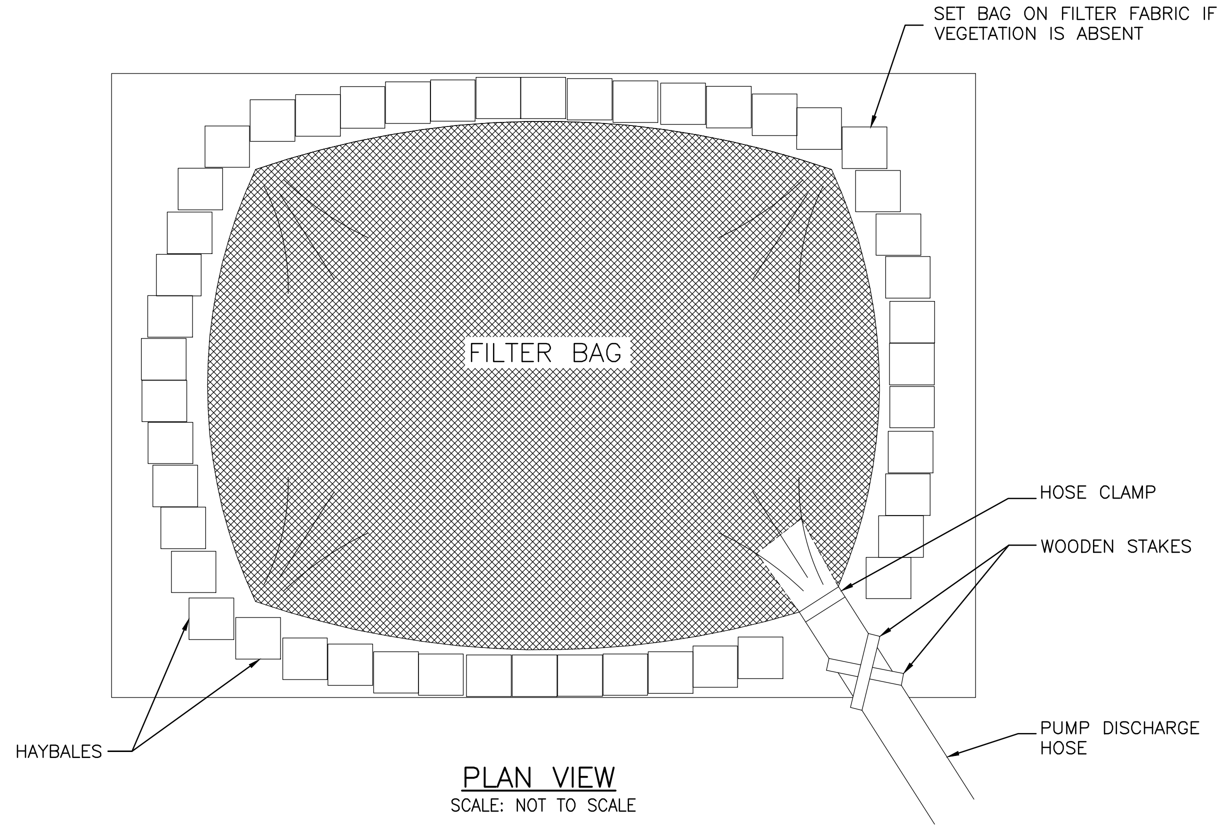
BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
STRAW BALE
DEWATERING STRUCTURE

PROJECT NO.

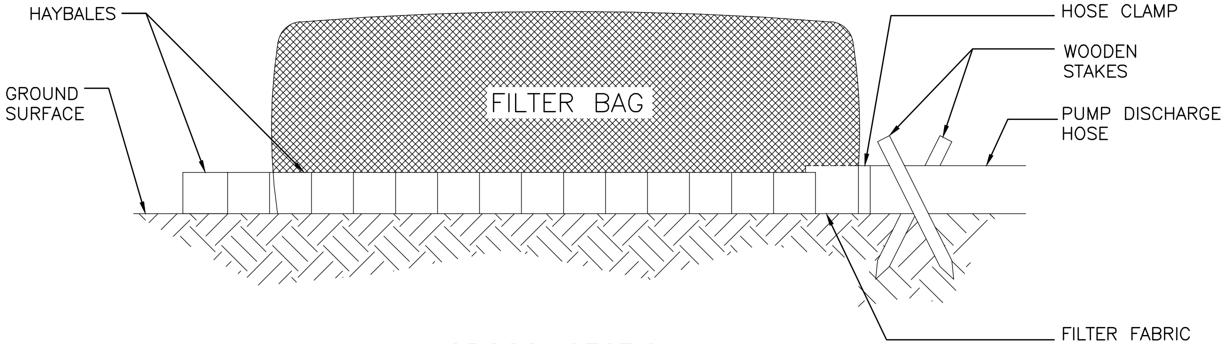
PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-18
C



PLAN VIEW
SCALE: NOT TO SCALE



CROSS-SECTION
SCALE: NOT TO SCALE

NOTES:

1. LIMIT ONE (1) DISCHARGE HOSE PER BAG.
2. REMOVE DEWATERING STRUCTURE AS SOON AS POSSIBLE AFTER COMPLETION OF DEWATERING ACTIVITIES.
3. FOR MAINTENANCE PURPOSES, ONCE THE FILTER BAG IS 50% FULL OF SEDIMENT, IT MUST BE REPLACED. ANY RIPS OR TEARS WILL ALSO REQUIRE REPLACING FILTER BAG.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS		CONST. YR.
FILENUMBER	CADD FILENAME FIGURE B-17.dwg	DRAWN KMA	DATE 6-29-20

REV. NO.	DESCRIPTION	BY	DATE	APP.
A	ISSUED FOR REVIEW	KMA	6-29-20	JHR
B	ISSUED FOR PERMIT	NMS	7-9-20	JHR

Appendix B1

BLUE MARLIN OFFSHORE PORT
ONSHORE PIPELINE
TYPICAL CONSTRUCTION
FILTER BAG

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
Figure B1-19 B

07-09-20 18:07 2 NMS

APPENDIX I –
HDD SITE SPECIFIC DRAWINGS

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 300'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

PROFILE

HORIZONTAL SCALE: 1"= 300'
VERTICAL SCALE: 1"= 75'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN – 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
2) CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.
3) CONTRACTOR TO PROVIDE PILOT HOLE INFORMATION TO COMPANY FOR APPROVAL PRIOR TO COMMENCEMENT OF REAMING.
4) CONTRACTOR TO PROVIDE AS-BUILT DRAWING AND INFORMATION WITHIN 10 DAYS FROM BOREHOLE COMPLETION AND SHALL INCLUDE THE FOLLOWING AT A MINIMUM:
   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
4) REFERENCE THE TOLUNAY-WONG ENGINEERS, INC. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT – HDD-ETCOP-NATCHES RIVER-14.23.122 REPORT NO. 69566. REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT – TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

- CONTRACTORS' SITE SPECIFIC BORE PLAN AND PROFILE, SHOWING FOREIGN PIPELINES AND UTILITIES WITH FIELD VERIFIED ELEVATIONS, TOP OF BORE SEPARATION FROM UNDERGROUND UTILITIES, ROADS AND OTHER FEATURES, PLANNED MINIMUM DRILL RADIUS WITH PC AND PT POINTS
- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
- DRILLING FLUID AND POTENTIAL ADDITIVES (PROVIDE MSDS), AUTHORIZED DISPOSAL LOCATION (COMPANY TO APPROVE)
- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
2) ANY ON-LAND TRENCH DEWATERING TO BE DIRECTED TO WETLAND FILTER BAG AND/OR DEWATERING STRUCTURE IN AN UPLAND AREA TO MINIMIZE EROSION OF SEDIMENTATION TO WETLANDS/WATERBODIES.
3) PRE-CONSTRUCTION CONTOURS TO BE RE-ESTABLISHED FOR ALL DISTURBED AREAS. ALL DISTURBED AREAS TO BE RESTORED AND/OR REVEGETATED AS APPLICABLE.
4) EROSION/SEDIMENTATION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL RESTORATION AND REVEGETATION ARE DEEMED SUCCESSFUL.

LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

		E	ISSUED FOR PERMIT	KMA	6-30-20	JHR	JHR
		D	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	3-5-20	JHR	JHR
		C	FOR GEOTECHINCAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-20-20	JHR	JHR
		B	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	1-22-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	12-17-19	JHR	JHR
DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D

IF THE P.E. SEAL IS NOT VISIBLE, THIS DRAWING IS PRELIMINARY AND NOT AUTHORIZED FOR CONSTRUCTION

PROJECT CONSULTING SERVICES, INC.
TEXAS ENGINEERING REGISTRATION F-6314
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
(504) 833-5321 Fax (504) 833-4940
www.projectconsulting.com

DWG. STATUS	CHECKED		APPROVED			
	BY	DATE	BY	DATE	BY	DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE:					
	FILE NAME:					

P.L./STA. NO.
ACCOUNT NO.

CONSTRUCTION YEAR

	BY	DATE
DESIGN		
DRAWN	KMA	12-10-19
ASBUILT		

FILE NO.

SCALE: 1"= 300'

Appendix B3
Figure B3-1

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
NECHES RIVER HDD
M.P. 1.0
ORANGE & JEFERSON COUNTIES, TEXAS

PROJECT NO.

PREVIOUS DWG. NO.

SHEET 1 OF 1

DWG. NO.
HDD-01
SHEET 1 OF 1

E

07-09-20 14:09 8 NMS 19187_HDD-01.DWG

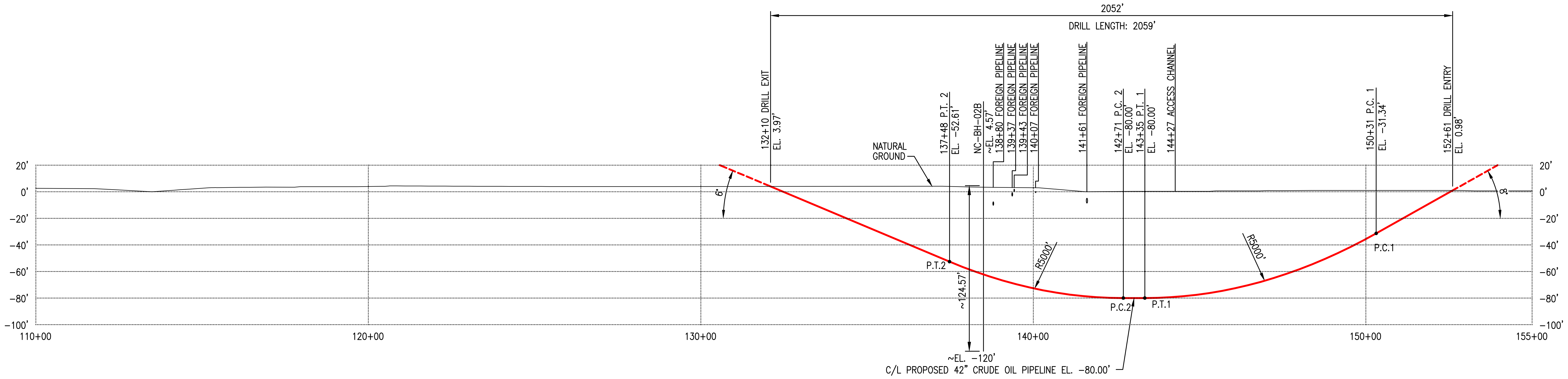
NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

HORIZONTAL DATUM: UTM COORDINATE SYSTEM, ZONE 15, U.S. FEET
COORDINATES: NAD 83
VERTICAL DATUM: NAVD 88
IMAGE COPYRIGHT: MAP DATA GOOGLE, 2018

PLAN

SCALE: 1"= 200'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.



PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN - 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
2) CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.
3) CONTRACTOR TO PROVIDE PILOT HOLE INFORMATION TO COMPANY FOR APPROVAL PRIOR TO COMMENCEMENT OF REAMING.
4) CONTRACTOR TO PROVIDE AS-BUILT DRAWING AND INFORMATION WITHIN 10 DAYS FROM BOREHOLE COMPLETION AND SHALL INCLUDE THE FOLLOWING AT A MINIMUM:
   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
5) REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT - TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

- CONTRACTORS' SITE SPECIFIC BORE PLAN AND PROFILE, SHOWING FOREIGN PIPELINES AND UTILITIES WITH FIELD VERIFIED ELEVATIONS, TOP OF BORE SEPARATION FROM UNDERGROUND UTILITIES, ROADS AND OTHER FEATURES, PLANNED MINIMUM DRILL RADIUS WITH PC AND PT POINTS
- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
- DRILLING FLUID AND POTENTIAL ADDITIVES (PROVIDE MSDS), AUTHORIZED DISPOSAL LOCATION (COMPANY TO APPROVE)
- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
2) ANY ON-LAND TRENCH DEWATERING TO BE DIRECTED TO WETLAND FILTER BAG AND/OR DEWATERING STRUCTURE IN AN UPLAND AREA TO MINIMIZE EROSION OF SEDIMENTATION TO WETLANDS/WATERBODIES.
3) PRE-CONSTRUCTION CONTOURS TO BE RE-ESTABLISHED FOR ALL DISTURBED AREAS. ALL DISTURBED AREAS TO BE RESTORED AND/OR REVEGETATED AS APPLICABLE.
4) EROSION/SEDIMENTATION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL RESTORATION AND REVEGETATION ARE DEEMED SUCCESSFUL.

LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⚠	GEOTECH CORE

ENVIRONMENTAL LEGEND:

→	PERENNIAL STREAM
→	EPHEMERAL STREAM
→	INTERMITTENT STREAM
→	NATURAL DRAINAGE
▭	WATERBODY
▭	WETLAND EMERGENT
▭	WETLAND FORESTED
▭	WETLAND SCRUB SHRUB

DWG. NO.	REFERENCE DRAWING TITLE
XXX	ALIGNMENT SHEET

NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	NMS	6-30-20	JHR	JHR
A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	11-7-20	JHR	JHR

IF THE P.E. SEAL IS NOT VISIBLE, THIS DRAWING IS PRELIMINARY AND NOT AUTHORIZED FOR CONSTRUCTION

PROJECT CONSULTING SERVICES, INC.
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3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
(504) 833-5321 Fax (504) 833-4940
www.projectconsulting.com

DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE: FILE NAME:					

	BY	DATE
P.L./STA. NO. ACCOUNT NO.		
CONSTRUCTION YEAR		
DESIGN		
DRAWN	KMA	11-7-19
ASBUILT		
FILE NO.		
SCALE: 1"= 400'		

Appendix B3
Figure B3-2

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
CANAL CROSSING HDD
M.P. xx.xx
ORANGE COUNTY, TEXAS

PROJECT NO.

PREVIOUS DWG. NO.

SHEET 1 OF 1

DWG. NO.
HDD-02 B
SHEET 1 OF 1

07-07-20 11:25 7 NMS 19187_HDD-02.DWG

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN - 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
2) CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.
3) CONTRACTOR TO PROVIDE PILOT HOLE INFORMATION TO COMPANY FOR APPROVAL PRIOR TO COMMENCEMENT OF REAMING.
4) CONTRACTOR TO PROVIDE AS-BUILT DRAWING AND INFORMATION WITHIN 10 DAYS FROM BOREHOLE COMPLETION AND SHALL INCLUDE THE FOLLOWING AT A MINIMUM:
   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
5) REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT - TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

- CONTRACTORS' SITE SPECIFIC BORE PLAN AND PROFILE, SHOWING FOREIGN PIPELINES AND UTILITIES WITH FIELD VERIFIED ELEVATIONS, TOP OF BORE SEPARATION FROM UNDERGROUND UTILITIES, ROADS AND OTHER FEATURES, PLANNED MINIMUM DRILL RADIUS WITH PC AND PT POINTS
- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
- DRILLING FLUID AND POTENTIAL ADDITIVES (PROVIDE MSDS), AUTHORIZED DISPOSAL LOCATION (COMPANY TO APPROVE)
- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
2) ANY ON-LAND TRENCH DEWATERING TO BE DIRECTED TO WETLAND FILTER BAG AND/OR DEWATERING STRUCTURE IN AN UPLAND AREA TO MINIMIZE EROSION OF SEDIMENTATION TO WETLANDS/WATERBODIES.
3) PRE-CONSTRUCTION CONTOURS TO BE RE-ESTABLISHED FOR ALL DISTURBED AREAS. ALL DISTURBED AREAS TO BE RESTORED AND/OR REVEGETATED AS APPLICABLE.
4) EROSION/SEDIMENTATION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL RESTORATION AND REVEGETATION ARE DEEMED SUCCESSFUL.

LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	ISSUED FOR PERMIT	NMS	6-30-20	JHR	JHR
		B	FOR GEOTECHNICAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-20-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	12-17-19	JHR	JHR

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3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
(504) 833-5321 Fax (504) 833-4940
www.projectconsulting.com

DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE:					
	FILE NAME:					

P.L./STA. NO.
ACCOUNT NO.
CONSTRUCTION YEAR

	BY	DATE
DESIGN		
DRAWN	KMA	11-7-19
ASBUILT		

FILE NO.
SCALE: 1"= 200'

Appendix B3
Figure B3-3

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
TPWD HDD
M.P. 8.5
ORANGE COUNTY, TEXAS

PROJECT NO.
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO.
HDD-03
C
SHEET 1 OF 1

07-06-20 14:30 8 NMS 19187_HDD-03.DWG

PLAN
SCALE: 1"= 200'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

PROFILE
HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN – 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
2) CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.
3) CONTRACTOR TO PROVIDE PILOT HOLE INFORMATION TO COMPANY FOR APPROVAL PRIOR TO COMMENCEMENT OF REAMING.
4) CONTRACTOR TO PROVIDE AS-BUILT DRAWING AND INFORMATION WITHIN 10 DAYS FROM BOREHOLE COMPLETION AND SHALL INCLUDE THE FOLLOWING AT A MINIMUM:
   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
5) REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT – TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

- CONTRACTORS' SITE SPECIFIC BORE PLAN AND PROFILE, SHOWING FOREIGN PIPELINES AND UTILITIES WITH FIELD VERIFIED ELEVATIONS, TOP OF BORE SEPARATION FROM UNDERGROUND UTILITIES, ROADS AND OTHER FEATURES, PLANNED MINIMUM DRILL RADIUS WITH PC AND PT POINTS
- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
- DRILLING FLUID AND POTENTIAL ADDITIVES (PROVIDE MSDS), AUTHORIZED DISPOSAL LOCATION (COMPANY TO APPROVE)
- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
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LEGEND:

—+—+—	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⊣⊢⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	ISSUED FOR PERMIT	NMS	6-30-20	JHR	JHR
		B	FOR GEOTECHNICAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-20-20	JHR	JHR
MEH-P3-	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	12-17-19	JHR	JHR

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DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE:					
	FILE NAME:					

P.L./STA. NO.
ACCOUNT NO.
CONSTRUCTION YEAR

	BY	DATE
DESIGN		
DRAWN	KMA	11-7-19
ASBUILT		

FILE NO.
SCALE: 1"= 200'

Appendix B3
Figure B3-4

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
FOREIGN PIPELINE CORRIDOR HDD
M.P. 9.8
ORANGE COUNTY, TEXAS

PROJECT NO.
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO.
HDD-04
SHEET 1 OF 1
C

07-06-20 14:35 7 NMS 19187_HDD-04.DWG

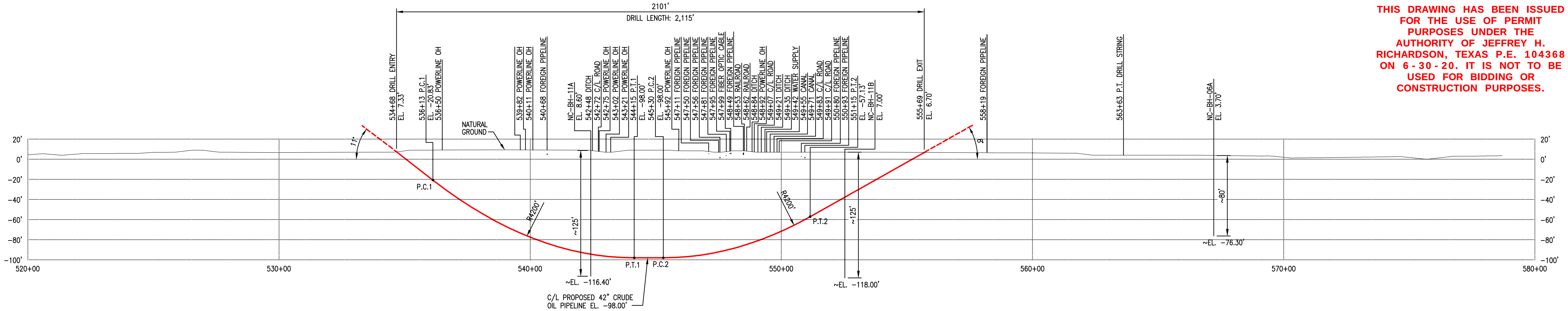
HORIZONTAL DATUM: UTM COORDINATE SYSTEM, ZONE 15, U.S. FEET
COORDINATES: NAD 83
VERTICAL DATUM: NAVD 88
IMAGE COPYRIGHT: MAP DATA GOOGLE, IMAGE GOOGLE, 2018

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.



PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN - 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
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   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
5) REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT - TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

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- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
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- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
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LEGEND:

─┼──┼─	PROPOSED PIPELINE
───	PERMANENT EASEMENT
───	TEMPORARY WORK SPACE
───	ADDITIONAL TEMPORARY WORK SPACE
─╫─╫─╫─	FOREIGN PIPELINE
── ─ ──	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	ISSUED FOR PERMIT	KMA	6-30-20	JHR	JHR
		B	FOR GEOTECHNICAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-20-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	NMS	2-19-20	JHR	JHR

IF THE P.E. SEAL IS NOT VISIBLE, THIS DRAWING IS PRELIMINARY AND NOT AUTHORIZED FOR CONSTRUCTION

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DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE: FILE NAME:					

	BY	DATE
P.L./STA. NO. ACCOUNT NO.		
CONSTRUCTION YEAR		
DESIGN		
DRAWN	KMA	2-18-20
ASBUILT		
FILE NO.		
SCALE: 1"= 200'		

Appendix B3
Figure B3-5

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
POWER PLANT RD & CANAL HDD
M.P. 10.5
ORANGE COUNTY, TEXAS

PROJECT NO.
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO.
HDD-5
C
SHEET 1 OF 1

HORIZONTAL DATUM: UTM COORDINATE SYSTEM, ZONE 15, U.S. FEET
COORDINATES: NAD 83
VERTICAL DATUM: NAVD 88
IMAGE COPYRIGHT: MAP DATA GOOGLE, IMAGE GOOGLE, 2018

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'

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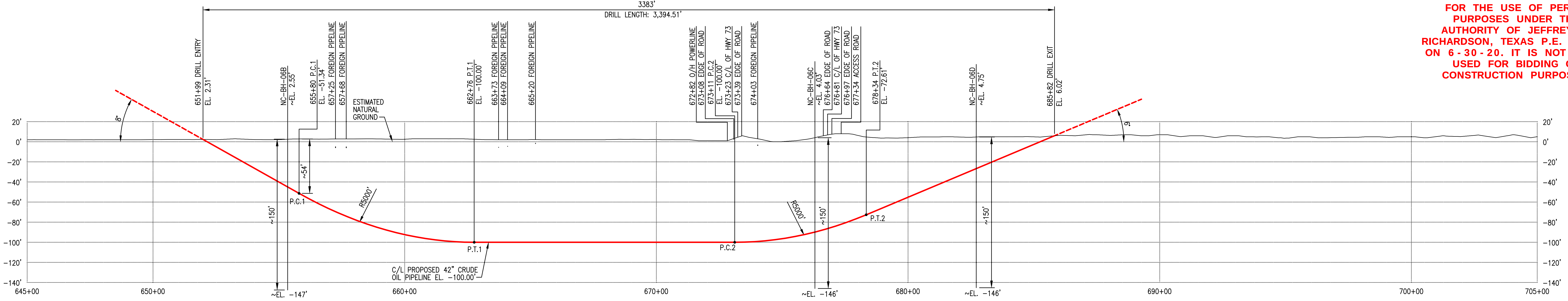

PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN – 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

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   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
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- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

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LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	ISSUED FOR PERMIT	NMS	6-30-20	JHR	JHR
		B	FOR GEOTECHNICAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-19-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	12-17-19	JHR	JHR

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DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
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CONSTR.						
CADDS	PLOT DATE:					
	FILE NAME:					

	BY	DATE
P.L./STA. NO. ACCOUNT NO.		
CONSTRUCTION YEAR		
DESIGN		
DRAWN	KMA	11-7-19
ASBUILT		
FILE NO.		
SCALE: 1"= 200'		

Appendix B3
Figure B3-6

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
HWY 73/87 CANAL HDD
M.P. 12.8
ORANGE COUNTY, TEXAS

PROJECT NO.

PREVIOUS DWG. NO.

SHEET 1 OF 1

DWG. NO.
HDD-06 C
SHEET 1 OF 1

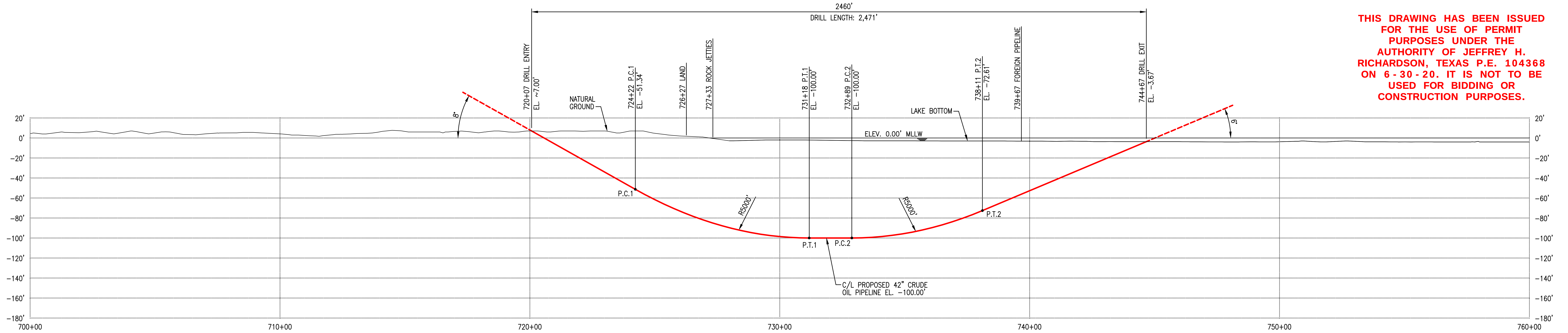
07-02-20 9:48 8 NMS 19187_HDD-06.DWG

HORIZONTAL DATUM: UTM COORDINATE SYSTEM, ZONE 15, U.S. FEET
COORDINATES: NAD 83
VERTICAL DATUM: NAVD 88
IMAGE COPYRIGHT: MAP DATA GOOGLE, IMAGE GOOGLE, 2018

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'



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PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
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HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN - 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

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LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
─┤├─┤├─	FOREIGN PIPELINE
—— – ——	GEOTECH ACCESS PATH
⊠	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION - DESCRIPTION	BY	DATE	CHK'D	APP'D
		B	ISSUED FOR PERMIT	KMA	6-30-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	6-16-20	JHR	JHR

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CONSTRUCTION YEAR

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DRAWN	KMA	6-16-20
ASBUILT		

FILE NO.
SCALE: 1"= 200'

Appendix B3
Figure B3-7

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
NORTH SABINE LAKE SHORE APPROACH
M.P. 13.5
ORANGE COUNTY, TEXAS

PROJECT NO.
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO.
HDD-07
B
SHEET 1 OF 1

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HORIZONTAL DATUM: UTM COORDINATE SYSTEM, ZONE 15, U.S. FEET
COORDINATES: NAD 83
VERTICAL DATUM: NAVD 88
IMAGE COPYRIGHT: MAP DATA GOOGLE, IMAGE GOOGLE, 2018

NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'

THIS DRAWING HAS BEEN ISSUED FOR THE USE OF PERMIT PURPOSES UNDER THE AUTHORITY OF JEFFREY H. RICHARDSON, TEXAS P.E. 104368 ON 6-30-20. IT IS NOT TO BE USED FOR BIDDING OR CONSTRUCTION PURPOSES.

PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

CARRIER PIPE: 42.000" O.D. X 0.875" W.T. X-70
A.P.I. 5L PSL 2, LSAW, W/ 14-16 MILS FBE AND 30 MILS ARO
HYDROSTATIC PRE-TEST PRESSURE: 1850 PSIG MIN – 2220 PSIG MAX
DESIGN PRESSURE: MAOP 1480 PSIG
DESIGN FACTOR: 0.507

GENERAL NOTES:

1) GRID PROJECTION BASED UPON UTM COORDINATE SYSTEM, ZONE 15 (GRID UNITS IN FEET) GEODETIC DATUM: NAD 1983, CENTRAL MERIDIAN.
2) CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.
3) CONTRACTOR TO PROVIDE PILOT HOLE INFORMATION TO COMPANY FOR APPROVAL PRIOR TO COMMENCEMENT OF REAMING.
4) CONTRACTOR TO PROVIDE AS-BUILT DRAWING AND INFORMATION WITHIN 10 DAYS FROM BOREHOLE COMPLETION AND SHALL INCLUDE THE FOLLOWING AT A MINIMUM:
   - CAD (2017 OR HIGHER) AND PDF FILE OF PIPING PLAN AND PROFILE
   - TABLE OF PILOT HOLE DATA USED TO CREATE PLAN AND PROFILE DRAWINGS
5) REFERENCE THE EUSTIS ENGINEERING L.L.C. GEOTECHNICAL REPORT FOR DETAILS, SOILS REPORT – TBD.

CONTRACTOR HDD PLAN NOTES:

CONTRACTOR'S PROPOSED HDD PLAN AND ANY OF ITS SUBCONTRACTORS, VENDORS, OR SUPPLIERS UTILIZED TO PERFORM HORIZONTAL DIRECTIONAL DRILLS SHALL BE SUBMITTED TO COMPANY FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO START OF DRILLING OPERATIONS. PLAN SHALL INCLUDE AT MINIMUM:

- CONTRACTORS' SITE SPECIFIC BORE PLAN AND PROFILE, SHOWING FOREIGN PIPELINES AND UTILITIES WITH FIELD VERIFIED ELEVATIONS, TOP OF BORE SEPARATION FROM UNDERGROUND UTILITIES, ROADS AND OTHER FEATURES, PLANNED MINIMUM DRILL RADIUS WITH PC AND PT POINTS
- CONTRACTORS EQUIPMENT AND SITE LAYOUT
- DRILLING PLAN AT A MINIMUM TO INCLUDE THE FOLLOWING: PILOT HOLE DRILL TOLERANCES, ANTICIPATED DOWN HOLE PRESSURE RANGE, EXPECTED PILOT AND REAMING PROCESS, EXPECTED PULL LOADS, SAFETY, GUIDANCE SYSTEM, CONTINGENCY PLANS, INADVERTENT RETURNS PLAN WITH NOTIFICATION PROCEDURES
- DRILLING FLUID AND POTENTIAL ADDITIVES (PROVIDE MSDS), AUTHORIZED DISPOSAL LOCATION (COMPANY TO APPROVE)
- BREAKOVER PROFILE WITH MINIMUM RADIUS, PIPE SUPPORT EQUIPMENT LOCATION WITH PIPE ELEVATION (COMPANY WILL EVALUATE PIPE STRESS) AND MAXIMUM ROLLER SPACING
- WATER SOURCE TO BE USED

ENVIRONMENTAL NOTES:

1) EROSION/SEDIMENT CONTROL STRUCTURES TO BE INSTALLED AND MAINTAINED TO MINIMIZE IMPACTS TO WETLANDS OR WATERBODIES.
2) ANY ON-LAND TRENCH DEWATERING TO BE DIRECTED TO WETLAND FILTER BAG AND/OR DEWATERING STRUCTURE IN AN UPLAND AREA TO MINIMIZE EROSION OF SEDIMENTATION TO WETLANDS/WATERBODIES.
3) PRE-CONSTRUCTION CONTOURS TO BE RE-ESTABLISHED FOR ALL DISTURBED AREAS. ALL DISTURBED AREAS TO BE RESTORED AND/OR REVEGETATED AS APPLICABLE.
4) EROSION/SEDIMENTATION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL RESTORATION AND REVEGETATION ARE DEEMED SUCCESSFUL.

LEGEND:

🟥	PROPOSED PIPELINE
🟨	PERMANENT EASEMENT
🟧	TEMPORARY WORK SPACE
🟪	ADDITIONAL TEMPORARY WORK SPACE
⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
⊗	GEOTECH CORE

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
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		B	FOR GEOTECHNICAL CORE ACQUISITION, NOT FOR CONSTRUCTION	NMS	2-19-20	JHR	JHR
XXX	ALIGNMENT SHEET	A	PRELIMINARY, NOT FOR CONSTRUCTION	KMA	12-23-19	JHR	JHR

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	FILE NAME:					

P.L./STA. NO. ACCOUNT NO.		
CONSTRUCTION YEAR		
	BY	DATE
DESIGN		
DRAWN	KMA	11-7-19
ASBUILT		
FILE NO.		
SCALE: 1"= 200'		

Appendix B3
Figure B3-8

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
ICWW HDD
M.P. 15.5
ORANGE COUNTY, TEXAS

PROJECT NO.

PREVIOUS DWG. NO.

SHEET 1 OF 1

DWG. NO.
HDD-08
C
SHEET 1 OF 1

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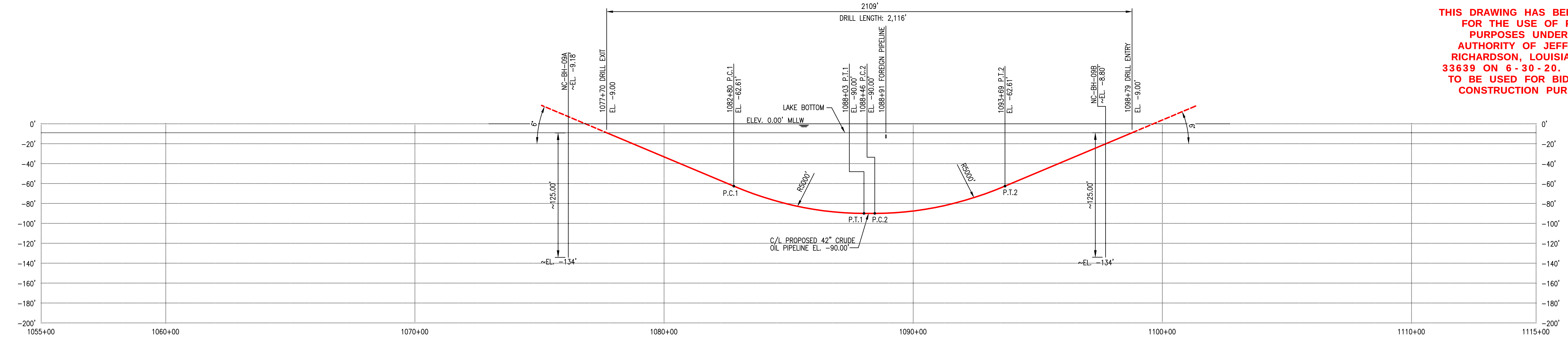
NOTE: CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL FOREIGN PIPELINE & CABLE CROSSINGS AND COVER PRIOR TO CONSTRUCTION.

PLAN

SCALE: 1"= 200'



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PROFILE

HORIZONTAL SCALE: 1"= 200'
VERTICAL SCALE: 1"= 50'

SPECIFICATIONS:

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⊣⊢	FOREIGN PIPELINE
— – —	GEOTECH ACCESS PATH
▲	GEOTECH CORE

		C	ISSUED FOR PERMIT	NMS	6-30-20	JHR	JHR
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FILE NO.		
SCALE: 1"= 200'		

Appendix B3
Figure B3-9

BLUE MARLIN OFFSHORE PORT PROJECT
42" CRUDE OIL PIPELINE
LAKE PIPELINE CROSSING HDD
M.P. 20.6
CAMERON, LOUISIANA

PROJECT NO.

PREVIOUS DWG. NO.

SHEET 1 OF 1

DWG. NO.
HDD-09
C
SHEET 1 OF 1

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APPENDIX J –
DRAFT COMPENSATORY MITIGATION PLAN

Blue Marlin Offshore Port (BMOP) Project

DRAFT Compensatory Mitigation Plan
(Joint Permit Application-####)

Submitted by:

Blue Marlin Offshore Port LLC
8111 Westchester Drive
Suite 600
Dallas, Texas 75225

September 2020

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
Applicant	Blue Marlin Offshore Port LLC
BMOP	Blue Marlin Offshore Port
BMPs	best management practices
BSM	brackish saline marsh
CFR	Code of Federal Register
CMP	Compensatory Mitigation Plan
CWA	Clean Water Act
CZ	Coastal Zone
DWP	Deepwater Port
E2EM	estuarine intertidal emergent
FEMA	Federal Emergency Management Agency
FCU	Functional Credit Unit
GCMB	Delta Land Services/ Ecosystem Investment Partners Graham Creek Mitigation Bank
HDD	horizontal direction drill
HGM	Hydrogeomorphic Approach to Assessing Wetland Functions
HUC	Hydrologic Unit Code
iHGM	Interim HGM
ILF	in-lieu fee
LDNR	Louisiana Department of Natural Resources
MP	milepost
NT	Nederland Terminal
PEM	palustrine emergent
PFO	palustrine forested
Project	Blue Marlin Offshore Port Project
PSS	palustrine scrub-shrub
ROW	right-of-way
SWG	Galveston District
U.S.	United States
USACE	U.S. Army Corp of Engineers
WPMB	Wildwood – Pineywoods Mitigation Bank
WSMB	Wildwood – Seabreeze Mitigation Bank

1.0 PROJECT INFORMATION

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico to provide crude oil transportation and loading services for crude oil produced in the continental United States (U.S.). The Project will consist of both onshore supply components and water dependent offshore/marine components, as depicted in **Figure 1**. Oil for export will be transported via pipeline from the existing Sunoco Partners Marketing and Terminals, L.P., a terminal and storage facility in Jefferson County, Texas referred to as the Nederland Terminal (NT). This terminal is connected to production from across the U.S. The Deepwater Port (DWP) will be approximately 99 statute miles off the coast of Cameron Parish, Louisiana, within approximate water depth of 162 feet. Crude oil will be routed from storage via pumps at the NT, through a new 37.02 mile, 42-inch outer diameter onshore pipeline to the existing Stingray Mainline at Station 501, and from there through the existing Stingray Mainline to the DWP. A Project overview map of the onshore Project components is provided in **Figure 1**.

The Project crosses both the U.S. Army Corps of Engineers (USACE) Galveston District and the New Orleans District as shown in **Figure 1**. The onshore pipeline and associated facilities from milepost (MP) 0.0 to 34.03 are located within the Galveston District and remaining portion of the onshore pipeline and associated facilities (MP 34.03 to 37.02) and the existing pipeline system to the DWP is located within the USACE New Orleans District.

The construction of the onshore pipeline will result in both temporary and permanent impacts to waters of the U.S. Impacts to waters of the U.S. that fall under the jurisdiction of Section 404 of the CWA only apply to impacts associated with the installation of the onshore pipeline and its associated facilities. The construction of the offshore portion of the Project (i.e., the DWP and its associated facilities) will not result in any impacts to waters of the U.S. Impacts to waters of the U.S. due to the construction of the onshore pipeline fall under the jurisdiction of both the Galveston and New Orleans District. The Applicant has prepared this Draft Compensatory Mitigation Plan (CMP) to offset the unavoidable permanent impacts to water of the U.S. from the construction of the onshore pipeline.

The purpose of this Draft CMP is to offset 2.21 acres of unavoidable, permanent loss of wetlands and permanent functional conversion of 5.54 acres of palustrine forested (PFO) wetlands to palustrine emergent (PEM) wetlands.

The permanent wetland disturbances associated with the onshore pipeline will occur within the Lower Neches Watershed (Hydrologic Unit Code [HUC] 12020003) in Jefferson and Orange County, Texas, Sabine Lake Watershed in Orange County, Texas and in the Lower Calcasieu Watershed (HUC 08080206) in Cameron Parish, Louisiana.

In order to compensate for the wetland loss, the Applicant proposes the following:

- Purchase of credits from the Louisiana Department of Natural Resources (LDNR) Office of Coastal Management’s in-lieu fee program (ILF) to offset impacts to estuarine intertidal emergent (E2EM) wetlands;
- Purchase of credits from Wildwood – Pineywoods Mitigation Bank (WPMB) and from Wildwood – Seabreeze Mitigation Bank (WSMB) to offset impacts to PEM wetlands. The onshore pipeline’s impacts to PEM wetlands are within the secondary service area of the WPMB and the secondary service area of the WSMB; and

- Purchase of credits from the Delta Land Services/EIP Graham Creek Mitigation Bank (GCMB) to offset impacts to PFO wetlands. The onshore pipeline's impacts to PFO wetlands are within the primary service area of the GCMB.

FIGURE 1 BMOP Project Overview Map

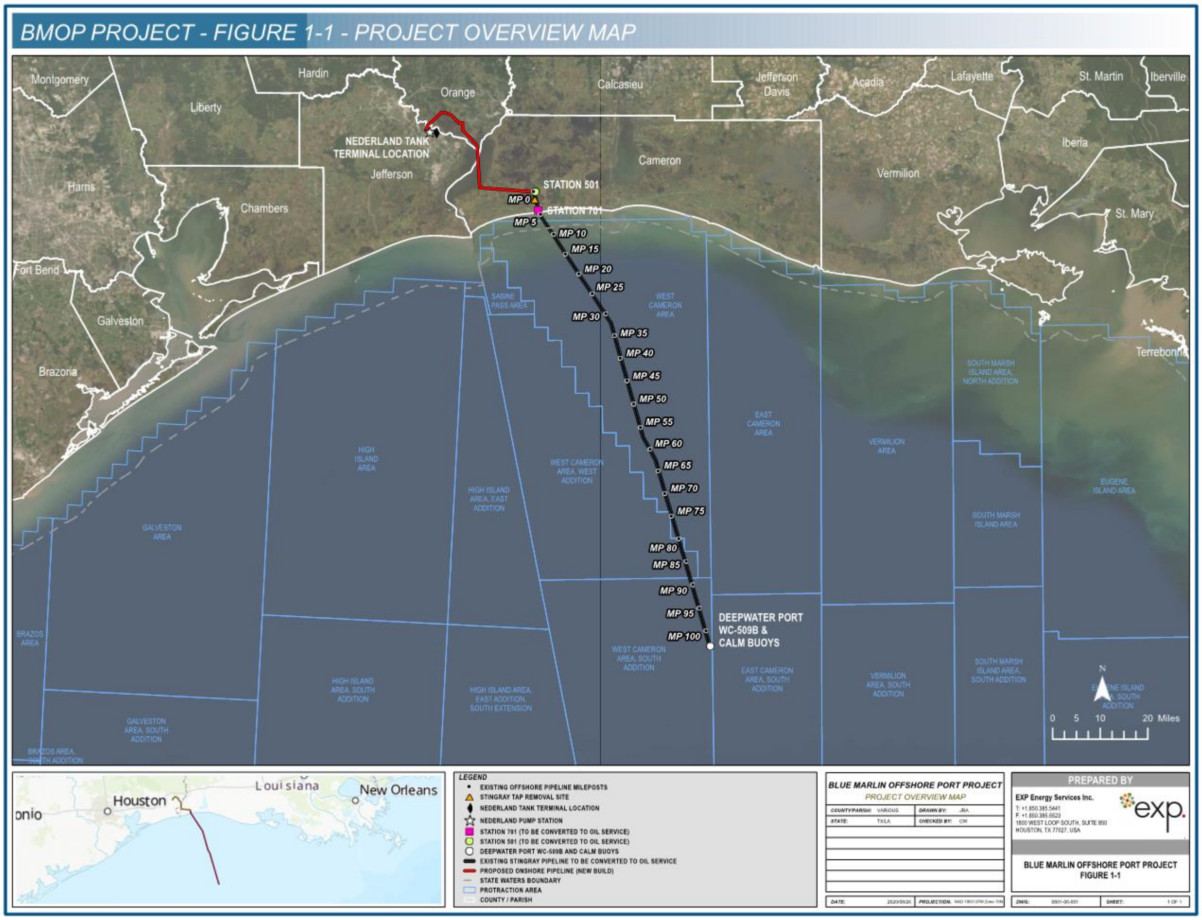
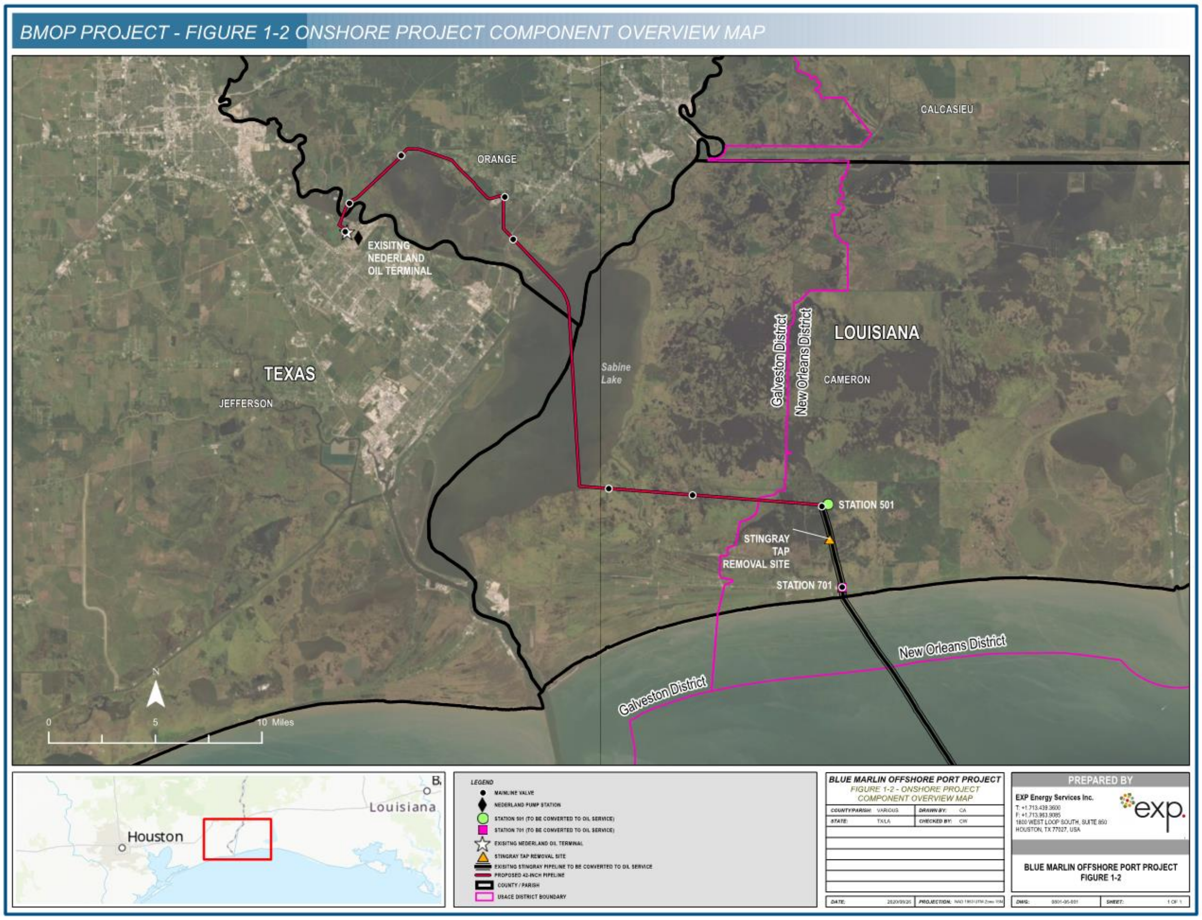


FIGURE 2 Onshore Pipeline Project



2.0 AVOIDANCE AND MINIMIZATION

In the development of the onshore pipeline route, the Applicant integrated the following designs to minimize and avoid potential impacts to wetlands and waterbodies:

- Minimized the footprint by using the existing NT site for the construction of the BMOP Pump Station;
- Conversion of existing facilities (Stingray Mainline, Station 501, and Station 701) to minimize footprint of new disturbance;
- Collocated the onshore pipeline to the extent possible (approximately 30 percent) with existing right-of-way (ROW) to minimize impacts on vegetation communities during construction;
- Conversion of the approximate 103.4 miles of Stingray Mainline from natural gas to oil service will minimize impacts to onshore and offshore communities;
- Crossed sensitive environmental land (i.e., Lower Neches Wildlife Management Area, Nelda Stark Unit) and wetlands and waterbodies (i.e., Neches River) by using the horizontal directional drill (HDD) construction method. See **Table 1** for list of the nine proposed HDD crossings. The HDD crossings will avoid impacts to 10.6 acres of wetlands and 2.7 acres of waterbodies;
- Use “push/pull” or “float” techniques to place the pipe in the trench where water and other site conditions allow; and
- Use of existing roads and canals for Project access during construction.

To minimize and avoid potential impacts to wetlands and waterbodies during construction, the Applicant will adhere to measures in the Onshore Construction Best Management Practices (BMPs) Plan (Onshore Construction BMP Plan [Appendix B of the Project’s Joint Permit Application]), Revegetation Plan (Appendix C-2 of Volume IIb of the Project’s DWP Application), Spill Prevention and Response Plan (SPAR Plan [Appendix C-3 of Volume IIb of the Project’s DWP Application]), and HDD Contingency Plan (Appendix C-5 of Volume IIb of the Project’s DWP Application). During construction, the following BMPs will be implemented to minimize and avoid impacts to wetlands and waterbodies:

- Minimized the footprint of the proposed work activities and the duration of disturbances to the extent practicable to reduce impacts on wildlife resources and habitat;
- Equipment on the construction ROW will be minimized and, when used, would be of the type having the least environmental impact in saturated ground conditions. This equipment includes mats, marsh buggies, airboats, amphibious equipment, tracked equipment, and barges. The contractor will use discretion in choosing the equipment that would create the least ground pressure and disturbance for the specific application;
- Additional temporary workspace (ATWS) areas are to be limited to the minimum needed to construct wetland and waterbody crossings;
- Installation and maintenance of erosion and sediment controls during construction in accordance with the Onshore Construction BMP Plan; and
- Wetland and waterbody buffers (e.g., extra work area setbacks, refueling restrictions) are to be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

During and after construction, erosion and sediment control measures will be installed and maintained until stabilization/revegetation of the Project. Temporary equipment or materials installed to provide access (e.g., timber mats or timber rip-rap) will be removed from wetlands and waterbodies at the completion of construction. Disturbances associated with temporary equipment access methods will be restored and stabilized after the bridging equipment and access materials are removed. Wetlands and waterbodies that are temporarily disturbed by construction will be restored to pre-construction conditions in accordance with the Onshore Construction BMP Plan and Revegetation Plan.

TABLE 1
List of HDD Crossings to Minimize Impacts to Waters of the U.S.

HDD ID Number	Start MP – End MP	Approximate Length (feet)	Feature Crossed[a]
HDD-01	1.60 – 1.25	3,457	Neches River
HDD-02	2.50 – 2.89	2,052	Foreign Pipelines and Canal
HDD-03	8.17 – 8.81	3,394	TPWD Lower Neches WMA Nelda Stark Unit
HDD-04	9.43 – 9.86	2,272	Foreign Pipeline
HDD-05	10.13 – 10.52	2,101	Gulf State Utilities Road, Powerhouse Road and Canal
HDD-06	12.35 – 12.99	3,384	SH 73/87
HDD-07	13.64 – 14.10	2,460	Sabine Lake North Shoreline
HDD-08	14.85 – 15.75	4,766	Gulf Intracoastal Waterway
HDD-09	20.41 – 20.81	2,109	Pipeline Crossing in Sabine Lake

Key:
HDD – horizontal direction drill
MP – milepost
SH – Texas State Highway
TPWD – Texas Parks and Wildlife Department
WMA – Wildlife Management Area

Notes:
[a] Waters of the U.S. will be avoided by all HDD crossing

3.0 COMPENSATORY MITIGATION PLAN

This Draft CMP has been prepared in accordance with the Compensatory Mitigation for Losses of Aquatic Resources, Final Rule issued on April 10, 2008 as detailed in 33 Code of Federal Register (CFR) § 332.4 (c) of the Federal Register (Volume 73, Number 70) in order to provide appropriate mitigation for permanent wetland loss associated with construction of the onshore pipeline. Being that the Applicant intends to meet their mitigation obligations by securing credits from the approved LDNR ILF, WPMB, WSMB, and GCMB, this mitigation plan is required to include the following two components:

1. Baseline information as per 33 CFR § 332.4(c)(5); and
2. Determination of credits as per 33 CFR § 332.4(c)(6).

3.1 BASELINE INFORMATION

> *A description of the ecological characteristics of the proposed compensatory mitigation project site and, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other site characteristics appropriate to the type of resource proposed as compensation. The baseline information should also include a delineation of waters of the United States on the proposed compensatory mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site, not the mitigation bank or in-lieu fee project site. See 33 CFR § 332.4(5).*

To identify the waters of the U.S. within the onshore pipeline footprint, the Applicant conducted field surveys of wetlands and waterbodies within the entire onshore pipeline project area, including those areas on the existing Stingray Mainline between existing Stations 501 and 701, during March, May, and June of 2020. Field delineations followed guidelines from the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region (Version 2.0). During the surveys, an approximate 300-foot survey corridor centered along the proposed pipeline centerline (150 feet from each side of the centerline) was evaluated in March, May, and June of 2020. In addition, the entire footprint of the proposed workspace for the existing and proposed stations, and access roads which require improvement was surveyed. The wetland delineation report is provided in Appendix A of the Applicant's Joint Permit Application for Work within Louisiana Coastal Zone for the Project.

The proposed pipeline route is located on a variety of habitats including existing utility ROW, estuarine marsh, and portions of Sabine Lake. The general drainage of the area is to the south and west. Many natural drainage laterals which facilitate drainage of surface water are present throughout the proposed route. Several significant waterbody crossings are located along the ROW, including the Neches River and Sabine Lake. Portions of the survey area are located within the Federal Emergency Management Agency (FEMA) 100-year floodplain. According to FEMA National Flood Insurance Rate Maps (https://msc.fema.gov/portal/home), the majority of the onshore pipeline (approximately 30 miles) and all mainline valves are located within the 100-year flood zone. Approximately 3.8 miles of the northern portion of the pipeline route in Orange County, Texas is located within areas within or outside of the 500-year flood zone. The BMOP Pump Station, Station 501, Station 701, and the Stingray Tap Removal site are located within the 100-year flood zone. Aerial photography indicates that the western portions of the survey area, located in Jefferson and Orange counties, have been cleared in the past and are utilized as an existing pipeline right-of-way and maintained through periodic mowing. The eastern portion of the line in Cameron Parish is composed of primarily open marsh habitat. **Table 2** provides a summary of the wetlands impacted by the construction of the onshore pipeline.

TABLE 2
Summary of Wetlands Impacted by the Onshore Pipeline

Project Component	**Acreage of Habitat Type Impacted**			
	Brackish Saline Marsh (E2EM)	**PEM**	**PSS**	**PFO**
Pipeline ROW[a]	150.14	58.16	0.23[e]	16.46[f,g]
Staging Areas[b]	0.00	2.55	0.00	0.18
Mainline Valves[c]	0.09	0.30	0.00	0.00
BMOP Pump Station[d]	0.00	0.00	0.00	0.00
Station 501[c]	2.31	0.00	0.00	0.00
Station 701[b]	1.36	0.00	0.00	0.00
Stingray Tap Removal[b]	1.92	0.00	0.00	0.00
Access roads[c]	0.00	0.38	0.00	0.00
Project Total	**155.82**	**61.39**	**0.23**	**16.63**
Galveston District Total	**120.22**	**61.39**	**0.23**	**16.63**
New Orleans District Total	**35.6**	**0**	**0**	**0**

Key:
E2EM - estuarine intertidal emergent
PEM - palustrine emergent
PSS - palustrine scrub-shrub
PFO - palustrine forested
ROW - right-of-way

Notes:

[a] Pipeline ROW impacts include both construction and operational impacts. All impacts are temporary except for the permanent functional conversion of the PFO wetlands.

[b] All impacts are temporary.

[c] Impacts include temporary and permanent.

[d] The BMOP Pump Station site is proposed to be developed as part of the NT Buildout Project, which is anticipated to commence in January 2021, prior to construction of the BMOP Project. Therefore, the site will consist of developed land and will not result in wetland impacts.

[e] All impacts to PSS wetlands are temporary.

[f] The maintenance of the permanent ROW will result in the permanent function conversion of 5.54 acres of PFO wetlands to PEM wetlands.

[g] 0.18 acres of PFO wetlands within the staging area will be avoided during construction.

Table 3 identifies the dominant wetland habitat and vegetation recorded in the impacted wetlands listed in **Table 4**.

TABLE 3
Characteristics of Wetlands Permanently Impacted by the Construction of the Onshore Pipeline

Habitat Type	Wetland Code	Description
Brackish saline marsh	E2EM	Estuarine emergent wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens that are present for most growing season in most years. These plants may be temporarily to permanently flooded at the base but do not tolerate prolonged inundation of the entire plant. **Dominant vegetation**: common reed (*Phragmites australis*)
Palustrine emergent wetland	PEM	Palustrine emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except those irregularly exposed. In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance year after year. **Dominant vegetation**: common rush (*Juncus effuses*), green flatsedge (*Cyperus virens*), sand spikerush (*Eleocharis montevidensis*), broadleaf cattail (*Typha latifolia*), common cutgrass (*Leersia hexandra*), narrowleaf cattail (*Typha angustifolia*), gulf cordgrass (*Spartina spartinae*), common reed
Palustrine forested wetland	PFO	Forested wetlands are characterized by woody vegetation that is 6 meters tall or taller. Forested wetlands are most common in the eastern U.S. and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. Forested wetlands normally possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. **Dominant vegetation:** alligator weed (*Alternanthera philoxeroides*), sand spikerush, Chinese tallow (*Triadica sebifera*), black willow (*Salix nigra*), sweet gum (*Liquidambar styraciflua*), sender woodoats (*Chasmanthium laxum*)

As shown in **Table 4**, the onshore pipeline will result in the unavoidable, permanent loss to 0.59 acres of PEM wetlands and 1.62 acres of E2EM wetlands for a total of 2.21 acres.

The construction of the onshore pipeline will result in impacts to 16.64 acres of PFO wetlands and 0.23 acres of palustrine scrub-shrub (PSS) wetlands. For impacts to PFO wetlands along the pipeline construction ROW, 10.92 acres of the impacted PFO wetlands will occur in the temporary workspace and 5.54 acres of impact will occur within the permanent ROW. The 10.92 acres of PFO wetlands within the temporary ROW will be allowed to revegetate to pre-construction conditions following construction and restoration. Due to maintenance and safety requirements for the permanent ROW, construction of the onshore pipeline will result in the permanent functional conversion of the 5.54 acres of PFO wetlands to PEM wetlands (**Table 4**). The remaining 0.18 acre of impacts to PFO wetlands is due to construction of a staging area. The Applicant will design the staging area, so that this 0.18 acres of PFO will be avoided. The 0.23 acres of PSS is located in the TWS and ATWS. Following construction activities, all TWS and ATWS will be allowed to revegetate to pre-construction conditions. The dominant woody species within PSS wetlands (Wetland H-10) is Chinese tallow (*Triadica sebifera*), an invasive tree species.

TABLE 4 Wetland Impacts Requiring Mitigation due to the Construction of the Onshore Pipeline for the Project							
Wetland ID	**Wetland Type**	**Milepost**	**Project Component**	**USACE District**	**County/Parish, State**	**Permanent Loss (Acres)**	**Permanent Functional Conversion (acres)**
WP1001 _PFO_L	PFO	0.53 – 0.54	Permanent ROW	Galveston	Jefferson County, TX	–	0.018
WP1001 _PFO_M	PFO	0.60	Permanent ROW	Galveston	Jefferson County, TX	–	0.025
H-007	PFO	1.32 – 1.36	Permanent ROW	Galveston	Orange County, TX	–	0.424
H-008	PEM	1.65-168	MLV-1 and PAR-03	Galveston	Orange County, TX	0.091	–
H-011	PFO	3.98	Permanent ROW	Galveston	Orange County, TX	–	0.308
H-014	PFO	4.08	Permanent ROW	Galveston	Orange County, TX	–	0.035
H-015	PFO	4.16	Permanent ROW	Galveston	Orange County, TX	–	0.272
H-018	PFO	4.35	Permanent ROW	Galveston	Orange County, TX	–	0.179
H-022	PFO	4.60	Permanent ROW	Galveston	Orange County, TX	–	0.055
H-025	PEM	4.97-4.98	MLV-2 and PAR-	Galveston	Orange County, TX	0.136	–
H-028	PFO	5.01	Permanent ROW	Galveston	Orange County, TX	–	0.125
H-030	PFO	5.17	Permanent ROW	Galveston	Orange County, TX	–	0.556
H-034	PFO	5.45	Permanent ROW	Galveston	Orange County, TX	–	0.211
H-037	PFO	5.77	Permanent ROW	Galveston	Orange County, TX	–	0.115
H-040	PFO	5.83	Permanent ROW	Galveston	Orange County, TX	–	0.400
H-044	PFO	6.11	Permanent ROW	Galveston	Orange County, TX	–	0.044
H-051	PFO	7.10	Permanent ROW	Galveston	Orange County, TX	–	0.460
H-062	PFO	8.85	Permanent ROW	Galveston	Orange County, TX	–	0.785
H-065	PFO	9.19	Permanent ROW	Galveston	Orange County, TX	–	0.155
H-066	PFO	9.27	Permanent ROW	Galveston	Orange County, TX	–	0.370
H-094	PFO	10.57	Permanent ROW	Galveston	Orange County, TX	–	0.666
H-096	PFO	10.72	Permanent ROW	Galveston	Orange County, TX	–	0.060
H-101	PEM	10.76	PAR-13	Galveston	Orange County, TX	0.019	–
H-102	PFO	10.81	Permanent ROW	Galveston	Orange County, TX	–	0.008

TABLE 4
Wetland Impacts Requiring Mitigation due to the Construction of the Onshore Pipeline for the Project

Wetland ID	Wetland Type	Milepost	Project Component	USACE District	County/Parish, State	Permanent Loss (Acres)	Permanent Functional Conversion (acres)
H-107	PFO	11.26	Permanent ROW	Galveston	Orange County, TX	–	0.262
H-112	PEM	12.84-13.01	MLV-4 and PAR-15	Galveston	Orange County, TX	0.334	–
H-126	E2EM	37.01	Station 501	New Orleans	Cameron Parish, LA	1.62	–
					Onshore Pipeline Total	**2.21**	**5.54**

Key:
E2EM – estuarine intertidal emergent
LA – Louisiana
MLV – mainline valve
PAR – permanent access road
PEM – palustrine emergent
PFO – palustrine forested
TX - Texas

3.2 DETERMINATION OF CREDITS

A description of the number of credits to be provided, including a brief explanation of the rationale for this determination. For permittee-responsible mitigation, this should include an explanation of how the compensatory mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity. See 33 CFR § 332.3(f) and 33 CFR § 332.4(6).

In response to compensatory mitigation regulations requiring project proponents to assess the function and value of disturbed areas, the USACE Galveston District circulated guidance in its September 11, 2008 Standard Operating Procedure adopting the Hydrogeomorphic Approach for Assessing Wetland Functions (HGM) as the primary method to evaluate the function and value of various wetland habitats anticipated to be disturbed (e.g., dredged or filled).

The HGM approach allows for the classification of wetlands based on the functions related to hydrologic, biologic and chemical processes, and habitat present. The HGMs utilized during this study are wetland habitat specific and were performed for each wetland habitat type with the potential to be lost. To determine potential mitigation requirements for PEM habitat, the Galveston District (SWG) Herbaceous and Shrub Interim HGM (iHGM) was utilized, and for PFO habitats, the SWG Riverine Forested iHGM was utilized.

As shown in **Table 5** and **Table 6**, a total of 2.4 functional credit units (FCUs) are required to offset the disturbed PEM habitat based on HGM results and 16.5 FCUs are required to offset the disturbed PFO habitats. The estimated cost for the purchase of credits to offsets the impacts to PFO habitat is $544,500 ($33,000 x 16.5 FCUs).

TABLE 5
BMOP Project SWG PEM Mitigation Needs

Hydrologic Unit Code	Mitigation Bank	USACE District	Service Area	Acreage	iHGM Chemical [a]	iHGM Biological [a]	iHGM Physical [a]

12020003 (Lower Neches)	Wildwood - Pineywoods	CESWG	Secondary	0.055	0.1	0.1	0.1
12040201 (Sabine Lake)	Wildwood – Seabreeze or Delta PRM	CESWG	Secondary	0.535	0.7	0.7	0.7

Key:
CESWG – Corps of Engineers Southwest Galveston District

Note:
[a] iHGM function requirements are estimated based on acreage impacts

TABLE 6
BMOP Project Forested Mitigation Needs

Hydrologic Unit Code	Mitigation Bank	USACE District	Service Area	iHGM Chemical [a]	iHGM Biological [a]	iHGM Physical [a]
12020003 (Lower Neches)	Delta Land Services/Ecosystem Investment Partners Graham Creek Mitigation Bank	CESWG	Primary	4.1	8.3	4.1

Key:
CESWG – Corps of Engineers Southwest Galveston District

Note:
[a] iHGM function requirements are estimated based on acreage impacts

Louisiana in-lieu fee Statement

The construction of the onshore pipeline will permanently impact 1.62 acres of E2EM/brackish saline marsh (BSM) within the USACE New Orleans District and the Louisiana Coastal Zone (CZ). The impacts occur within the Chenier Plain of the CZ. Currently, there are no publicly available approved mitigation banks in the CZ that provide BSM offset. Rockefeller Refuge (U.S. Fish and Wildlife Service) is an approved bank with BSM; however, Rockefeller has traditionally only offered credits for impacts that occur on the refuge. According to the 2008 Mitigation Rule and approved mitigation options within the CZ, the next preference would be purchase from an approved in lieu fee program (ILF). The Louisiana Department of Natural Resources (LDNR) Office of Coastal Management operates an ILF program within the CZ. The Applicant proposes to offset the 1.62 acres of BSM impact through a purchase of credits from LDNR's ILF. The estimated cost for the purchase of credits from LDNR ILF is $340,200 (estimated $70,000/acre x 4.86 acres (3:1 ratio)).

4.0 FINANCIAL ASSURANCES

Prior to issuance of a permit from the USACE and after finalizing this Draft CMP, the Applicant will purchase the necessary credits from WPMB, WSMB, and GCMB. The Applicant has had initial conversations with the owners of these mitigation banks and currently there are available credits for purchase to offset the unavoidable impacts. The Applicant will secure an official quote and purchase agreement from the banks prior to issuance of the final CMP for the Project.

APPENDIX C-1

408 SWG-RE FORM 701a

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From: Michael Aubele

Sent: Monday, September 28, 2020 3:56 PM

To: mvn-re@usace.army.mil; swg-re@usace.army.mil

Cc: Jason Zoller <Jason.Zoller@exp.com>; Minter, Justin D <justin.minter@energytransfer.com>; robert.rose@energytransfer.com

Subject: Blue Marlin Offshore Port LLC - Multipurpose Application for Real Estate and Section 408 Alterations

Please find the attached Form SWG-RE-701i for Blue Marlin Offshore Port LLC (the Applicant's) proposed Blue Marlin Offshore Port (BMOP) Project in Federal Waters offshore from Louisiana. The Applicant is proposing to develop the Project in the Gulf of Mexico to provide crude oil transportation and loading services for crude oil produced in the continental US. The Project will consist of both onshore supply components and water dependent offshore/marine components. Oil for export will be transported via pipeline from the existing Sunoco Partners Marketing and Terminals, L.P., a terminal and storage facility in Jefferson County, Texas. The Deepwater Port will be located in federal waters off the coast of Cameron Parish, Louisiana, within approximate water depth of 162 feet. Crude oil will be routed from Nederland through a new 37.02 mile, 42-inch onshore pipeline to the existing Stingray Mainline at Station 501 in Cameron Parish, Louisiana, and from there through the existing Stingray Mainline to the Deepwater Port.

The Applicant has been in communication with the USACE Regulatory and Real Estate branches for both Galveston and New Orleans Districts. An application was submitted pursuant to Section 404/10 through the Louisiana Department of Natural Resources on 24 September 2020 for both Districts. The Applicant is currently aware of two federal channel crossings along the proposed 37.02 mile, 42-inch onshore pipeline (Neches River and Gulf Intercoastal Waterway). With this application, the Applicant is requesting the USACE review for federal interest and real estate along the entire Project. Additional information included with this submittal: 1) SWG-RE-701i form, 2) W-9, 3) Articles of Incorporation, and 4) GIS shapefiles and KMZ for the Project.

Should you have any questions with regard to this submittal, please contact me at 713.985.9914 or by email.

Thanks,

Michael C. Aubele

EXP | Vice President, Environmental and Regulatory

m : +1.713.985.9914 | e : Mike.Aubele@exp.com

1800 West Loop South

Suite 850

Houston, TX 77027 USA

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MULTI-PURPOSE APPLICATION

Real Estate Outgrants & Civil Works Project Alteration (section 408)
For use of this form, see SWG-RE 701i

PART I - BUSINESS/COMPANY APPLICANT INFORMATION

1a. BUSINESS/COMPANY NAME Blue Marlin Offshore Port LLC		1b. CAGE CODE (sam.gov)	
1c. LAST NAME (SIGNATORY FOR APPLICANT) Rose	FIRST NAME Robert	M.I.	
1d. TITLE VP ROW & Land	1e. E-MAIL Robert.Rose@energytransfer.com	1f. PHONE 713.989.2864	
1g. PHYSICAL ADDRESS 1300 Main Street	1h. CITY Houston	1i. STATE Texas	1j. ZIP CODE 77002
1k. MAILING ADDRESS 1300 Main Street	1l. CITY Houston	1m. STATE Texas	1n. ZIP CODE 77002

PART II - AGENT INFORMATION (IF APPLICABLE)

2a. BUSINESS/COMPANY NAME EXP Energy Services, Inc			
2b. LAST NAME (AGENT) Aubele	FIRST NAME Michael	M.I.	
2c. TITLE VP, Environment and Regulatory	2d. E-MAIL mike.aubele@exp.com	2e. PHONE 713.439.3648	
2f. ADDRESS 1800 West Loop South, Suite 850	2g. CITY Houston	2h STATE Texas	2i. ZIP CODE 77027

PART III - LEGAL OFFICER / CERTIFYING OFFICER INFORMATION

(For dredging must be an attorney, for all others must be corporate officer)

3a. LAST NAME Malott	FIRST NAME James	M.I.	
3b. TITLE EVP - Business Dev. Crude Oil	3c. E-MAIL James.Malott@energytransfer.com	3d. PHONE 713.989.4371	
3e. ADDRESS 1300 Main Street	3f. CITY Houston	3g. STATE Texas	3h. ZIP CODE 77002

PART IV – FINANCIAL CONTACT

4a. LAST NAME Whitfield	FIRST NAME Gina	M.I.	
4b.TITLE Director- Bus. Development	4c. E-MAIL Gina.Whitfield@energytransfer.com	4d. PHONE 713.989.6260	
4e. ADDRESS 1300 Main Street	4f. CITY Houston	4g. STATE Texas	4h. ZIP CODE 77002

PART V - PERMITTING

5a. Do you hold a current authorizing Regulatory document (i.e., Section 404, Section 10, Nationwide Permit(s) or Letter of Permission) for the requested activity? If "Yes", ATTACH COPIES of all permits and amendments.	Yes ☐	No ☑
5b. Have you applied for a regulatory permit for this action? If "Yes" include permit # in box 5c	Yes ☐ No ☑	5c. SWG-________-______________

PART VI - PROJECT DESCRIPTION

6a. TYPE (check all that apply) Dredging ☐ Pipeline ☑ Other Construction ☐ None of these ☐	6b. DREDGING New work ☐ Maintenance ☐ Estimated c.y.	6c. PIPELINE New work ☑ Replacement ☑ Crossing federal channel? Yes ☑ No ☐	6d. GIS/GOOGLE EARTH Include both GIS shape files (.shp) and Google file (.kmz)

6e. PROPOSED START DATE: Q3 2022 ESTIMATED END DATE: Q3 2023	6f. PREVIOUS OUTGRANT NUMBER (if applicable) DACW64-_____-______-__________

6g. SUMMARY OF PROJECT

(Describe the project in its entirety, do not limited the project summary to the area description in the regulatory permit. Include the placement areas that will be used, if applicable. Include ingress, egress and lay down areas.)

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop a Deepwater Port (DWP), the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico to provide United States crude oil loading services onto very large crude carriers (and other crude oil carriers) for export to the global market.

The DWP will be located in federal waters approximately 99 statute miles off the coast of Cameron Parish, Louisiana. The DWP will be supported by an onshore pipeline system that will consist both a new-build pipeline and the repurposing of an existing pipeline.

The onshore portion of the Project will consist of approximately 37-mile, 42-inch OD pipeline connecting the existing Nederland Terminal in Jefferson County, Texas, to the existing Mainline at Station 501 in Cameron Parish, Louisiana. The new build pipeline route begins at the proposed Nederland Pump Station and proceeds north across the Neches River continuing almost to Bridge City, Texas, before turning east/southeast and crossing Sabine Lake. After leaving Sabine Lake in Cameron Parish, Louisiana, the route proceeds east for approximately 11 miles to Station 501 where it will tie into the existing Stingray Mainline. The onshore portion of the Project will comprise of the 37 miles of 42-inch OD pipeline, new pump station (BMOP Pump Station) located in Jefferson County, Texas, adjacent to the existing Nederland Terminal in Jefferson County, Texas at MP 0.0, nine new mainline valves, temporary and permanent access roads, and temporary use of existing pipe and construction yards.

The Project will utilize seven horizontal directional drills along the pipeline route to cross selected existing foreign pipelines, major roadways, and major waterbodies, and also as a mitigating measure to avoid impacts to wetlands and/or sensitive resources.

PART VII REQUIRED DOCUMENTS

When submitting the application include: W9, Articles of Incorporation, GIS Shape file and T-4 form (pipelines) to SWG-RE@USACE.ARMY.MIL

Note: W9 and Articles of Incorporation must match the applicant information listed above.

PART VIII - CERTIFICATION

I HEREBY CERTIFY that I am of legal age and authorized to do business in the State of Texas and that I have personally examined the information contained in this application and believe that the information submitted is correct to the best of my knowledge.

Robert Rose	Robert Rose Digitally signed by Robert Rose Date: 2020.09.28 15:10:57 -05'00'	
NAME	SIGNATURE	DATE

APPENDIX C-2

U.S. ENVIRONMENTAL PROTECTION AGENCY NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT APPLICABILITY EVALUATION

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September 22, 2020

Mitty Mohon
Regional Coordinator and Enforcement Officer
NPDES Water Enforcement Section
EPA Region 6
1201 Elm St., Suite 500
Dallas, TX 75270-2102

RE: Blue Marlin Offshore Port, LLC
Draft NPDES Permit Application

Ms. Mohon,

As discussed during a coordination meeting on June 25, 2020, Blue Marlin Offshore Port LLC, an Affiliate of Energy Transfer, is proposing the Blue Marlin Offshore Port (BMOP) Deepwater Port (DWP) Project on the continental shelf in the Gulf of Mexico. The primary purpose of the BMOP Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. The DWP will be located in federal waters within West Cameron Lease Blocks 509 and 508 and East Cameron Lease Block 263. The DWP will be approximately 99 statute miles off the coast of Cameron Parish, Louisiana.

Blue Marlin Offshore Port LLC is submitting a DWP Application to the U.S. Coast Guard (USCG)/ United States Maritime Administration and has prepared the attached information in support of the DWP Application. Specifically, a draft of National Pollutant Discharge Elimination System (NPDES) applicability information and the following EPA forms have been prepared:

- DRAFT EPA Form 1 - General Information;
- DRAFT EPA Form 2E - Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater; and
- DRAFT EPA Form 2F - Stormwater Discharges Associated with Industrial Activity.

The information provided highlights the proposed construction and operational discharges of the BMOP DWP Project that will occur offshore in federal waters. The draft information is being provided for informational purposes only and the BMOP NPDES application will be further refined during detailed design prior to construction. Blue Marlin Offshore Port LLC will also coordinate further with EPA Region 6 on the required application contents and discharge limits.

We look forward to working with you further on the BMOP DWP Project. Once the DWP Application is submitted, the USCG will be reaching out for coordination on review of the MARAD application. In the meantime, please don't hesitate to contact the undersigned at 409-749-3902, or via email at justin.minter@energytransfer.com, should you have any questions.

Sincerely,

Justin D Minter

Justin D. Minter
Sr. Environmental Project Manager

Blue Marlin Offshore Port (BMOP) Project

NPDES Permit Applicability Evaluation

Submitted to:

EPA Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270

Submitted by:

Blue Marline Offshore Port LLC
8111 Westchester Drive
Suite 600
Dallas, Texas 75225

September 2020

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LIST OF TABLES

LIST OF ATTACHMENTS

Attachment A	BMOP DWP Mapping
Attachment B	DRAFT EPA Form 1 - General Information
Attachment C	DRAFT EPA Form 2E - Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater
Attachment D	DRAFT EPA Form 2F - Stormwater Discharges Associated with Industrial Activity

ABBREVIATIONS AND ACRONYMS

Applicant	Blue Marlin Offshore Port LLC
BMOP	Blue Marlin Offshore Port
CALM	Catenary Anchor Leg Mooring
DWP	Deepwater Port
DWPA	Deepwater Port Act
EC	East Cameron
EPA	Environmental Protection Agency
GOM	Gulf of Mexico
gpm	gallons per minute
NT	Nederland Terminal
NPDES	National Pollutant Discharge Elimination System
OD	outer diameter
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLEMs	Pipeline End Manifolds
Project	Blue Marlin Offshore Port Project
VBT	Vent Boom Tripods
VLCCs	very large crude carriers
WC	West Cameron

1.0 NPDES PERMIT APPLICABILITY EVALUATION

Blue Marlin Offshore Port LLC, the Applicant, is proposing the Blue Marlin Offshore Port (BMOP) Deepwater Port (DWP) Project on the continental shelf in the Gulf of Mexico (GOM). The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. The DWP will be located in federal waters within West Cameron Lease Blocks (WC) 509 and 508 and East Cameron (EC) Block 263. The DWP will be approximately 99 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet. Mapping of the BMOP DWP is provided in **Attachment A**.

Oil for export will be transported out of the existing Sunoco Partners Marketing and Terminals, L.P. terminal and storage facility in Jefferson County, Texas (NT). The Applicant has confirmed the existing Stingray Pipeline System's Mainline (Mainline), currently in natural gas service, is suitable for conversion to oil service providing for pipeline transport of the oil offshore to the DWP. The Mainline is an existing 36-inch Outer Diameter (OD) pipeline that is approximately 104 miles long from Station 501, near Holly Beach in Cameron Parish, Louisiana, to WC 509. In addition to the subsea Mainline, an existing Stingray System platform complex located in WC 509 is also suitable for conversion to crude oil service. The existing WC 509 Platform Complex consists of three platforms and a Vent Boom Tripods (VBT). The WC 509A Platform is a natural gas gathering platform. This will be converted to also house the 36-inch riser for the crude oil Mainline. The WC 509B Platform currently is a natural gas compression and control platform. It houses natural gas compressors, separators, the Control Room and Platform Complex's utilities. The WC 509B Platform will continue to house the natural gas separation facilities and the Platform Complex's utilities. It will also house the crude oil Control Room, metering facilities, and pig traps. The WC 509C Platform is the personnel platform and will continue in that role. The WC 509 VBT are utilized for natural gas venting and will continue in this role for any planned and emergency natural gas blowdowns.

The DWP's offshore loading facilities will consist of the existing WC 509 Platform Complex; two new Pipeline End Manifolds (PLEMs) and Catenary Anchor Leg Mooring (CALM) Buoys in WC 508 and EC 263; two new Crude Oil Loading Pipelines from the WC 509 Platform Complex to the PLEMs; and flexible hoses attached to the CALM Buoys. Very Large Crude Carriers (VLCCs) or other large seafaring crude oil vessels will moor at a CALM Buoy and retrieve and connect floating crude oil hoses connected to the CALM Buoy for loading. Up to 365 VLCCs (or other crude oil carriers) will load per year.

The BMOP DWP Project will result in both construction and operational discharges in federal waters within the GOM. In support of future Environmental Protection Agency (EPA) Region 6 National Pollutant Discharge Elimination System (NPDES) Permitting of the discharges, BMOP has prepared drafts of the following EPA forms:

- DRAFT EPA Form 1 - General Information (**Attachment B**);
- DRAFT EPA Form 2E - Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater (**Attachment C**); and
- DRAFT EPA Form 2F - Stormwater Discharges Associated with Industrial Activity (**Attachment D**).

Note, these *DRAFT* EPA forms are for informational purposes and the BMOP NPDES application will be further refined during detailed design prior to construction. The Applicant will also coordinate further with EPA Region 6 on the required application contents and discharge limits. The following subsections highlight the proposed construction and operational discharges of the BMOP DWP Project that will occur offshore in federal waters. Onshore construction and operational discharges will be addressed under separate cover and permitted in accordance with Texas Railroad Commission and Louisiana Department of Environmental Quality requirements.

2.0 HYDROSTATIC TEST-WATER DISCHARGES AT THE DWP (CONSTRUCTION)

Prior to DWP operations, the existing Mainline and Crude Oil Loading Pipelines will be hydrostatically tested in accordance with PHMSA requirements. The hydrotest of the Mainline between Station 701 and WC 509 will be conducted after all conversion tasks of the Mainline have been completed. The Mainline will already have been filled with seawater as part of the conversion process, so only a nominal volume of water will be added into the pipeline to achieve test pressures. Upon successful completion of the hydrostatic tests, the Mainline will be dewatered from Station 701 to the WC 509 Platform Complex with natural gas, nitrogen or air. Details on the discharge are provided in **Table 1**.

The final hydrostatic test of the newly constructed Crude Oil Loading Pipelines that extend from the WC 509B Platform to the PLEMs at the CALM Buoy after all installation tasks have been completed. Hydrotest pumps and test monitoring instrumentation will be set up on the WC 509B Platform. The test will require a nominal volume of seawater, which will be added into the pipelines to achieve test pressure. Upon successful completion of the hydrostatic test, the Crude Oil Loading Pipelines will be dewatered with air or nitrogen. Details on the discharge are provided in **Table 1**.

TABLE 2
Hydrostatic Test-Water Discharge Information and Volumes

Pipeline Segment	Withdrawal Location	Discharge Location	Approximate Volume (gallons)
Hydrostatic Testing of the Mainline (Station 701 to WC 509)	WC 509A Platform or WC 148 Platform	WC 509A Platform	26,005,000
Crude Oil Loading Pipeline: WC 509B Platform to PLEM No. 1	WC 509 or WC WC 508	WC 509 or WC 508	229,000
Crude Oil Loading Pipeline: WC 509B Platform to PLEM No. 2	WC 509 or EC 263	WC 509 or EC 263	296,000

At this time, it is expected that a biocide and potentially an oxygen scavenger will be used to treat the water prior to filling of the pipelines. A typical biocide (like BIOC16779A) is a microbial agent that hydrolyzes rapidly into acetic acid and hydrogen peroxide which can safely be discharged. Following hydrotesting of the Mainline and before performing a Nitrogen purge, a second biocide, possibly in the form of a biocide pill (like BIOC11139A) might be used. The biocide pill (i.e., biocide combined with freshwater), if used, will be contained between two pigs as it is sent through the Mainline. Biocides like BIOC11139A are usually a combination of glutaraldehyde and quaternary amine actives which will likely not meet regulations for overboard discharge. Therefore, the Applicant would stage frac tanks at the WC 509 Platform Complex to gather and treat the fluids between the two pigs and then transfer them to shore for appropriate disposal.

3.0 OPERATIONAL DISCHARGES AT THE DWP

An overview of the proposed operational discharges at the DWP is provided in **Table 2**. Operational discharges will be associated with the firewater system, seawater pumps, sanitary system, and stormwater.

The firewater system for the BMOP DWP will consist of two electrically driven firewater pumps on the WC 509B Platform, which will be automatically activated when a drop in pressure is detected in the fire suppression header. The firewater pumps will be operated only in case of emergency or for regular testing. Firewater pumps are required to be tested for a 30-minute run per week and a 12-hour run per quarter. The firewater pumps will be designed to deliver 4,000-gallons per minute (gpm) per pump. The seawater discharge location for firewater pumps during testing will be contained within the platform jacket framing.

The seawater system will be supplied by two seawater pumps capable of pumping 160 gpm each. They will be motor driven submersible pumps installed within caissons to help strain ocean debris. Provisions will be made for the injection of hypochlorite to control marine growth. Seawater will be used to supply the water maker; pressurize the firewater system; supply fire water for hose reels; and supply the hypochlorite system. Pressure in the seawater pump discharge header will be maintained via a spill back control valve located on the pump discharge to the sea. The discharge locations for the seawater pump system will be contained within the DWP Platform jacket framing. These pumps will be run on demand, not continuously.

The DWP will have accommodations available for 24-hours-per-day, 7-days-per-week operations. It will be designed to accommodate a maximum of 28 operations personnel, including contractors at any one time. Water from toilets, sinks, and showers will be directed into a sewage treatment system. The volume of wastewater to be processed is estimated at 20 gallons per person per day (approximately 560 gallons/day).

The open drain system on the DWP Platform will be designed to collect deck drainage resulting from storm events. Rainwater will be captured with a system of drain piping that routes the run-off into the capture sump and then into the oily water separator system. Hydrocarbons removed from the deck drain system will be returned to the crude oil Mainline and water will be discharged overboard after meeting NPDES permit requirements. The closed drain system will collect all contaminants not authorized for ocean discharge. Water from miscellaneous operations including platform washdown will also be captured in the deck drain system for subsequent treatment in the open drain system. The estimated volume of rainwater to be treated is based on a maximum of four inches per hour for a two-hour rain event falling on the upper deck area, conservatively increased by 50 percent to accommodate rainwater which would land on lower decks.

TABLE 2
Water Discharges During DWP Operations

Overboard Discharge	Volume (gallons)	Discharge Location	Treatment
Firewater system testing and maintenance	35,520,000 gallons per year	DWP Platform jacket framing.	Treated with biocide.
Seawater Pump	57,456 gallons per day (gpd)	DWP Platform jacket framing.	Treated with biocide.
Seawater to Freshwater (Potable Water) Converter	10,800 gpd	DWP Platform jacket framing.	None.
Marine Sanitation System	5,600 gpd	DWP Platform jacket framing.	Effluent neutralized within system prior to overboard discharge.

TABLE 2
Water Discharges During DWP Operations

Overboard Discharge	Volume (gallons)	Discharge Location	Treatment
Storm Water Run-off and platform washdown from utility water system	111,000 gpd	WC 509.	Into deck drain / sump / oily water separator system.

4.0 OUTFALL IDENTIFICATION

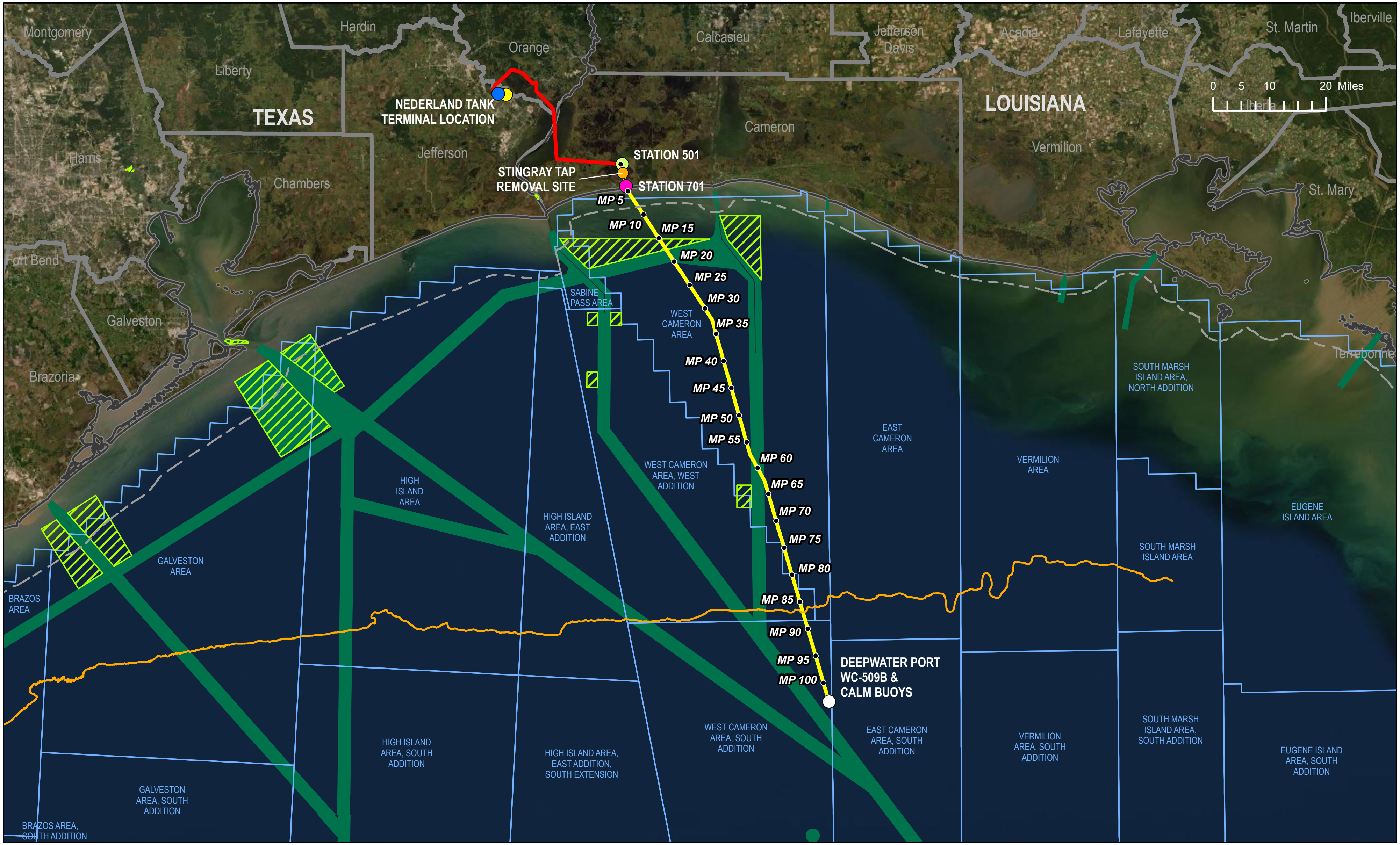
During detailed engineering and prior to DWP operations, the proposed outfalls will be further defined for the WC 509 Platform Complex and hydrostatic testing. Tentative outfall assignments are listed in Table 3 which correspond with the DRAFT EPA forms in **Attachments B**, **C**, and **D**.

TABLE 3
Water Discharges During DWP Operations

Outfall	Discharge	Discharge Location
001	Firewater system testing and maintenance	WC 509 Platform Complex jacket framing
002	Seawater Pump	WC 509 Platform Complex jacket framing
003	Seawater to Freshwater (Potable Water) Converter	WC 509 Platform Complex jacket framing
004	Marine Sanitation System	WC 509 Platform Complex jacket framing
005	Storm Water Run-off and platform washdown from utility water system	WC 509 Platform Complex jacket framing
006	Hydrostatic Testing of the Mainline	Adjacent to the WC 509 Platform Complex
007	Hydrostatic Testing of the Mainline Crude Oil Loading Pipeline No. 1	Adjacent to the WC 509 Platform Complex
008	Hydrostatic Testing of the Mainline Crude Oil Loading Pipeline No. 2	Adjacent to the WC 509 Platform Complex

Attachment A
BMOP DWP Mapping

BMOP PROJECT - PROJECT OVERVIEW MAP



LEGEND

- ● EXISTING OFFSHORE PIPELINE MILEPOSTS
- 🟠 STINGRAY TAP REMOVAL SITE
- 🟡 NEDERLAND TANK TERMINAL LOCATION
- 🔵 NEDERLAND PUMP STATION
- 🟣 STATION 701 (TO BE CONVERTED TO OIL SERVICE)
- 🟢 STATION 501 (TO BE CONVERTED TO OIL SERVICE)
- ○ DEEPWATER PORT WC-509B AND CALM BUOYS
- 🟨 EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- 🟥 PROPOSED ONSHORE PIPELINE (NEW BUILD)
- 🟧 DEPTH CONTOUR -108'
- ▬ STATE WATERS BOUNDARY
- ▨ SAFETY ANCHORAGES
- ☐ PROTRACTION AREA
- 🟩 SHIPPING FAIRWAY
- ▭ COUNTY / PARISH
- ▭ STATE BOUNDARY

BLUE MARLIN OFFSHORE PORT PROJECT

PROJECT OVERVIEW MAP

COUNTY/PARISH:	VARIOUS	***DRAWN BY:***	CA
STATE:	TX/LA	***CHECKED BY:***	CW
DATE:	2020/09/17	***PROJECTION:***	NAD 1983 UTM Zone 15N

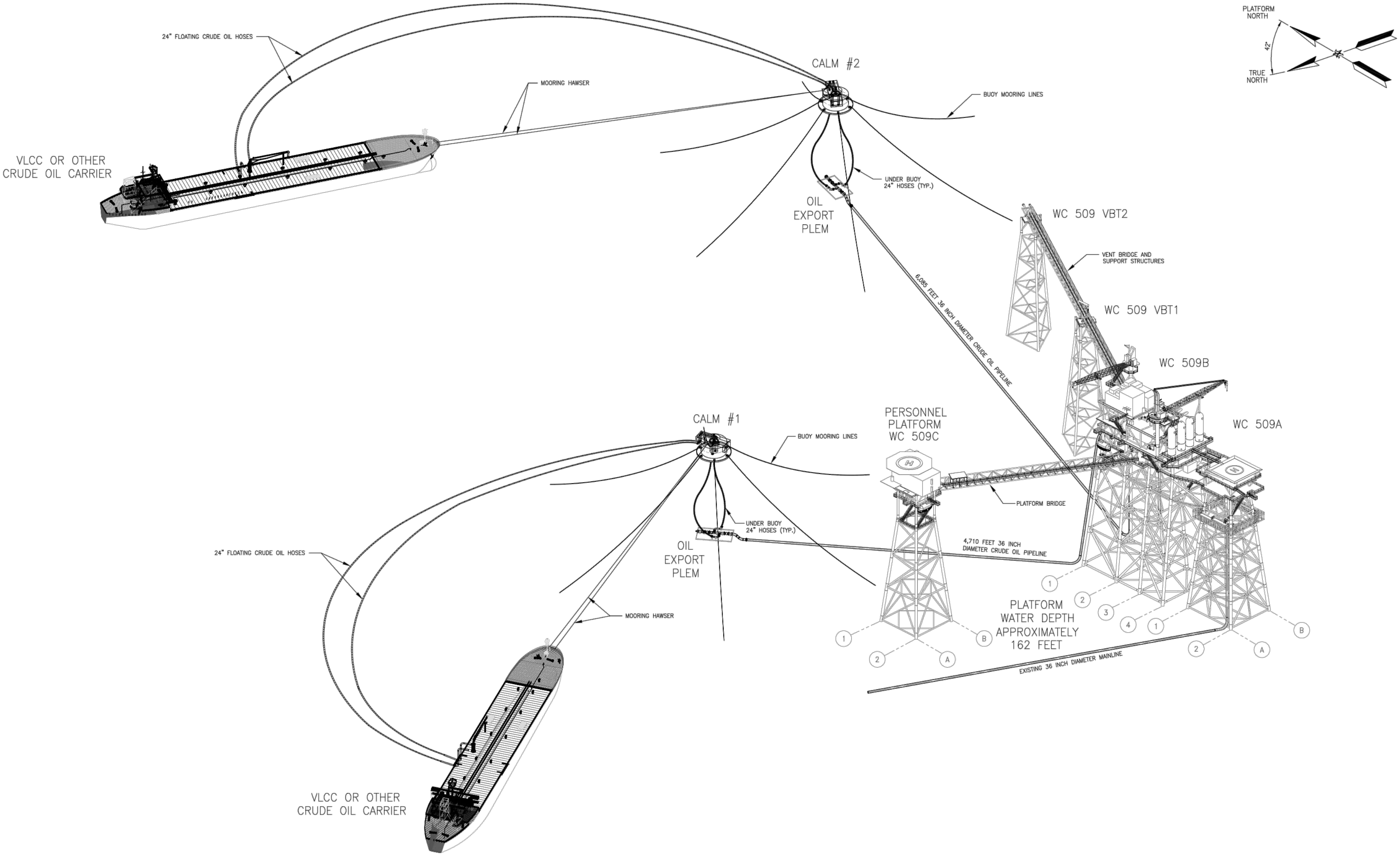
PREPARED BY

EXP Energy Services Inc.
T: +1.850.385.5441
F: +1.850.385.5523
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT

DWG:	0802-01-005	***SHEET:***	1 OF 1

BMOP DWP SCHEMATIC WITH VLCCs



Attachment B
DRAFT EPA Form 1 - General Information

Print All Pages

Print Form Only

United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-1 Revised March 2019

Water Permits Division

Application Form 1

General Information

NPDES Permitting Program

Note: All applicants to the National Pollutant Discharge Elimination System (NPDES) permits program, with the exception of publicly owned treatment works and other treatment works treating domestic sewage, must complete Form 1. Additionally, all applicants must complete one or more of the following forms: 2B, 2C, 2D, 2E, or 2F. To determine the specific forms you must complete, consult the “General Instructions” for this form.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

Form 1 NPDES

EPA

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

GENERAL INFORMATION

SECTION 1. ACTIVITIES REQUIRING AN NPDES PERMIT (40 CFR 122.21(f) and (f)(1))

Activities Requiring an NPDES Permit

1.1 Applicants *Not Required* to Submit Form 1

1.1.1 Is the facility a new or existing **publicly owned treatment works**?
If yes, STOP. Do NOT complete Form 1. Complete Form 2A. ■ No

1.1.2 Is the facility a new or existing **treatment works treating domestic sewage**?
If yes, STOP. Do NOT complete Form 1. Complete Form 2S. ■ No

1.2 Applicants *Required* to Submit Form 1

1.2.1 Is the facility a **concentrated animal feeding operation** or a **concentrated aquatic animal production facility?**
☐ Yes ➔ Complete Form 1 ***and*** Form 2B. ■ No

1.2.2 Is the facility an **existing** manufacturing, commercial, mining, or silvicultural **facility** that **is currently discharging process wastewater**?
☐ Yes ➔ Complete Form 1 ***and*** Form 2C. ■ No

1.2.3 Is the facility a **new** manufacturing, commercial, mining, or silvicultural **facility** that has **not yet commenced to discharge**?
☐ Yes ➔ Complete Form 1 ***and*** Form 2D. ■ No

1.2.4 Is the facility a **new or existing** manufacturing, commercial, mining, or silvicultural **facility** that **discharges only nonprocess wastewater**?
■ Yes ➔ Complete Form 1 ***and*** Form 2E. ☐ No

1.2.5 Is the facility a **new or existing facility** whose discharge is composed entirely of **stormwater associated with industrial activity** or whose discharge is composed of **both stormwater and non-stormwater**?
■ Yes ➔ Complete Form 1 ***and*** Form 2F unless exempted by 40 CFR 122.26(b)(14)(x) or (b)(15). ☐ No

SECTION 2. NAME, MAILING ADDRESS, AND LOCATION (40 CFR 122.21(f)(2))

Name, Mailing Address, and Location

2.1 Facility Name

Blue Marline Offshore Port – conversion of existing Stingray Pipeline Platform Complex in West Cameron 509. Existing permit is - Stingray Pipeline Company Permit ID No. GMG 290031.

2.2 EPA Identification Number

2.3 Facility Contact

Name (first and last)	Title	Phone number

Email address

2.4 Facility Mailing Address

Street or P.O. box
8111 Westchester Drive, Suite 600

City or town	State	ZIP code
Dallas	Texas	75225

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

Name, Mailing Address, and Location Continued

2.5 **Facility Location**

Street, route number, or other specific identifier
Gulf of Mexico Outer Continental Shelf Lease Block West Cameron 509

County name	County code (if known)	
City or town	State	ZIP code

SECTION 3. SIC AND NAICS CODES (40 CFR 122.21(f)(3))

SIC and NAICS Codes

3.1

SIC Code(s)	**Description** (optional)
4612	Crude Petroleum

3.2

NAICS Code(s)	**Description** (optional)
4861	Pipeline Transportation of Crude Oil

SECTION 4. OPERATOR INFORMATION (40 CFR 122.21(f)(4))

Operator Information

4.1 **Name of Operator**
Blue Marlin Offshore Port LLC

4.2 Is the name you listed in Item 4.1 also the owner?
☒ Yes ☐ No

4.3 **Operator Status**
☐ Public—federal ☐ Public—state ☐ Other public (specify)_______________
☒ Private ☐ Other (specify) _______________

4.4 **Phone Number of Operator**

Operator Information Continued

4.5 **Operator Address**

Street or P.O. Box
8111 Westchester Drive, Suite 600

City or town	State	ZIP code
Houston	Texas	75225

Email address of operator

SECTION 5. INDIAN LAND (40 CFR 122.21(f)(5))

Indian Land

5.1 Is the facility located on Indian Land?
☐ Yes ☒ No

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 6. EXISTING ENVIRONMENTAL PERMITS (40 CFR 122.21(f)(6))

Existing Environmental Permits

6.1 **Existing Environmental Permits** (check all that apply and print or type the corresponding permit number for each)

☒ NPDES (discharges to surface water) Stingray Pipeline Company Permit ID No. GMG 290031	☐ RCRA (hazardous wastes)	☐ UIC (underground injection of fluids)
☒ PSD (air emissions) Application submitted concurrent with DWP Application	☐ Nonattainment program (CAA)	☐ NESHAPs (CAA)
☐ Ocean dumping (MPRSA)	☐ Dredge or fill (CWA Section 404) Application submitted concurrent with DWP Application	☒ Other (specify) MARAD/USCG DWP Application submitted concurrent

SECTION 7. MAP (40 CFR 122.21(f)(7))

Map

7.1 Have you attached a topographic map containing all required information to this application? (See instructions for specific requirements.) Project is offshore, See Attachment A

☐ Yes ☒ No ☐ CAFO—Not Applicable (See requirements in Form 2B.)

SECTION 8. NATURE OF BUSINESS (40 CFR 122.21(f)(8))

Nature of Business

8.1 Describe the nature of your business.

Deepwater port for the export of crude oil onto Very Large Crude Carriers or other large tanker ships.

SECTION 9. COOLING WATER INTAKE STRUCTURES (40 CFR 122.21(f)(9))

Cooling Water Intake Structures

9.1 Does your facility use cooling water?

☐ Yes ☒ No ➔ SKIP to Item 10.1.

9.2 Identify the source of cooling water. (Note that facilities that use a cooling water intake structure as described at 40 CFR 125, Subparts I and J may have additional application requirements at 40 CFR 122.21(r). Consult with your NPDES permitting authority to determine what specific information needs to be submitted and when.)

SECTION 10. VARIANCE REQUESTS (40 CFR 122.21(f)(10))

Variance Requests

10.1 Do you intend to request or renew one or more of the variances authorized at 40 CFR 122.21(m)? (Check all that apply. Consult with your NPDES permitting authority to determine what information needs to be submitted and when.)

☐ Fundamentally different factors (CWA Section 301(n))

☐ Non-conventional pollutants (CWA Section 301(c) and (g))

☐ Not applicable

☐ Water quality related effluent limitations (CWA Section 302(b)(2))

☐ Thermal discharges (CWA Section 316(a))

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls	Form Approved 03/05/19 OMB No. 2040-0004

SECTION 11. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

11.1 In Column 1 below, mark the sections of Form 1 that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Activities Requiring an NPDES Permit	☐ w/ attachments
☒ Section 2: Name, Mailing Address, and Location	☐ w/ attachments
☒ Section 3: SIC Codes	☐ w/ attachments
☒ Section 4: Operator Information	☐ w/ attachments
☒ Section 5: Indian Land	☐ w/ attachments
☒ Section 6: Existing Environmental Permits	☐ w/ attachments
☐ Section 7: Map Project is offshore, See Attachment A	☐ w/ topographic map ☐ w/ additional attachments
☒ Section 8: Nature of Business	☐ w/ attachments
☒ Section 9: Cooling Water Intake Structures	☐ w/ attachments
☒ Section 10: Variance Requests	☐ w/ attachments
☒ Section 11: Checklist and Certification Statement	☐ w/ attachments

11.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

Click to go back to the beginning of Form

Attachment C
DRAFT EPA Form 2E - Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

Print All Pages

Print Form Only

United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-2E Revised March 2019

Water Permits Division

EPA

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	
		Converted Stingray WC 509 Platform – New Outfalls	Form Approved 03/05/19 OMB No. 2040-0004

FORM 2E NPDES

EPA

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater
MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
001	Gulf of Mexico	28° 26' 00.01	93° 00' 15.23
		° ′ ″	° ′ ″
		° ′ ″	° ′ ″

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger (New Outfall – Existing Platform Complex) ☐ Existing discharger ➔ SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes

☐ Restaurant or cafeteria waste

☐ Non-contact cooling water

☐ Other nonprocess wastewater (describe/explain directly below)

____

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No ➔ SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	Composition of Additives (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) ➔ SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Total suspended solids (TSS)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Oil and grease	New Outfall	N/A	N/A	N/A	N/A	4
Ammonia (as N)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Discharge flow	New Outfall	120,000 gallons				4
pH (report as range)	New Outfall	Ambient				4
Temperature (winter)	New Outfall	Ambient				4
Temperature (summer)	New Outfall	Ambient				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (Use codes per Instructions.)
		Mass	Conc.	Mass	Conc.	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☒ Yes ☐ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Total Residual Chlorine			< 5 ppm		< 5 ppm	4

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☒ Yes ➔ Complete this section. ☐ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

Firewater pumps will be operated only in case of emergency or for regular testing. Firewater pumps are required to be tested for 30-min run per week and 12-hour run per quarter. Firewater Pumps will be designed to deliver 4,000-gallons per minute (gpm) per pump.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

The firewater pump intake will be treated with biocide. Specifically, sodium hypochlorite generated from seawater in electrochemical cells will be supplied for injection at seawater pump intakes to prevent bio-fouling. No treatment of the discharge is anticipated.

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

This is a new outfall. Updated discharge information will be available following additional design and submitted prior to operations.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

Click to go back to the beginning of Form

Print All Pages

Print Form Only

United States
Environmental Protection Agency

Office of Water
Washington, D.C.

EPA Form 3510-2E
Revised March 2019

Water Permits Division

EPA

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

FORM 2E NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility’s outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
002	Gulf of Mexico	28° 26’ 00.01	93° 00’ 15.23
		° ’ ”	° ’ ”
		° ’ ”	° ’ ”

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger (New Outfall – Existing Platform Complex) ☐ Existing discharger ➔ SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes
☐ Restaurant or cafeteria waste
☐ Non-contact cooling water
☐ Other nonprocess wastewater (describe/explain directly below)

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No ➔ SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	**Composition of Additives** (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) ➔ SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Total suspended solids (TSS)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Oil and grease	New Outfall	N/A	N/A	N/A	N/A	4
Ammonia (as N)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Discharge flow	New Outfall	57,456 gallons				4
pH (report as range)	New Outfall	Ambient				4
Temperature (winter)	New Outfall	Ambient				4
Temperature (summer)	New Outfall	Ambient				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	
		Converted Stingray WC 509 Platform – New Outfalls	Form Approved 03/05/19 OMB No. 2040-0004

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (Use codes per Instructions.)
		Mass	Conc.	Mass	Conc.	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☒ Yes ☐ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Total Residual Chlorine			< 5 ppm		< 5 ppm	4

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☐ Yes ➔ Complete this section. ☒ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

The seawater pump intake will be treated with biocide. Specifically, sodium hypochlorite generated from seawater in electrochemical cells will be supplied for injection at seawater pump intakes to prevent bio-fouling. No treatment of the discharge is anticipated.

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name
		Converted Stingray WC 509 Platform – New Outfalls

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

This is a new outfall. Updated discharge information will be available following additional design and submitted prior to operations.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-2E Revised March 2019

Water Permits Division

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

FORM 2E NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
003	Gulf of Mexico	28° 26’ 00.01	93° 00’ 15.23
		° ’ ”	° ’ ”
		° ’ ”	° ’ ”

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger (New Outfall – Existing Platform Complex) ☐ Existing discharger ➔ SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes

☐ Restaurant or cafeteria waste

☐ Non-contact cooling water

☐ Other nonprocess wastewater (describe/explain directly below)

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No ➔ SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	**Composition of Additives** (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) ➔ SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall		EPA Limit		EPA Limit	4
Total suspended solids (TSS)	New Outfall		EPA Limit		EPA Limit	4
Oil and grease	New Outfall		N/A		N/A	4
Ammonia (as N)	New Outfall		EPA Limit		EPA Limit	4
Discharge flow	New Outfall	10,800 gallons				4
pH (report as range)	New Outfall	EPA Limit				4
Temperature (winter)	New Outfall	41 °F				4
Temperature (summer)	New Outfall	95 °F				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No → SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (Use codes per Instructions.)
		Mass	Conc.	Mass	Conc.	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☒ Yes ☐ No → SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Total Residual Chlorine			< 5 ppm		< 5 ppm	4

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No → SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☐ Yes → Complete this section. ☒ No → SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

The seawater pump intake will be treated with biocide. Specifically, sodium hypochlorite generated from seawater in electrochemical cells will be supplied for injection at seawater pump intakes to prevent bio-fouling. No treatment of the discharge is anticipated.

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

This is a new outfall. The discharge will be a brine solution from seawater to freshwater conversion.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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Water Permits Division

EPA

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

FORM 2E NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
004	Gulf of Mexico	28° 26' 00.01	93° 00' 15.23
		° ' "	° ' "
		° ' "	° ' "

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger (New Outfall – Existing Platform Complex) ☐ Existing discharger → SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes

☐ Restaurant or cafeteria waste

☐ Non-contact cooling water

☐ Other nonprocess wastewater (describe/explain directly below)

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No → SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	Composition of Additives (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) → SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall		<50mg/L (system design)		<50 mg/L (system design)	Unit Specs
Total suspended solids (TSS)	New Outfall		<100mg/L (system design)		<100mg/L (system design)	Unit Specs
Oil and grease	New Outfall		N/A		N/A	4
Ammonia (as N)	New Outfall		EPA Limit		EPA Limit	4
Discharge flow	New Outfall	5,600 gallons				4
pH (report as range)	New Outfall	EPA Limit				4
Temperature (winter)	New Outfall	41 °F				4
Temperature (summer)	New Outfall	95 °F				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☒ Yes ☐ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (Use codes per Instructions.)
		Mass	**Conc.**	**Mass**	**Conc.**	
Fecal coliform	New Outfall		< 200/100ml (system design)		< 200/100ml (system design)	Unit Specs
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☒ Yes ☐ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (use codes per instructions)
		Mass	**Conc.**	**Mass**	**Conc.**	
Total Residual Chlorine			5 mg/L (system design)		5 mg/L (system design)	Unit Specs

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (use codes per instructions)
		Mass	**Conc.**	**Mass**	**Conc.**	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☐ Yes ➔ Complete this section. ☒ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

Type-2 Marine Sanitation Device utilizing maceration and disinfection using electro-chlorination of water and oxidation of Fecal Coliform waste.

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[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

This is a new outfall. Updated discharge information will be available following additional design and submitted prior to operations.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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Water Permits Division

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	
		NEW - Blue Marlin Offshore Port	Form Approved 03/05/19 OMB No. 2040-0004

FORM 2E NPDES

EPA

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
006	Gulf of Mexico	28° 26’ 00.01	93° 00’ 15.23
		° ’ ”	° ’ ”
		° ’ ”	° ’ ”

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger ☐ Existing discharger ➔ SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes

☐ Restaurant or cafeteria waste

☐ Non-contact cooling water

☐ Other nonprocess wastewater (describe/explain directly below)

____

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No ➔ SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	**Composition of Additives** (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) ➔ SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall		+/- 5 mg/L over Ambient		+/- 5 mg/L over Ambient	4
Total suspended solids (TSS)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Oil and grease	New Outfall	N/A	N/A	N/A	N/A	4
Ammonia (as N)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Discharge flow	New Outfall	3,000 gallons per minute; 4.32 million gallons per day				4
pH (report as range)	New Outfall	Ambient				4
Temperature (winter)	New Outfall	Ambient				4
Temperature (summer)	New Outfall	Ambient				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		NEW - Blue Marlin Offshore Port	

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (Use codes per Instructions.)
		Mass	Conc.	Mass	Conc.	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☐ Yes ☒ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Total Residual Chlorine						

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☒ Yes ➔ Complete this section. ☐ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

There will be a one-time discharge of hydrostatic test-water.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

At this time, it is expected that a biocide and potentially an oxygen scavenger will be used to treat the water prior to filling of the Mainline. A typical biocide (like BIOC16779A) is a microbial agent that hydrolyzes rapidly into acetic acid and hydrogen peroxide which can safely be discharged. Following hydrotesting of the Mainline and before performing a Nitrogen purge, a second biocide, possibly in the form of a biocide pill (like BIOC11139A) might be used. The biocide pill (i.e., biocide combined with freshwater), if used, will be contained between two pigs as it is sent through the Mainline. Biocides like BIOC11139A are usually a combination of glutaraldehyde and quaternary amine actives which will likely not meet regulations for overboard discharge. Therefore, the Applicant would stage frac tanks at the WC 509 Platform Complex to gather and treat the fluids between the two pigs and then transfer them to shore for appropriate disposal.

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		NEW - Blue Marlin Offshore Port	

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

The pipeline will be filled with ambient seawater until the time of discharge. Therefore, the discharge parameters are anticipated to be similar those of the surrounding seawater.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-2E Revised March 2019

Water Permits Division

EPA

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name
		NEW - Blue Marlin Offshore Port

Form Approved 03/05/19
OMB No. 2040-0004

FORM 2E NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater
MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
007	Gulf of Mexico	28° 26' 00.01	93° 00' 15.23
		° ' "	° ' "
		° ' "	° ' "

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger ☐ Existing discharger → SKIP to Section 3.

2.2 Specify your anticipated discharge date:
July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes
☐ Restaurant or cafeteria waste
☐ Non-contact cooling water
☐ Other nonprocess wastewater (describe/explain directly below)

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No → SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	**Composition of Additives** (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) → SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall		+/- 5 mg/L over Ambient		+/- 5 mg/L over Ambient	4
Total suspended solids (TSS)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Oil and grease	New Outfall	N/A	N/A	N/A	N/A	4
Ammonia (as N)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Discharge flow	New Outfall	229,000 gallons				4
pH (report as range)	New Outfall	Ambient				4
Temperature (winter)	New Outfall	Ambient				4
Temperature (summer)	New Outfall	Ambient				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name
		NEW - Blue Marlin Offshore Port

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (Use codes per Instructions.)
		Mass	Conc.	Mass	Conc.	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☐ Yes ☒ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Total Residual Chlorine						

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☒ Yes ➔ Complete this section. ☐ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

There will be a one-time discharge of hydrostatic test-water.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

At this time, it is expected that a biocide and potentially an oxygen scavenger will be used to treat the water prior to filling of the Crude Oil Loading Pipeline. A typical biocide (like BIOC16779A) is a microbial agent that hydrolyzes rapidly into acetic acid and hydrogen peroxide which can safely be discharged. Following hydrotesting of the Mainline and before performing a Nitrogen purge, a second biocide, possibly in the form of a biocide pill (like BIOC11139A) might be used. The biocide pill (i.e., biocide combined with freshwater), if used, will be contained between two pigs as it is sent through the Mainline. Biocides like BIOC11139A are usually a combination of glutaraldehyde and quaternary amine actives which will likely not meet regulations for overboard discharge. Therefore, the Applicant would stage frac tanks at the WC 509 Platform Complex to gather and treat the fluids between the two pigs and then transfer them to shore for appropriate disposal.

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EPA Identification Number	NPDES Permit Number	Facility Name
		NEW - Blue Marlin Offshore Port

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

The pipeline will be filled with ambient seawater until the time of discharge. Therefore, the discharge parameters are anticipated to be similar those of the surrounding seawater.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-2E Revised March 2019

Water Permits Division

Application Form 2E

Manufacturing, Commercial, Mining, and Silvicultural Facilities Which Discharge Only Nonprocess Wastewater

NPDES Permitting Program

Note: Complete this form *and* Form 1 if your facility is a new or existing manufacturing, commercial, mining, and silvicultural facility that discharges only nonprocess wastewater.

EPA Identification Number	NPDES Permit Number	Facility Name	
		NEW - Blue Marlin Offshore Port	Form Approved 03/05/19 OMB No. 2040-0004

FORM 2E NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL FACILITIES WHICH DISCHARGE ONLY NONPROCESS WASTEWATER

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(h)(1))

Outfall Location

1.1 Provide information on each of the facility’s outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
008	Gulf of Mexico	28° 26’ 00.01	93° 00’ 15.23
		° ’ ”	° ’ ”
		° ’ ”	° ’ ”

SECTION 2. DISCHARGE DATE (40 CFR 122.21(h)(2))

Discharge Date

2.1 Are you a new or existing discharger? (Check only one response.)

☒ New discharger ☐ Existing discharger ➔ SKIP to Section 3.

2.2 Specify your anticipated discharge date:

July 2023

SECTION 3. WASTE TYPES (40 CFR 122.21(h)(3))

Waste Types

3.1 What types of wastes are currently being discharged if you are an existing discharger or will be discharged if you are a new discharger? (Check all that apply.)

☐ Sanitary wastes

☐ Restaurant or cafeteria waste

☐ Non-contact cooling water

☐ Other nonprocess wastewater (describe/explain directly below)

3.2 Does the facility use cooling water additives?

☐ Yes ☒ No ➔ SKIP to Section 4.

3.3 List the cooling water additives used and describe their composition.

Cooling Water Additives (list)	Composition of Additives (if available to you)

SECTION 4. EFFLUENT CHARACTERISTICS (40 CFR 122.21(h)(4))

Effluent Characteristics

4.1 Have you completed monitoring for all parameters in the table below at each of your outfalls and attached the results to this application package? (New Outfall)

☐ Yes ☐ No; a waiver has been requested from my NPDES permitting authority (attach waiver request and additional information) ➔ SKIP to Section 5.

4.2 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	Number of Analyses (if actual data reported)	Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Source (use codes per instructions)
		Mass	Conc.	Mass	Conc.	
Biochemical oxygen demand (BOD_5)	New Outfall		+/- 5 mg/L over Ambient		+/- 5 mg/L over Ambient	4
Total suspended solids (TSS)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Oil and grease	New Outfall	N/A	N/A	N/A	N/A	4
Ammonia (as N)	New Outfall	Ambient	Ambient	Ambient	Ambient	4
Discharge flow	New Outfall	296,000 gallons				4
pH (report as range)	New Outfall	Ambient				4
Temperature (winter)	New Outfall	Ambient				4
Temperature (summer)	New Outfall	Ambient				4

---

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name
		NEW - Blue Marlin Offshore Port

Effluent Characteristics Continued

4.3 Is fecal coliform believed present, or is sanitary waste discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Item 4.5.

4.4 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (Use codes per Instructions.)
		Mass	**Conc.**	**Mass**	**Conc.**	
Fecal coliform						
E. coli						
Enterococci						

4.5 Is chlorine used (or will it be used)?

☐ Yes ☒ No ➔ SKIP to Item 4.7.

4.6 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (use codes per instructions)
		Mass	**Conc.**	**Mass**	**Conc.**	
Total Residual Chlorine						

4.7 Is non-contact cooling water discharged (or will it be discharged)?

☐ Yes ☒ No ➔ SKIP to Section 5.

4.8 Provide data as requested in the table below.[1] (See instructions for specifics.)

Parameter or Pollutant	**Number of Analyses** (if actual data reported)	**Maximum Daily Discharge** (specify units)		**Average Daily Discharge** (specify units)		**Source** (use codes per instructions)
		Mass	**Conc.**	**Mass**	**Conc.**	
Chemical oxygen demand (COD)						
Total organic carbon (TOC)						

SECTION 5. FLOW (40 CFR 122.21(h)(5))

Flow

5.1 Except for stormwater water runoff, leaks, or spills, are any of the discharges you described in Sections 1 and 3 of this application intermittent or seasonal?

☒ Yes ➔ Complete this section. ☐ No ➔ SKIP to Section 6.

5.2 Briefly describe the frequency and duration of flow.

There will be a one-time discharge of hydrostatic test-water.

SECTION 6. TREATMENT SYSTEM (40 CFR 122.21(h)(6))

Treatment System

6.1 Briefly describe any treatment system(s) used (or to be used).

At this time, it is expected that a biocide and potentially an oxygen scavenger will be used to treat the water prior to filling of the Crude Oil Loading Pipeline. A typical biocide (like BIOC16779A) is a microbial agent that hydrolyzes rapidly into acetic acid and hydrogen peroxide which can safely be discharged. Following hydrotesting of the Mainline and before performing a Nitrogen purge, a second biocide, possibly in the form of a biocide pill (like BIOC11139A) might be used. The biocide pill (i.e., biocide combined with freshwater), if used, will be contained between two pigs as it is sent through the Mainline. Biocides like BIOC11139A are usually a combination of glutaraldehyde and quaternary amine actives which will likely not meet regulations for overboard discharge. Therefore, the Applicant would stage frac tanks at the WC 509 Platform Complex to gather and treat the fluids between the two pigs and then transfer them to shore for appropriate disposal.

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[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name
		NEW - Blue Marlin Offshore Port

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 7. OTHER INFORMATION (40 CFR 122.21(h)(7))

Other Information

7.1 Use the space below to expand upon any of the above items. Use this space to provide any information you believe the reviewer should consider in establishing permit limitations. Attach additional sheets as needed.

The pipeline will be filled with ambient seawater until the time of discharge. Therefore, the discharge parameters are anticipated to be similar those of the surrounding seawater.

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1 below, mark the sections of Form 2E that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☒ Section 1: Outfall Location	☐ w/ attachments (e.g., responses for additional outfalls)
☒ Section 2: Discharge Date	☐ w/ attachments
☒ Section 3: Waste Types	☐ w/ attachments
☒ Section 4: Effluent Characteristics	☐ w/ attachments
☒ Section 5: Flow	☐ w/ attachments
☒ Section 6: Treatment System	☐ w/ attachments
☒ Section 7: Other Information	☐ w/ attachments
☒ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

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Attachment D
DRAFT EPA Form 2F - Stormwater Discharges Associated with Industrial Activity

Print All Pages

Print Form Only

United States Environmental Protection Agency	Office of Water Washington, D.C.	EPA Form 3510-2F Revised March 2019

Water Permits Division

Application Form 2F

Stormwater Discharges Associated with Industrial Activity

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if you are a new or existing facility whose discharge is composed entirely of stormwater associated with industrial activity, excluding discharges from construction activity under 40 CFR 122.26(b)(14)(x) or (b)(15). If your discharge is composed of stormwater *and* non-stormwater, you must complete Forms 1 and 2F, *and* you must complete Form 2C, 2D, or 2E, as appropriate. See the “Instructions” inside for further details.

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls	Form Approved 03/05/19 OMB No. 2040-0004

Form 2F NPDES

U.S Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

STORMWATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(g)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below

Outfall Number	Receiving Water Name	Latitude	Longitude
005	Gulf of Mexico	28° 26' 00.01	93° 00' 15.23
		° ' "	° ' "
		° ' "	° ' "
		° ' "	° ' "
		° ' "	° ' "
		° ' "	° ' "

SECTION 2. IMPROVEMENTS (40 CFR 122.21(g)(6))

Improvements

2.1 Are you presently required by any federal, state, or local authority to meet an implementation schedule for constructing, upgrading, or operating wastewater treatment equipment or practices or any other environmental programs that could affect the discharges described in this application?

☐ Yes ☒ No → SKIP to Section 3.

2.2 Briefly identify each applicable project in the table below.

Brief Identification and Description of Project	Affected Outfalls (list outfall numbers)	Source(s) of Discharge	Final Compliance Dates	
			Required	Projected

2.3 Have you attached sheets describing any additional water pollution control programs (or other environmental projects that may affect your discharges) that you now have underway or planned? (Optional Item)

☐ Yes ☐ No

SECTION 3. SITE DRAINAGE MAP (40 CFR 122.26(c)(1)(i)(A))

Site Drainage Map

3.1 Have you attached a site drainage map containing all required information to this application? (See instructions for specific guidance.)

☐ Yes ☒ No (New Outfall – Still in Design)

SECTION 4. POLLUTANT SOURCES (40 CFR 122.26(c)(1)(i)(B))

Pollutant Sources

4.1 Provide information on the facility's pollutant sources in the table below.

Outfall Number	Impervious Surface Area (within a mile radius of the facility)		Total Surface Area Drained (within a mile radius of the facility)	
005		*specify units*	22,034	*specify units* Square Feet
		specify units		*specify units*
		specify units		*specify units*
		specify units		*specify units*
		specify units		*specify units*
		specify units		*specify units*

4.2 Provide a narrative description of the facility's significant material in the space below. (See instructions for content requirements.)

Area includes plated deck area including the following:
- 100% of helideck and top deck areas
- 50% of areas of lower deck(s)

Estimated laydown areas and exposed areas of vertical scrubbers.

Other equipment, building and access platforms are not finalized at this time.

4.3 Provide the location and a description of existing structural and non-structural control measures to reduce pollutants in stormwater runoff. (See instructions for specific guidance.)

Stormwater Treatment

Outfall Number	Control Measures and Treatment	Codes from Exhibit 2F–1 (list)
005	All stormwater run-off and deck washdowns will be collected and routed via drain headers to a Corrugated Plate Interceptor (CPI) unit which works as an oil-water separator to reduce suspended solids and Oil and Grease in water to well within overboard discharge limit of 29-mg/L. The treated water is then directed overboard.	Specific code not noted

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 5. NON STORMWATER DISCHARGES (40 CFR 122.26(c)(1)(i)(C))

Non-Stormwater Discharges

5.1 *I certify under penalty of law that the outfall(s) covered by this application have been tested or evaluated for the presence of non-stormwater discharges. Moreover, I certify that the outfalls identified as having non-stormwater discharges are described in either an accompanying NPDES Form 2C, 2D, or 2E application.*

Name (print or type first and last name) Non-stormwater discharges addressed in Form E.	Official title
Signature	Date signed

5.2 Provide the testing information requested in the table below.

Outfall Number	Description of Testing Method Used	Date(s) of Testing	Onsite Drainage Points Directly Observed During Test

SECTION 6. SIGNIFICANT LEAKS OR SPILLS (40 CFR 122.26(c)(1)(i)(D))

Significant Leaks or Spills

6.1 Describe any significant leaks or spills of toxic or hazardous pollutants in the last three years.

New outfall for converted WC 509 Platform Complex.

SECTION 7. DISCHARGE INFORMATION (40 CFR 122.26(c)(1)(i)(E))

Discharge Information

See the instructions to determine the pollutants and parameters you are required to monitor and, in turn, the tables you must complete. Not all applicants need to complete each table.

7.1 Is this a new source or new discharge?

☒ Yes ➔ See instructions regarding submission of *estimated* data.

☐ No ➔ See instructions regarding submission of *actual* data.

Tables A, B, C, and D

7.2 Have you completed Table A for each outfall?

☒ Yes

☐ No

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

Discharge Information Continued	7.3	Is the facility subject to an effluent limitation guideline (ELG) or effluent limitations in an NPDES permit for its process wastewater?	☐ Yes ☒ No ➔ SKIP to Item 7.5.
	7.4	Have you completed Table B by providing quantitative data for those pollutants that are (1) limited either directly or indirectly in an ELG and/or (2) subject to effluent limitations in an NPDES permit for the facility's process wastewater?	☐ Yes ☐ No
	7.5	Do you know or have reason to believe any pollutants in Exhibit 2F–2 are present in the discharge?	☐ Yes ☒ No ➔ SKIP to Item 7.7.
	7.6	Have you listed all pollutants in Exhibit 2F–2 that you know or have reason to believe are present in the discharge and provided quantitative data or an explanation for those pollutants in Table C?	☐ Yes ☐ No
	7.7	Do you qualify for a small business exemption under the criteria specified in the Instructions?	☐ Yes ➔SKIP to Item 7.18. ☒ No
	7.8	Do you know or have reason to believe any pollutants in Exhibit 2F–3 are present in the discharge?	☐ Yes ☒ No ➔ SKIP to Item 7.10.
	7.9	Have you listed all pollutants in Exhibit 2F–3 that you know or have reason to believe are present in the discharge in Table C?	☐ Yes ☐ No
	7.10	Do you expect any of the pollutants in Exhibit 2F–3 to be discharged in concentrations of 10 ppb or greater?	☐ Yes ☒ No ➔ SKIP to Item 7.12.
	7.11	Have you provided quantitative data in Table C for those pollutants in Exhibit 2F–3 that you expect to be discharged in concentrations of 10 ppb or greater?	☐ Yes ☐ No
	7.12	Do you expect acrolein, acrylonitrile, 2,4-dinitrophenol, or 2-methyl-4,6-dinitrophenol to be discharged in concentrations of 100 ppb or greater?	☐ Yes ☒ No ➔ SKIP to Item 7.14.
	7.13	Have you provided quantitative data in Table C for the pollutants identified in Item 7.12 that you expect to be discharged in concentrations of 100 ppb or greater?	☐ Yes ☐ No
	7.14	Have you provided quantitative data or an explanation in Table C for pollutants you expect to be present in the discharge at concentrations less than 10 ppb (or less than 100 ppb for the pollutants identified in Item 7.12)?	☐ Yes ☒ No
	7.15	Do you know or have reason to believe any pollutants in Exhibit 2F–4 are present in the discharge?	☐ Yes ☒ No ➔ SKIP to Item 7.17.
	7.16	Have you listed pollutants in Exhibit 2F–4 that you know or believe to be present in the discharge and provided an explanation in Table C?	☐ Yes ☐ No
	7.17	Have you provided information for the storm event(s) sampled in Table D?	☐ Yes ☒ No (New Outfall)

EPA Identification Number	NPDES Permit Number	Facility Name Converted Stingray WC 509 Platform – New Outfalls

Form Approved 03/05/19
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Discharge Information Continued

Used or Manufactured Toxics

7.18 Is any pollutant listed on Exhibits 2F–2 through 2F–4 a substance or a component of a substance used or manufactured as an intermediate or final product or byproduct?

☐ Yes ☒ No → SKIP to Section 8.

7.19 List the pollutants below, including TCDD if applicable.

1.	4.	7.
2.	5.	8.
3.	6.	9.

SECTION 8. BIOLOGICAL TOXICITY TESTING DATA (40 CFR 122.21(g)(11))

Biological Toxicity Testing Data

8.1 Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last three years?

☐ Yes ☒ No → SKIP to Section 9.

8.2 Identify the tests and their purposes below.

Test(s)	Purpose of Test(s)	Submitted to NPDES Permitting Authority?	Date Submitted
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	

SECTION 9. CONTRACT ANALYSIS INFORMATION (40 CFR 122.21(g)(12))

Contract Analysis Information

9.1 Were any of the analyses reported in Section 7 (on Tables A through C) performed by a contract laboratory or consulting firm?

☐ Yes ☒ No → SKIP to Section 10.

9.2 Provide information for each contract laboratory or consulting firm below.

	Laboratory Number 1	Laboratory Number 2	Laboratory Number 3
Name of laboratory/firm			
Laboratory address			
Phone number			
Pollutant(s) analyzed			

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
		Converted Stingray WC 509 Platform – New Outfalls	

SECTION 10. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

10.1 In Column 1 below, mark the sections of Form 2F that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to complete all sections or provide attachments.

Column 1	Column 2	
☒ Section 1	☐ w/ attachments (e.g., responses for additional outfalls)	
☒ Section 2	☐ w/ attachments	
☒ Section 3	☐ w/ site drainage map	
☒ Section 4	☐ w/ attachments	
☐ Section 5	☐ w/ attachments	
☒ Section 6	☐ w/ attachments	
☒ Section 7	☒ Table A	☐ w/ small business exemption request
	☐ Table B	☐ w/ analytical results as an attachment
	☐ Table C	☐ Table D
☒ Section 8	☐ w/attachments	
☒ Section 9	☐ w/attachments (e.g., responses for additional contact laboratories or firms)	
☒ Section 10	☐	

10.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) NOTE: This is a *DRAFT* application for informational purposes	Official title
Signature	Date signed

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
		Converted Stingray WC 509 Platform – New Outfalls	005

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TABLE A. CONVENTIONAL AND NON-CONVENTIONAL PARAMETERS (40 CFR 122.26(c)(1)(i)(E)(3))[1]

You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details and requirements.

Pollutant or Parameter		Maximum Daily Discharge (specify units)		Average Daily Discharge (specify units)		Number of Storm Events Sampled	Source of Information (new source/new dischargers only; use codes in instructions)
		Grab Sample Taken During First 30 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 30 Minutes	Flow-Weighted Composite		
1.	Oil and grease	< 15 ppm (system design)		< 15 ppm (system design)		New Outfall	Unit Specs
2.	Biochemical oxygen demand (BOD_5)	EPA Limit		EPA Limit		New Outfall	4
3.	Chemical oxygen demand (COD)	EPA Limit		EPA Limit		New Outfall	4
4.	Total suspended solids (TSS)	EPA Limit		EPA Limit		New Outfall	4
5.	Total phosphorus	EPA Limit		EPA Limit		New Outfall	4
6.	Total Kjeldahl nitrogen (TKN)	EPA Limit		EPA Limit		New Outfall	4
7.	Total nitrogen (as N)	EPA Limit		EPA Limit		New Outfall	4
8.	pH (minimum)	EPA Limit		EPA Limit		New Outfall	4
	pH (maximum)	EPA Limit		EPA Limit		New Outfall	4

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

APPENDIX C-3

LDEQ GENERAL PERMIT NO. LAG670000

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DEQ
LOUISIANA

OFFICE OF ENVIRONMENTAL SERVICES

Water Discharge Permit

AI 97422 / PER20170002
GENERAL PERMIT NUMBER LAG670000

HYDROSTATIC TEST AND VESSEL TESTING WASTEWATER

Pursuant to the Clean Water Act, as amended (33 U.S.C. 1251 et seq.), and the Louisiana Environmental Quality Act, as amended (La. R. S. 30:2001 et seq.), rules and regulations effective or promulgated under the authority of said Acts, this Louisiana Pollutant Discharge Elimination System (LPDES) General Permit is reissued. This permit authorizes persons who meet the requirements herein and who have been approved by this Office, to discharge to waters of the State hydrostatic test and vessel testing wastewater and related wastewater in accordance with effluent limitations, monitoring requirements, and other conditions set forth herein.

This permit shall become effective on March 23, 2018

This permit and the authorization to discharge shall expire five (5) years from the effective date of the permit.

Issued on March 23, 2018

Elliott B. Vega
Assistant Secretary

GALVEZ BUILDING ● 602 N. FIFTH STREET ● P.O. BOX 4313 ● BATON ROUGE, LA 70821-4313 ● PHONE (225) 219-9371

PART I

SECTION A: APPLICABILITY

Coverage under this general permit is available for discharges of hydrostatic test and vessel testing wastewater from:

1) new pipelines, flowlines, piping, vessels, or tanks; and

2) pipelines, flowlines, piping, vessels, or tanks which have been used for the transport, transfer, or storage of natural gas, crude oil, liquid or gaseous petroleum hydrocarbons, or other substances which would adequately be regulated by the effluent limitations in this permit, and which discharge wastewater as a result of these hydrostatic tests. **For the purpose of this permit, "petroleum" shall mean** crude oil, gasoline, diesel fuel, aviation fuel, fuel oils, petroleum lubricants, petroleum solvents, petroleum derived asphalts, and gasoline additives stored and used in conjunction with gasoline storage; and

3) vessel testing wastewater from the above sources provided the vessel testing wastewater is generated from the conduits or vessels that will be hydrostatically tested.

This general permit may provide either site-specific or statewide authorization to discharge. Site owners or operators who conduct hydrostatic tests at more than one location in the state may obtain statewide coverage under this permit for discharges related to those testing activities. Statewide authorization numbers shall be designated LAG679XXX while the site-specific authorization numbers are LAG67YXXX where X equals a numeral from 0 to 9 and Y equals a numeral from 0 to 8.

All persons operating a source or conducting an activity that results in a discharge as described above and who meet all eligibility conditions may be covered under this general permit and will become permittees authorized to discharge upon the receipt of a hand-delivered, correctly completed Notice of Intent (NOI) by the Office of Environmental Services, Water Permits Division, 48 hours after the postmark date on the envelope that contains the correctly completed NOI, or 48 hours after receipt of an electronic NOI. Should electronic NOIs (e-NOIs) become available during the term of this permit, the Department may suspend use of paper NOIs.

Each NOI received to request authorization under this LPDES general permit will be evaluated by the DEQ to assess the reasonable potential for the discharge of pollutants from the facility to cause or contribute to a violation of water quality standards for any known impairments. Coverage under the general permit may be denied and regulation under an individual permit required if more stringent limitations than the limitations contained in the general permit are required for protection of a receiving stream.

Submission of an NOI is an acknowledgement that the conditions of this general permit are applicable to the proposed discharge, and that the applicant agrees to comply with the conditions of this general permit. **The applicant's signature on the NOI certifies that the applicant qualifies for coverage under the permit and agrees to comply with all terms and conditions of the authorization to discharge to waters of the State of Louisiana.** Unless notified otherwise by the Secretary or appropriate designee, eligible owners/operators are authorized to discharge wastewaters under the terms and conditions of this permit.

Notice of Intent (NOI) to be covered under this general permit shall be made using form HST-G or an approved equivalent. The HST-G form and other approved NOI forms to apply for LPDES permit coverage may be obtained from the LDEQ web site at http://www.deq.louisiana.gov/. Go through the following links to find the NOI form: WATER – Permits – LPDES Forms – LPDES Permit Application Forms – HST-G form. The appropriate box should be checked on the NOI to request either site-specific coverage or statewide coverage. If this activity is currently being conducted on a site-specific basis or a statewide basis and has not been permitted, an NOI shall be submitted immediately. Should electronic NOIs (e-NOIs) become available during the term of this permit, the Department may suspend use of paper NOIs.

If determined appropriate by the agency, operators may be authorized under this permit after submittal of an alternate NOI/application form. Applicants who submit an alternate NOI/application form are not eligible for automatic permit coverage. These eligible applicants will be covered upon issuance of a permit authorization number and authorization letter by the Water Permits Division.

Dischargers who are currently permitted under the LPDES version of this permit that expires on January 31, 2018, are not required to submit a new NOI. Provided the applicability requirements of the reissued permit are met, these permitted dischargers will be automatically covered under the reissued LPDES permit. Per 40 CFR 122.28(b)(2)(vi), LDEQ will notify each permittee in writing after permit finalization. This written notification of coverage along with a link to the reissued permit will be sent to each permittee after permit finalization. Permit conditions in the reissued permit are effective for these automatically-authorized permittees on the postmark date of the notification of the facility's coverage under the reissued general permit.

The permittee must keep a copy of the NOI that it submitted to the Water Permits Division and a copy of the general permit at the permitted facility. A copy of the NOI that was submitted for statewide permit coverage and a copy of the general permit must be kept at each site where hydrostatic test activities are occurring under a statewide permit number.

If circumstances at the permitted facility are expected to change in the future and the change will result in the addition or elimination of permitted outfalls, or a change in the composition of effluent from a permitted outfall, the permittee is required to notify the Water Permits Division of the proposed changes and to receive the appropriate permit coverage prior to adding a new outfall or changing the composition of effluent from a permitted outfall.

The permittee is required to submit a permit transfer request to the Permit Support Services Division either prior to or no later than 45 days after a permitted facility changes ownership/operator. The request must be made on the official LDEQ form NOC-1 which is available on the LDEQ website at: http://www.deq.louisiana.gov/ - WATER – Permits – LPDES Forms – LPDES Permit Application Forms – NOC-1 form.. Any questions related to making a permit transfer should be directed to the Permits Application Administrative Review (PAAR) group at (225) 219-3292.

A printed hard copy of this permit may be obtained by contacting LDEQ's Water Permits Division at (225) 219-9371, or a copy can be downloaded from the LDEQ Internet website at www.deq.louisiana.gov/. Go through the following links to find the permit: WATER – Permits – LPDES Permit Information – LAG670000.

Construction activities that occur at a facility that is authorized under this general permit may require LPDES permit coverage under a different LPDES general permit for those construction activities. Construction activities include clearing, grubbing, grading, excavation, adding fill material, road construction, and similar activities. Construction activities that disturb one to five acres of land are regulated under LAC 33:IX.2511.B.15 and are covered under the LPDES Storm Water General Permit for Small Construction Activities (LAR200000). Construction activities that disturb five acres of land or more are regulated under LAC 33:IX.2511.B.14.j and are required to obtain permit coverage under the LPDES Storm Water General Permit for Large Construction Activities (LAR100000). Both of the construction storm water general permits can be accessed on the LDEQ web site. The LPDES Storm Water General Permit for Small Construction Activities (LAR200000) can be downloaded from the LDEQ website at http://deq.louisiana.gov/assets/docs/Permits/LAR200000.pdf. The LPDES Storm Water General Permit for Large Construction Activities can be downloaded from the LDEQ website at http://deq.louisiana.gov/assets/docs/Permits/LAR100000.pdf.

All wastewaters covered by this permit must be treated, if necessary, to meet the effluent limitations in Outfall 001, before being discharged from the site of origin. Wastewater types other than those described herein are not authorized under this general permit and discharge of such wastewaters at a site covered under this general permit will constitute a violation of the permit unless authorization to discharge has been granted under a separate LPDES permit.

If a proposed hydrostatic test is to be performed on a pipe, pipeline, flowline, piping, vessel or tank that is connected to an existing treatment facility, then, when practicable, the wastewater from that hydrostatic test may be routed to the treatment facility, as long as:

1. The treatment facility discharges through an outfall which is already covered by an LPDES permit and routing the hydrostatic test and vessel testing wastewater to the treatment facility will not adversely affect the operation of that treatment facility; and

2. the pollutant being discharged from the hydrostatic test has been previously described as present in the permit application and has limitations and monitoring requirements in the LPDES permit.

Hydrostatic test wastewater and vessel testing wastewater which is routed to treatment facilities such as those described above do not need coverage under this general permit.

This general permit **shall not** apply to activities:

1. producing and/or receiving wastewater from sources other than hydrostatic testing;

2. discharges, or the potential for discharge, of substances that are not addressed by or would not be adequately regulated by this permit, including any of the Organic Toxic Pollutants, Other Toxic Pollutants (Metals and Cyanide) and Total Phenols, and Toxic Pollutants and Hazardous Substances listed in Tables II, III, and V of LAC 33:IX.7107 Appendix D, except as specifically limited herein for discharges of hydrostatic test wastewaters and vessel testing wastewater;

3. discharges of wastewaters which have limits assigned to them in the Louisiana Water Quality Management Plan or an approved Waste Load Allocation which are different from the limits contained in this permit;

4. discharges that are mixed with other, non-covered discharge types unless those other discharges are in compliance with another LPDES permit;

5. discharges of wastewater determined by this Office to present an environmental risk or potential risk of discharging pollutants other than those intended to be regulated by this permit;

6. discharges at operations classed as new sources or new dischargers, if the discharge will cause or contribute to the violation of water quality standards (LAC 33:IX.2317.A.9);

7. discharges which cause or contribute to the violation of a state water quality standard;

8. discharges which are likely to have unauthorized adverse effects upon threatened or endangered species, or on the critical habitat for these species as determined in conjunction with the U.S. Fish and Wildlife Service (USFWS);

9. discharges which adversely affect properties listed or eligible for listing in the National Register of Historic Places, unless they are in compliance with requirements of the National Historic Preservation Act and any necessary activities to avoid or minimize impacts have been coordinated with the Louisiana State Historic Preservation Officer (*for questions, the operator should contact the Section 106 Review Coordinator, Office of Cultural Development, P. O. Box 44247, Baton Rouge, LA 70804 or telephone (225) 342-8170*); or

10. discharges from onshore facilities associated with production, field exploration, drilling, well completion, or well treatment, where the discharge is potentially contaminated with raw material, intermediate products, finished products, byproducts, or waste products (see 40 CFR Part 435.30).

This general permit **may not** apply to:

1. discharges from facilities not in compliance with a previously issued individual or general wastewater discharge permit;

2. discharges from facilities which have previously been in violation of state water quality regulations;

3. discharges from facilities which are located in an environmentally sensitive area including streams designated as Outstanding Natural Resource Waters; and

4. discharges from facilities which owe any outstanding fees or fines to the Department.

The Department may deny coverage under this permit and require submittal of an application for an individual LPDES permit based on a review of the NOI or other information. This Office reserves the right to issue such facilities an individual LPDES permit with more appropriate limitations and conditions.

SECTION B. EFFLUENT LIMITATIONS

During the period beginning with written notification of coverage under this permit and lasting through the expiration date of this general permit, all permittees authorized to discharge under this general permit are authorized to discharge hydrostatic test wastewater and vessel testing wastewater in accordance with the following limitations and monitoring requirements.

OUTFALL 001: DISCHARGES OF HYDROSTATIC TEST AND VESSEL TESTING WASTEWATER

Outfall numbers used in the NOI must correspond to the appropriate outfall numbers in the permit. The permittee shall designate discharges of hydrostatic test and vessel testing wastewater as Outfall 001. Each outfall location for discharges of hydrostatic test and vessel testing wastewater that meets the criteria described above shall be identified in the NOI and shall be monitored in accordance with the following table.

EFFLUENT CHARACTERISTICS*	**DISCHARGE LIMITATIONS**		**MONITORING REQUIREMENTS**	
	DAILY MAX		**MEASUREMENT FREQUENCY [1]**	**SAMPLE TYPE**
Flow (MGD) [2, 3]	Report		1/discharge event	Estimate
TSS [2, 3]	90 mg/L		once prior to proposed discharge	Grab
TSS – NET [2, 3, 4]	90 mg/L		once prior to proposed discharge	Grab
Oil and Grease [2, 3]	15 mg/L		once prior to proposed discharge	Grab
TOC [3, 5, 7]	50 mg/L		once prior to proposed discharge	Grab
Benzene [3, 5, 7]	50 µg/L		once prior to proposed discharge	Grab
Total BTEX [3, 5, 6, 7]	250 µg/L		once prior to proposed discharge	Grab
Lead, Total [3, 5, 7]	50 µg/L		once prior to proposed discharge	Grab
pH - Allowable Range (Standard Units) [2, 3]	6.0 (Min)	9.0 (Max)	once prior to proposed discharge	Grab

* All "heels" or free liquids must be removed from a container **before** washing, rinsing or conducting a hydrostatic test on the storage tank, vessel, or similar container.

[1] If any discharge extends beyond one calendar week in duration, then sampling of the above parameters shall continue on a weekly basis until the discharge ends.

[2] Any permittee who plans to discharge wastewater from the hydrostatic testing of **new** pipes, vessels, and/or tanks**, may request approval from the appropriate LDEQ Regional Office** to sample and run analysis **for Flow, TSS, Oil & Grease, and pH** at the time of discharge (i.e., not prior to discharge). Current regional office address and telephone numbers are available on the LDEQ website at http://deq.louisiana.gov/directory/office/regional-offices. If approval is granted by the appropriate LDEQ Regional Office the permittee may sample and run analysis at the time of discharge. **Permittees hydrostatic testing used pipe, vessels and/or tanks and/or permittees with statewide permit coverage must comply with all other reporting requirements stated in Part II, Other Requirements, Section F.** Other Requirements, Section F is applicable only to permittees with statewide permit coverage and/or permittees hydrostatic testing used pipe, vessels and/or tanks.

[3] The highest result from any individual hydrostatic test must be reported.

[4] The background concentration of Total Suspended Solids (TSS) will be allowed in the discharge if the effluent is being returned to the same water source from which the intake water was obtained. In these cases, the permit limitations will be 90 mg/L plus the concentration of TSS in the intake water. The TSS concentration of the intake water shall be reported in the comment section of the Discharge Monitoring Report (DMR) along with the concentration of TSS in the effluent.

[5] Total Organic Carbon (TOC) shall be measured on discharges from pipes, vessels, and/or tanks which have previously been in service - i.e., those which are not new. Benzene, Total BTEX, and Lead shall be measured on discharges from pipes, vessels, and/or tanks which have been used for the storage or transportation of liquid or gaseous petroleum hydrocarbons**. Accordingly, Flow, TSS, Oil and Grease, and pH are the only limitations and testing requirements for NEW pipes, vessels, and tanks.**

[6] BTEX shall be measured as the sum of benzene, toluene, ethylbenzene, ortho-xylene, meta-xylene, and para-xylene, as quantified using the methods prescribed by the latest approved 40 CFR Part 136.

[7] In accordance with 40 CFR 122.44(i)(1)(iv), the permittee is required to use the most sufficiently sensitive method necessary to prove compliance with the effluent limitations. Further, be advised that all effluent testing shall be conducted utilizing EPA-approved methods from laboratories accredited to conduct the required analyses.

For a given parameter, if the MQL prescribed by the permit is less than the permit limitation, any EPA-approved method with a method detection level (MDL) which is equal to or less than this MQL may be utilized. In this scenario, if an individual analytical result is below the

> MQL, the permittee may report “0” on a discharge monitoring report (DMR).
>
> Where the MQL prescribed by the permit is greater than the permit limitation, the permittee shall use a sufficiently sensitive EPA-approved method capable of yielding a quantifiable result which proves compliance with the limitation. If a sufficiently sensitive method is available with an MDL equal to or less than the permit limit, and the individual analytical result is less than the MDL, the permittee may report “0” on a DMR. However, some instances may occur where there is no sufficiently sensitive EPA-approved method which will yield a quantifiable result equal to or less than the permit limitation. In these cases, the permittee must submit supporting documentation indicating that they used the most sensitive method available. In this scenario, if an individual analytical result is not detectable at the MDL of the method used, the permittee must report “non-detect” on the DMR. Please note that ANY quantifiable result above the permit limitation shall be reported as an excursion.

There shall be no discharge of floating or settleable solids or visible foam in other than trace amounts, or of free oil or other oily materials, or of toxic materials in quantities such as to cause acute toxicity to aquatic organisms [LAC 33:IX.1113.B]. Furthermore, there shall be no visible sheen or stains attributable to this discharge. There shall be no accumulation of solids in the receiving stream which has the potential to negatively impact aquatic life or hinder natural drainage. The use of dilution (Part III, Standard Conditions, Section A.13) or flow augmentation (LAC 33:IX.3705.F) to achieve effluent concentration limitations is prohibited.

No discharge shall generate a flow condition within any drainage conveyance or water body which, either alone or in concert with storm water runoff, represents a threat to public safety by virtue of discharge velocity.

In addition to all other conditions and requirements contained within this permit, the permittee shall follow all reporting requirements in Part II, Other Requirements, Section F.

Additives such as corrosion inhibitors, bactericides, and dyes may not be added to the test water to be discharged without prior written approval from this Office. Written requests for approval must include toxicity data for each additive proposed for use, as well as a clear description of the proposed discharge including projected volumes of wastewaters and additive levels in the wastewaters. See Part II, Other Requirements, Section K for specific requirements.

There shall be no discharge of PCBs. **Proof that PCBs are not present in the pipe is required for all pipelines which have been in use for transmission of *natural gas*.** Such proof shall consist of a statement, signed by a responsible company official, certifying that *either* the pipeline has been tested for, and found to be free of PCBs, *or* that compressors or other equipment that contained PCBs were never used on the pipeline. If the permittee cannot furnish such certification, then the discharge water must be tested for PCBs prior to any discharge, in accordance with the methods prescribed by the latest approved 40 CFR Part 136, and the results submitted to the Water Permits Division.

SECTION C. MONITORING AND REPORTING REQUIREMENTS

Monitoring results for all hydrostatic tests performed during each quarter shall be summarized and reported on an electronic DMR form. The highest result from any individual hydrostatic test must be reported.

1. All sampling and testing shall be conducted in accordance with the methods prescribed by the latest approved 40 CFR Part 136.

2. Samples shall be taken prior to mixing with the receiving water (immediately after exiting the treatment mechanism, if treatment is required.)

3. If treatment is required, provisions must be made during the installation of the treatment unit for obtaining a proper sample.

4. Proper sampling techniques shall be used to ensure that analytical results are representative of pollutants in the discharge. Monitoring shall be conducted according to analytical, apparatus and materials, sample collection, preservation, handling, etc., procedures listed at 40 CFR Part 136, and in particular, Appendices A, B, and C. [LAC 33:IX.4901]

5. The flow measurement sample type for the effluent schedules contained in this general permit are specified as “estimate”. Therefore, the permittee shall not be subject to the accuracy provisions for flow measurement established in the Standard Conditions of this permit. When collecting samples for permit compliance purposes, the flow value may be estimated using best engineering judgment. [LAC 33:IX.2701]

6. If a discharge is found to be in violation of specified limits, the permittee will be subject to enforcement action, including civil penalties, and may be required to obtain an individual permit.

7. Records of monitoring information shall include:

   a. The date, exact place, and time of sampling or measuring;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) and time(s) analyses were begun;
   d. The individual(s) who performed the analyses;
   e. The analytical techniques or methods used;
   f. The results of such analyses; and
   g. The results of all Quality Control procedures.

8. Monitoring results must be submitted through a department-approved electronic document receiving system (NetDMR) in accordance with LAC 33:I.Chapter 21 unless the state administrative authority gives written authorization to the permittee to submit monitoring results in an alternative format such as paper DMRs. When reporting electronically and monitoring is not required during a certain quarter(s), use a no data indicator (NODI) code of 9 for conditional or not required. For additional information regarding NetDMR, see the LDEQ's NetDMR website: http://deq.louisiana.gov/page/netdmr. Permittees shall submit a DMR for each outfall identified in Appendix A attached to the permittee's cover letter for every monitoring period even if there were no discharges during a monitoring period. All monitoring reports must be retained for a period of at least three (3) years from the date of sample measurement. The permittee shall make available to this Department, upon request, copies of all monitoring data required by this permit. Be aware that LDEQ will accept laboratory results only from "LDEQ accredited" laboratories (see Part III, Standard Conditions, Section C.10).

All permittees shall submit a DMR quarterly even if there were no discharges during a particular monitoring period. If more than one sample is collected during a monitoring period, the highest result from any individual test taken during the Monitoring Period must be reported as the Daily Maximum. Laboratory results for each regulated parameter in your discharge shall be averaged and reported as the Monthly Average on a Discharge Monitoring Report (DMR). Note that Daily Maximum values cannot be averaged.

Monitoring results for all hydrostatic tests performed during each quarter shall be summarized and reported on a Discharge Monitoring Report (DMR)and electronically submitted to the Office of Environmental Compliance on a quarterly basis as described below.

The schedule for quarterly DMR electronic submission is as follows:

Quarterly Submission

Monitoring Period	DMR Postmark Date
January, February, March	April 28th
April, May, June	July 28th
July, August, September	October 28th
October, November, December	January 28th

All DMR submittals must contain the operator-specific **permit authorization number** and **Agency Interest (AI) Number**. The operator-specific permit authorization number and AI number will be found on the cover letter that the permittee will receive from LDEQ authorizing the site-specific or statewide discharge of hydrostatic test and vessel wastewater. *Please note that your operator-specific AI Number is* *not* *AI 97422. AI 97422 is the Agency Interest Number for the master general permit.*

An electronic DMR reporting system (NetDMR) is available at www.deq.louisiana.gov/ using the following path: Enforcement – NetDMR. Permittees must use this online system, unless a waiver is granted by the Office of Environmental Compliance – Enforcement Division, Permit Compliance Unit (PCU). If granted, Discharge Monitoring Reports shall be submitted to the Enforcement Division, Office of Environmental Compliance, Department of Environmental Quality, P. O. Box 4312, Baton Rouge, LA 70821-4312. **DMRs must be electronically submitted in accordance with LAC 33:I.2101.A and B no later than the 28th day of the month following the reporting period.**

PART II: OTHER REQUIREMENTS

The permittee must comply with all applicable provisions of the Louisiana Water Quality Regulations including standard conditions found in LAC 33:IX.2701. This Office has established the following definitions and requirements in accordance with those regulations. The definition of other terms may be found in the Louisiana Water Pollution Control Regulations (LAC 33:IX.2313).

SECTION A. DEFINITIONS

For definitions of monitoring and sampling terminology see Part III, Standard Conditions, Section F.

Additional definitions:

1. *Act*: means Act 449 of the 1979 Louisiana Legislature which established Section 2001, et seq. of Title 30 of the Louisiana Revised Statutes of 1950 and any subsequent amendment to these Sections.

2. *Activity*: means any conduct, operation or process which causes or may cause the discharge of pollutants into the waters of the state.

3. *Bypass*: means the intentional diversion of waste streams from any portion of a treatment facility.

4. *Commingled Discharges*: means waste streams that are mixed prior to final discharge and can not be sampled separately as internal outfalls.

5. *Daily Maximum discharge limitation*: means the highest allowable permitted pollutant concentration that is allowed to be discharged during a particular discharge event.

6. *Discharge*: when used without qualification means the “discharge of a pollutant”.

7. *Discharge Monitoring Report (DMR)*: The form used when a waiver from the electronic DMR reporting system has been granted (including any subsequent additions, revisions, or modifications) to report self-monitoring results of effluent discharges by NPDES permittees and permittees in delegated states. EPA Form 3320-1 is the DMR form that must be used by permittees in the state of Louisiana (LPDES permittees) to report self-monitoring results if a waiver from the electronic DMR reporting system has been granted.

8. *Effluent*: means wastewater discharged to the waters of the State.

9. *Effluent Limitations*: means any applicable state or federal quality or quantity limitation which imposes any restriction or prohibition on quantities, discharge rates, and concentrations of pollutants which are discharged into the waters of the State.

10. *Facility*: means a pollution source, or any public or private property or site and all contiguous land and structures, other appurtenances and improvements, where any activity is conducted which discharges or may result in the discharge of pollutants into waters of the State.

11. *Facility-specific*: means any fixed location at which the activities covered by this permit occur. A fixed location may have several discharge points at that location.

12. *General Permit*: means an LPDES permit authorizing a category of similar discharges within a geographical area.

13. *Hydrostatic Test*: is a leakage determination test that is conducted on a hollow object or piece of equipment by filling the tested item with water and subjecting it to pressure.

14. *Hydrostatic Test Wastewater*: water that has been used to conduct a hydrostatic test.

15. *Internal Outfalls*: means sampling points already in existence in a combined effluent outfall that are positioned such as to allow the different wastewater streams to be sampled before they combine.

16. *LPDES*: means those portions of the Louisiana Environmental Quality Act and the Louisiana Water Control Law and all regulations promulgated under their authority which are deemed equivalent to the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act in accordance with Section 402 of the Clean Water Act and all applicable federal regulations.

17. *NetDMR*: means a web-based tool that allows facilities to electronically sign and submit LPDES discharge monitoring reports (DMRs) to the LDEQ.

18. *Office*: means the Office of Environmental Services within the Department of Environmental Quality.

19. *Operator*: means the person or legal entity responsible for the operation and/or maintenance of a facility with a discharge covered by the Title 33 regulations.

20. *Owner*: means the person or legal entity holding legal title to a facility with a discharge covered by the Title 33 regulations.

21. *Person*: means an individual, municipality, public or private corporation, partnership, firms, the United States Government and any agent or subdivision thereof, or any other juridical person.

22. *Petroleum*: means crude oil, gasoline, diesel fuel, aviation fuel, fuel oils, gasoline additives stored and used in conjunction with gasoline storage, petroleum lubricants, petroleum solvents and petroleum derived asphalts.

23. *Process Wastewater*: means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. Process wastewater may include interior or exterior washing of plant trucks or product receptacles.

24. *Secretary*: means the Secretary of the Louisiana Department of Environmental Quality.

25. *Standard Methods*: means Standard Methods for the Examination of Water and Wastewater, American Public Health Association, Washington, DC, the American Water Works Association, and the Water Environment Federation.

26. *State Administrative Authority*: means the Secretary of the Department of Environmental Quality or his designee or the appropriate assistant secretary or his designee.

27. *Total Suspended Solids (TSS)*: means the amount of solid material suspended in water commonly expressed as a concentration in terms of mg/L.

28. *Unauthorized Discharge*: means a continuous, intermittent or one-time discharge, whether intentional, anticipated, or unanticipated, from any source, permitted or unpermitted, which is in contravention of any provision of the Act or of any permit terms and conditions, or of any applicable regulation, compliance schedule, variance or exception of the administrative authority.

29. *Vessel Testing Wastewater*: means, **after removing all "heels" or free liquids from a pipe, pipeline, flowline, storage tank, vessel or similar conduit or container**, wastewater generated by cleaning or rinsing either the interior or the exterior surface of a new conduit or container; wastewater generated by cleaning or rinsing either the interior or the exterior of a conduit or container that has been used to contain, transfer, transport, or store natural gas, crude oil, liquid or gaseous petroleum hydrocarbons, or materials of similar nature; or wastewater generated during the hydrostatic test of either a new or a petroleum contaminated conduit or container.

30. *Visible sheen*: means a silvery or metallic sheen, gloss, or increased reflectivity; visual color; or iridescence on the water surface.

31. *Waters of the State*: for the purposes of the Louisiana Pollutant Discharge Elimination System, all surface waters within the state of Louisiana and, on the coastline of Louisiana and the Gulf of Mexico, all surface waters extending therefrom three miles into the Gulf of Mexico. For purposes of the LPDES, this includes all surface waters that are subject to the ebb and flow of the tide, lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, impoundments of waters within the state of Louisiana otherwise defined as *Waters of the United States* in 40 CFR 122.2, and tributaries of all such waters. *Waters of the State* does not include wastewater treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act, 33 U.S.C. 1251 et seq.

SECTION B. COMPLIANCE SCHEDULE

The permittee shall be in compliance with the effluent limitations and monitoring requirements specified herein on the date of authorization of coverage under this general permit. If a discharge is found to be in violation of specified limits, the permittee will be subject to enforcement action, including civil penalties, and may be required to obtain an individual permit.

SECTION C. OTHER DISCHARGES

This permit does not in any way authorize the permittee to discharge a pollutant not limited or monitored for in the permit, not normally associated with the activity represented in the notice of intent, or from a source not eligible for coverage under this general permit.

SECTION D. STATE WATER QUALITY STANDARDS

LAC 33:IX.1113 describes numerical and general criteria that apply to all water bodies of the State. Criteria are elements of the water quality which set limitations on the permissible amounts of a substance or other characteristics of state waters. The General Criteria, as described in the Louisiana Administrative Code, limit discharges to maintain aesthetics, color, turbidity, the biologic and aquatic community integrity, and many other elements in the receiving water body. Any noncompliance with the General or Numerical Criteria is not authorized under this permit.

Discharges from facilities permitted under LPDES general permits typically consist of low volume flows, and discharges that are intermittent in nature. This general permit is applicable to very specific types of facilities and allows very limited types of discharges that specifically occur at industrial facilities that are eligible for coverage under this permit. The effluent limitations and other conditions are determined to be sufficient to assure protection to state waters. Pursuant to LAC 33:IX.2317.A.9 new source discharges or new discharges of wastewater from a facility whose discharges are in compliance with the general permit requirements should not adversely impact water quality of 303(d) listed impaired water bodies nor should they cause or contribute to the violation of state water quality standards in receiving water bodies throughout the state, including 303(d) listed impaired water bodies. Discharges from facilities which are authorized under this general permit will not negatively impact the water quality of receiving streams because permitted facilities are required to be in compliance with the general permit requirements immediately upon coverage by the permit. In accordance with Part II, Other Requirements, Sections E and G, measures can be taken by the permitting authority to prohibit any discharge that is not protective of state water quality standards.

LDEQ will review and evaluate each NOI submitted in accordance with the State Antidegradation Policy to assess eligibility for coverage under the general permit. Through the analysis of each discharge, its effects upon the receiving water body, the characteristics of the receiving water body in combination with other water quality factors (including point source discharges in near proximity), LDEQ will determine if the discharge is eligible for coverage. If LDEQ determines the discharge will have reasonable potential to adversely impact water quality, coverage under the general permit will not be granted.

SECTION E. REQUIRING AN INDIVIDUAL PERMIT OR AN ALTERNATIVE GENERAL PERMIT

1. The LDEQ may require any person authorized by this permit to apply for and/or obtain either an individual LPDES permit or an alternative LPDES general permit. Any interested person may petition the LDEQ to take action under this paragraph. Where the LDEQ requires a discharger authorized to discharge under this permit to apply for an individual LPDES permit, the LDEQ shall notify the discharger in writing that a permit application or alternative general permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of issuance or denial of the individual LPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. The LDEQ may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an application as required by the LDEQ under this paragraph, then the applicability of this permit to the permittee is automatically terminated at the end of the day specified by the LDEQ for application submittal.

2. Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of LAC 33:IX.2515.B.3.c., with reasons supporting

the request, to the State Administrative Authority at the Louisiana Department of Environmental Quality, Office of Environmental Services, P. O. Box 4313, Baton Rouge, LA 70821-4313, ATTN: Water Permits Division. The request may be granted by issuance of an individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. In order to appropriately cover all discharges that might occur at a facility, a permittee authorized to discharge under this LPDES permit might also need coverage under an individual LPDES permit or other LPDES general permits for discharges that occur at the facility/site that are not authorized by this general permit. The permittee shall maintain appropriate permit coverage for the permitted facility/site and shall maintain compliance with all effective LPDES permits issued to the facility/site.

4. When an individual LPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative LPDES general permit, the applicability of this permit to that LPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. **When an individual LPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied coverage under an alternative LPDES general permit, that owner or operator then becomes ineligible for authorization to discharge under this general permit, unless the LDEQ determines that specific discharges from the owner or operator's facility may be authorized by this permit.**

SECTION F. REPORTING TO REGIONAL OFFICE (Hydrostatic Testing used pipe, vessels and/or tanks and/or Statewide Basis – Additional Sites)

In addition to the sampling analysis provisions specified above in Outfall 001, any permittee hydrostatic testing used pipe, vessels and/or tanks and/or any permittee with coverage on a statewide basis must telephone the local regional office in whose region the discharge will occur **prior** to the initial discharge from a hydrostatic test. Current regional office address and telephone numbers are available on the LDEQ website at http://deq.louisiana.gov/directory/office/regional-offices. At the time of the telephone call the permittee must provide the regional office with:

1. the location of the proposed discharge;
2. the approximate date of the proposed discharge;
3. the effluent pathway into the receiving waters;
4. the source of the fill water to be utilized during the hydrostatic test;
5. the approximate volume of water to be discharged;
6. whether the discharge is to be from new or used equipment (pipe, tank, flowline, or other container);
7. whether additives approved by the Office of Environmental Services are to be used in

the test water (See Part II, Other Requirements, Section K); and

8. any additional information which the Regional Office representative deems necessary.

Facilities that conduct hydrostatic testing of tanks or vessels at their site on a regular basis may request approval from the regional office to discharge from scheduled hydrostatic test events. The facility should submit a written request to the regional office that includes the above information along with a schedule of when testing will occur. If approved by the regional office, the facility may discharge in accordance with the schedule of testing without notifying the regional office by telephone **prior** to each testing event.

In addition, written results of laboratory analyses conducted in accordance with the effluent limitations in Outfall 001 of this permit must be submitted to the regional office **prior** to commencing the discharge from the hydrostatic test. The sample analysis must have been performed less than thirty (30) working days before the proposed commencement of discharge. **If approved by the appropriate regional office**, this prior submission of laboratory analyses will not be required for discharges from **new** vessels or tanks. In such instances, sampling shall be conducted for the purposes of DMR submittal at the time of the discharge in accordance with the effluent limitations in Outfall 001 of this permit.

SECTION G. PERMIT REOPENER CLAUSE

If there is evidence indicating that the discharges authorized by this permit cause, have the reasonable potential to cause, or contribute to a violation of water quality standard, the discharge may be required to obtain an individual permit or an alternative general permit in accordance with Definitions and Other Requirements, Sections F and G of this permit, or the permit may be modified to include different requirements and/or limitations.

SECTION H. 24-HOUR ORAL REPORTING: DAILY MAXIMUM LIMITATION VIOLATIONS

Under the provisions of Part III, Standard Conditions, Section D.6.b. of this permit, violations of daily maximum limitations for the following pollutants shall be reported to the Office of Emergency Response. Notification of all violations of daily maximum limitations for these parameters must be reported to the Office of Environmental Compliance Single Point of Contact (SPOC) within 24 hours upon discovering the unauthorized discharge or release. Notification can be made by email or orally utilizing any **one** of the following procedures: (1) use the Online Incident Reporting report and procedures found at http://deq.louisiana.gov/form/online-incident-reporting-spill-incident-release; (2) use a direct email addressed to spoc@la.gov; or (3) verbally notify LDEQ by calling the LDEQ Hotline at (225) 342-1234, which is manned 24 hours a day, 7 days a week, or by calling the LDEQ-SPOC at (225) 219-3640 which is manned during normal office hours (M-F, 8:00 am – 4:30 pm). The online notification procedure removes the need to make a verbal call to the LDEQ Hotline or the SPOC phone number and allows the notification to be submitted directly to the SPOC electronically. The Excursion Form found at http://deq.louisiana.gov/form/online-incident-reporting-spill-incident-release may be completed and emailed to spoc@la.gov to satisfy the 24-hour reporting requirement. Under the provisions of Part III, Standard Conditions, Section D.6.e of this permit, the facility must also submit a Written Notification Report within five (5) calendar days after submitting the 24-hour electronic or verbal notification of any LPDES permit limit excursion. Written notification Reports may be either faxed or mailed to the LDEQ, Office of Environmental Compliance, Surveillance Division. Written Notification Reports should be **either** faxed to (225) 219-4044, or mailed to the Louisiana Department of Environmental Quality, ATTN: Office of Environmental Compliance – SPOC, Unauthorized Discharge Notification Report, P. O. Box 4312, Baton Rouge, LA 70821-4312.

Pollutants: Benzene, Total BTEX, Lead

SECTION I. MINIMUM QUANTIFICATION LEVEL (MQL)

METALS	MQL (µg/L)
Lead (Total)	2

VOLATILE COMPOUNDS	MQL (µg/L)
Benzene	10
Ethylbenzene	10
Toluene	10
Xylene	10

PESTICIDES	MQL (µg/L)
Total PCBs	0.2

The permittee may develop an effluent specific method detection limit (MDL) in accordance with Appendix B to 40 CFR Part 136 (See LAC 33:IX.4901). For any pollutant for which the permittee determines an effluent specific MDL, the permittee shall send to this Office a report containing QA/QC documentation, analytical results, and calculations necessary to demonstrate that the effluent specific MDL was correctly calculated. An effluent specific minimum quantification level (MQL) shall be determined in accordance with the following calculation:

$$MQL = 3.3 \times MDL$$

Upon written approval by this Office, the effluent specific MQL may be utilized by the permittee for all future Discharge Monitoring Report (DMR) calculations and reporting requirements.

In accordance with 40 CFR 122.44(i)(1)(iv), the permittee is required to use the most sufficiently sensitive method necessary to prove compliance with the effluent limitations. Further, be advised that all effluent testing shall be conducted utilizing EPA-approved methods from laboratories accredited to conduct the required analyses.

For a given parameter, if the MQL prescribed by the permit is less than the permit limitation, any EPA-approved method with a method detection level (MDL) which is equal to or less than this MQL may be utilized. In this scenario, if an individual analytical result is below the MQL, the permittee may report “0” on a discharge monitoring report (DMR).

Where the MQL prescribed by the permit is greater than the permit limitation, the permittee shall use a sufficiently sensitive EPA-approved method capable of yielding a quantifiable result which proves compliance with the limitation. If a sufficiently sensitive method is available with an MDL equal to or less than the permit limit, and the individual analytical result is less than the MDL, the permittee may report “0” on a DMR. However, some instances may occur where there is no sufficiently sensitive EPA-approved method which will yield a quantifiable result equal to or less than the permit limitation. In these cases, the permittee must submit supporting documentation indicating that they used the most sensitive method available. In this scenario, if an individual analytical result is not detectable at the MDL of the method used, the permittee must report “non-detect” on the DMR. Please note that ANY quantifiable result above the permit limitation shall be reported as an excursion.

SECTION J. FLOW MEASUREMENT

The flow measurement sample type for the effluent schedule contained in this general permit is specified as “estimate”. Therefore, the permittee shall not be subject to the accuracy provisions for flow measurement established in the Standard Conditions of this permit. When collecting samples for permit compliance purposes, the flow may be estimated using best engineering judgment. [LAC 33:IX.2701]

SECTION K. PROPOSED ADDITIVES

Additives such as corrosion inhibitors, bactericides, and dyes may not be added to the test water to be discharged without prior written approval from this Office. Written requests for approval must include the following information:

1. Facility name and physical address
2. GPS coordinates of the outfall that will discharge wastewater containing the proposed additive
3. First named receiving waters that the effluent from this facility will enter
4. Effluent flow from the applicable outfall (in MGD)

5. Duration of flow
6. End of pipe concentration (mg/L or ppm) of the proposed additive(s)
7. Holding time of the wastewater containing the additive
8. SDS sheets for each additive
9. Aquatic toxicity data. If ecological toxicity is not provided in the SDS sheets, Whole Effluent Toxicity (WET) testing data may be provided by the facility

A letter which fully addresses items 1-9 above must be submitted to LDEQ at least sixty (60) days prior to the proposed discharge. If any of the above information is not submitted in the written request, the approval of the additive may be delayed or the use of the additive may be denied.

PART III
STANDARD CONDITIONS FOR LPDES PERMITS

SECTION A. GENERAL CONDITIONS

1. Introduction
   In accordance with the provisions of LAC 33:IX.2701, et seq., this permit incorporates either expressly or by reference ALL conditions and requirements applicable to the Louisiana Pollutant Discharge Elimination System Permits (LPDES) set forth in the Louisiana Environmental Quality Act (LEQA), as amended, as well as ALL applicable regulations.

2. Duty to Comply
   The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Louisiana Environmental Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. Penalties for Violation of Permit Conditions
   a. La. R. S. 30:2025 provides for civil penalties for violations of these regulations and the Louisiana Environmental Quality Act. La. R. S. 30:2076.2 provides for criminal penalties for violation of any provisions of the LPDES or any order or any permit condition or limitation issued under or implementing any provisions of the LPDES program. (See Section E. Penalties for Violation of Permit Conditions for additional details).

   b. Any person may be assessed an administrative penalty by the State Administrative Authority under La. R. S. 30:2025 for violating a permit condition or limitation implementing any of the requirements of the LPDES program in a permit issued under the regulations or the Louisiana Environmental Quality Act.

4. Toxic Pollutants
   a. Other effluent limitations and standards under Sections 301, 302, 303, 307, 318, and 405 of the Clean Water Act. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Clean Water Act for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, the state administrative authority shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition.

   b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act within the time provided in the regulations that establish these standards or prohibitions, or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

5. Duty to Reapply
   a. Individual Permits. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The new application shall be submitted at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the state administrative authority. (The state administrative authority shall not grant permission for applications to be submitted later than the expiration date of the existing permit.) Continuation of expiring permits shall be governed by regulations promulgated at LAC 33:IX.2321 and any subsequent amendments.

b. General Permits. General permits expire five years after the effective date. The 180-day reapplication period as defined above is not applicable to general permit authorizations. Reissued general permits may provide automatic coverage for permittees authorized under the previous version of the permit, and no new application is required. Requirements for obtaining authorization under the reissued general permit will be outlined in Part I of the new permit. Permittees authorized to discharge under an expiring general permit should follow the requirements for obtaining coverage under the new general permit to maintain discharge authorization.

6. Permit Action

This permit may be modified, revoked and reissued, or terminated for cause in accordance with LAC 33:IX.2903, 2905, 2907, 3105 and 6509. The causes may include, but are not limited to, the following:

a. Noncompliance by the permittee with any condition of the permit;

b. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time; or

c. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination;

d. A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge;

e. Failure to pay applicable fees under the provisions of LAC 33: IX. Chapter 13;

f. Change of ownership or operational control.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege, nor does it authorize any injury to private or public property, nor any infringement of federal, state, or local laws or regulations.

8. Duty to Provide Information

The permittee shall furnish to the state administrative authority, within a reasonable time, any information which the state administrative authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the state administrative authority, upon request, copies of records required to be kept by this permit.

9. Criminal and Civil Liability

Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to La. R.S. 30:2025.

10. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

11. State Laws
    Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

12. Severability
    If any provision of these rules and regulations, or the application thereof, is held to be invalid, the remaining provisions of these rules and regulations shall not be affected, so long as they can be given effect without the invalid provision. To this end, the provisions of these rules and regulations are declared to be severable.

13. Dilution
    A permittee shall not achieve any effluent concentration by dilution unless specifically authorized in the permit. A permittee shall not increase the use of process water or cooling water or otherwise attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve permit limitations or water quality.

14. Facilities Requiring Approval from Other State Agencies
    In accordance with La. R.S.40.4(A)(6) the plans and specifications of all sanitary sewerage treatment systems, both public and private, must be approved by the Department of Health and Hospitals state health officer or his designee. It is unlawful for any person, firm, or corporation, both municipal and private to operate a sanitary sewage treatment facility without proper authorization from the state health officer.

    In accordance with La. R.S.40.1149, it is unlawful for any person, firm or corporation, both municipal and private, operating a sewerage system to operate that system unless the competency of the operator is duly certified by the Department of Health and Hospitals state health officer. Furthermore, it is unlawful for any person to perform the duties of an operator without being duly certified.

    In accordance with La. R.S.48.385, it is unlawful for any industrial wastes, sewage, septic tanks effluent, or any noxious or harmful matter, solid, liquid or gaseous to be discharged into the side or cross ditches or placed upon the rights-of-ways of state highways without the prior written consent of the Department of Transportation and Development chief engineer or his duly authorized representative and of the secretary of the Department of Health and Hospitals.

15. The standards provided in Chapter 11 – Surface Water Quality Standards are official regulations of the state, and any person who discharges pollutants to the waters of the state in such quantities as to cause these standards to be violated shall be subject to the enforcement procedures of the state as specified in R.S. 30:2025.

SECTION B. PROPER OPERATION AND MAINTENANCE

1. Need to Halt or Reduce not a Defense
   It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Duty to Mitigate
   The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The permittee shall also take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with the permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

3. Proper Operation and Maintenance
   a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up

or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and other functions necessary to ensure compliance with the conditions of this permit.

4. Bypass of Treatment Facilities
  a. ***Bypass***. The intentional diversion of waste streams from any portion of a treatment facility.

  b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Section B.4.c. and 4.d of these standard conditions.

  c. Notice
    (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Office of Environmental Services, Water Permits Division, if possible at least ten days before the date of the bypass.

    (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in LAC 33:IX.2701.L.6 (24-hour notice) and Section D.6.e. of these standard conditions.

  d. Prohibition of bypass
    (1) Bypass is prohibited, and the state administrative authority may take enforcement action against a permittee for bypass, unless:

      (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

      (c) The permittee submitted notices as required by Section B.4.c of these standard conditions.

    (2) The state administrative authority may approve an anticipated bypass after considering its adverse effects, if the state administrative authority determines that it will meet the three conditions listed in Section B.4.d(1) of these standard conditions.

5. Upset Conditions
  a. Upset. An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

  b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Section B.5.c. are met. No determination made during administrative review of claims that noncompliance was caused by an upset, and before an action for noncompliance, is final administrative action subject to judicial review.

  c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
    (1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required by LAC 33:IX.2701.L.6.b.ii. and Section D.6.e.(2) of these standard conditions; and

(4) The permittee complied with any remedial measures required by Section B.2 of these standard conditions.

d. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. Removed Substances
Solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be properly disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the state and in accordance with environmental regulations.

7. Percent Removal
For publicly owned treatment works, the 30-day average percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent in accordance with LAC 33:IX.5905.A.3. and B.3. Publicly owned treatment works utilizing waste stabilization ponds/oxidation ponds are not subject to the 85 percent removal rate for Total Suspended Solids.

SECTION C. MONITORING AND RECORDS

1. Inspection and Entry
The permittee shall allow the state administrative authority or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by the law to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

Enter upon the permittee's premises where a discharge source is or might be located or in which monitoring equipment or records required by a permit are kept for inspection or sampling purposes. Most inspections will be unannounced and should be allowed to begin immediately, but in no case shall begin more than thirty (30) minutes after the time the inspector presents his/her credentials and announces the purpose(s) of the inspection. Delay in excess of thirty (30) minutes shall constitute a violation of this permit. However, additional time can be granted if the inspector or the Administrative Authority determines that the circumstances warrant such action; and

b. Have access to and copy, at reasonable times, any records that the department or its authorized representative determines are necessary for the enforcement of this permit. For records maintained in either a central or private office that is open only during normal office hours and is closed at the time of inspection, the records shall be made available as soon as the office is open, but in no case later than the close of business the next working day;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act or the Louisiana Environmental Quality Act, any substances or parameters at any location.

e. Sample Collection

   (1) When the inspector announces that samples will be collected, the permittee may be given an additional thirty (30) minutes to prepare containers in order to collect duplicates. If the permittee cannot obtain and prepare sample containers within this time, he is considered to have waived his right to collect duplicate samples and the sampling will proceed immediately. Further delay on the part of the permittee in allowing initiation of the sampling will constitute a violation of this permit.

   (2) At the discretion of the administrative authority, sample collection shall proceed immediately (without the additional 30 minutes described in Section C.1.a. above) and the inspector shall supply the permittee with a duplicate sample.

f. It shall be the responsibility of the permittee to ensure that a facility representative familiar with provisions of its wastewater discharge permit, including any other conditions or limitations, be available either by phone or in person at the facility during all hours of operation. The absence of such personnel on-site who are familiar with the permit shall not be grounds for delaying the initiation of an inspection except in situations as described in Section C.1.b. of these standard conditions. The permittee shall be responsible for providing witnesses/escorts during inspections. Inspectors shall abide by all company safety rules and shall be equipped with standard safety equipment (hard hat, safety shoes, safety glasses) normally required by industrial facilities.

g. Upon written request copies of field notes, drawings, etc., taken by department personnel during an inspection shall be provided to the permittee after the final inspection report has been completed.

2. Representative Sampling

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. All samples shall be taken at the outfall location(s) indicated in the permit. The state administrative authority shall be notified prior to any changes in the outfall location(s). Any changes in the outfall location(s) may be subject to modification, revocation and reissuance in accordance with LAC 33:IX.2903.

3. Retention of Records

Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the state administrative authority at any time.

4. Record Contents

Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The time(s) analyses were begun;
e. The individual(s) who performed the analyses;
f. The analytical techniques or methods used;
g. The results of such analyses; and
h. The results of all quality control procedures.

5. Monitoring Procedures

a. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in this permit.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to ensure accuracy of measurements and shall maintain appropriate records of such activities.

c. The permittee or designated laboratory shall have an adequate analytical quality assurance/quality control program to produce defensible data of known precision and accuracy. All quality control measures shall be assessed and evaluated on an on-going basis and quality control acceptance criteria shall be used to determine the validity of the data. All method specific quality control as prescribed in the method shall be followed. If quality control requirements are not included in the method, the permittee or designated laboratory shall follow the quality control requirements as prescribed in the Approved Edition (40 CFR Part 136) Standard Methods for the Examination of Water and Wastes, Sections 1020A and 1020B. General sampling protocol shall follow guidelines established in the “Handbook for Sampling and Sample Preservation of Water and Wastewater, 1982 ”U.S. Environmental Protection Agency. This publication is available from the National Service Center for Environmental Publications https://nepis.epa.gov/Exe/ZyNET.exe/30000QSA.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C81thru85%5CTxt%5C00000001%5C30000QSA.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

6. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

a. “A Guide to Methods and Standards for the Measurement of Water Flow, 1975,” U.S. Department of Commerce, National Bureau of Standards. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161, Phone number (800) 553-6847. Order by NTIS publication number COM-75-10683.

b. “Flow Measurement in Open Channels and Closed Conduits, Volumes 1 and 2,” U.S. Department of Commerce, National Bureau of Standards. This publication is available from the National Technical Service (NTIS), Springfield, VA, 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-273 535.

c. “NPDES Compliance Flow Measurement Manual,” U.S. Environmental Protection Agency, Office of Water Enforcement. This publication is available from the National Technical Information Service (NTIS), Springfield, VA 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-82-131178.

7. Prohibition for Tampering: Penalties

a. La. R.S. 30:2025 provides for punishment of any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit.

b. La. R.S. 30:2076.2 provides for penalties for any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance.

8. Additional Monitoring by the Permittee
   If the Permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 (See LAC 33:IX.4901) or, in the case of sludge use and disposal, approved under 40 CFR Part 136 (See LAC 33:IX.4901) unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the state administrative authority.

9. Averaging of Measurements
   Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the state administrative authority in the permit.

10. Laboratory Accreditation
    a. LAC 33:I.Subpart 3, Chapters 45-59 provide requirements for an accreditation program specifically applicable to commercial laboratories, wherever located, that provide chemical analyses, analytical results, or other test data to the department, by contract or by agreement, and the data is:
       (1) Submitted on behalf of any facility, as defined in La. R.S.30:2004;
       (2) Required as part of any permit application;
       (3) Required by order of the department;
       (4) Required to be included on any monitoring reports submitted to the department;
       (5) Required to be submitted by contractor
       (6) Otherwise required by department regulations.

    b. The department laboratory accreditation program, Louisiana Environmental Laboratory Accreditation Program (LELAP) is designed to ensure the accuracy, precision, and reliability of the data generated, as well as the use of department-approved methodologies in generation of that data. Laboratory data generated by commercial environmental laboratories that are not (LELAP) accredited will not be accepted by the department. Retesting of analysis will be required by an accredited commercial laboratory.

       Where retesting of effluent is not possible (i.e. data reported on DMRs for prior month's sampling), the data generated will be considered invalid and in violation of the LPDES permit.

    c. Regulations on the Louisiana Environmental Laboratory Accreditation Program and a list of labs that have applied for accreditation are available on the department website located under LDEQ → About LDEQ→ LA Lab Accreditation at the following link:

       http://deq.louisiana.gov/page/la-lab-accreditation

       Questions concerning the program may be directed to (225) 219-3247.

SECTION D. REPORTING REQUIREMENTS

1. Facility Changes
   The permittee shall give notice to the state administrative authority as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

   b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under LAC 33:IX.2703.A.1.

   c. For Municipal Permits. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to Section 301, or 306 of the CWA if it were directly discharging those pollutants; and any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. Anticipated Noncompliance
The permittee shall give advance notice to the state administrative authority of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers
This permit is not transferable to any person except after notice to the state administrative authority. The state administrative authority may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act or the Louisiana Environmental Quality Act. (See LAC 33:IX.2901; in some cases, modification or revocation and reissuance is mandatory.)

A permit may be transferred by the permittee to a new owner or operator only if: (1)the permit has been modified or revoked and reissued (under LAC 33:IX.2903.A.2.b) by the permittee and new owner submitting a Name/Ownership/Operator Change Form (NOC-1 Form) and approved by LDEQ (LAC 33:I.Chapter 19); or (2) a minor modification made (under LAC 33:IX.2905) to identify the new permittee and incorporate such other requirements as may be necessary under the Clean Water Act and the Louisiana Environmental Quality Act.

The NOC-1 form can be found using the pathway LDEQ → Water→ LPDES Application Forms at the following link: **http://deq.louisiana.gov/page/lpdes-water-permits**

4. Monitoring Reports
Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be submitted through a department-approved electronic document receiving system (NetDMR) in accordance with LAC 33:I.Chapter 21 unless the state administrative authority gives written authorization to the permittee to submit monitoring results in an alternative format such as paper DMRs.

Information about NetDMR and gaining access can be viewed using the pathway LDEQ → Water→ NETDMR on the department's website at: **http://deq.louisiana.gov/page/netdmr**

The permittee shall submit properly completed Discharge Monitoring Reports (DMRs) using the format specified in the permit.

If authorized to report using an alternative format such as paper DMRs, then preprinted DMRs will be provided to majors/92-500s and other designated facilities. Please contact the Permit Compliance Unit concerning preprints. Self-generated DMRs must be pre-approved by the Permit Compliance Unit prior to submittal. Self-generated DMRs are approved on an individual basis. Requests for approval of self-generated DMRs should be submitted to:

Supervisor, Permit Compliance Unit
Office of Environmental Compliance
Post Office Box 4312
Baton Rouge, LA 70821-4312

5. Compliance Schedules
   Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

6. Requirements for Notification

   a. Emergency Notification
      As required by LAC 33.I.3915, in the event of an unauthorized discharge that does cause an emergency condition, the discharger shall notify the hotline (DPS 24-hour Louisiana Emergency Hazardous Materials Hotline) by telephone at (877) 925-6595 (collect calls accepted 24 hours a day) immediately (a reasonable period of time after taking prompt measures to determine the nature, quantity, and potential off-site impact of a release, considering the exigency of the circumstances), but in no case later than one hour after learning of the discharge. (An emergency condition is any condition which could reasonably be expected to endanger the health and safety of the public, cause significant adverse impact to the land, water, or air environment, or cause severe damage to property.) Notification required by this section will be made regardless of the amount of discharge. Prompt Notification Procedures are listed in Section D.6.c. of these standard conditions.

      A written report shall be provided within seven calendar days after the notification. The report shall contain the information listed in Section D.6.d. of these standard conditions and any additional information in LAC 33:I.3925.B.

   b. Prompt Notification
      As required by LAC 33:I.3917, in the event of an unauthorized discharge that exceeds a reportable quantity specified in LAC 33:I.Subchapter E, but does not cause an emergency condition, the discharger shall promptly notify DPS by telephone at (877) 925-6595 (collect calls accepted 24 hours a day) within 24 hours after learning of the discharge.

      In the event of an unauthorized discharge that requires notification, the DPS 24-hour Louisiana Emergency Hazardous Materials Hotline will notify the Department of Environmental Quality.

      In accordance with LAC 33:I.3923, notifications not required by LAC 33:I.3915 or 3917 shall be provided to the department within a time frame not to exceed 24 hours, or as specified by the specific regulation or permit provision requiring the notification, and shall be given to SPOC, as follows:

      (1) by the Online Incident Reporting screens found at **http://deq.louisiana.gov/page/file-a-complaint-report-an-incident**;or
      (2) by e-mail utilizing the Incident Report Form and instructions found at **http://deq.louisiana.gov/page/single-point-of-contact**;or
      (3) by telephone at (225) 219-3640 during office hours, or (225) 342-1234 after hours and on weekends and holidays.

   c. Content of Prompt Notifications. The following guidelines will be utilized as appropriate, based on the conditions and circumstances surrounding any unauthorized discharge, to provide relevant information regarding the nature of the discharge:
      (1) the name of the person making the notification and the telephone number where any return calls from response agencies can be placed;
      (2) the name and location of the facility or site where the unauthorized discharge is imminent or has occurred, using common landmarks. In the event of an incident involving transport, include the name and address of the transporter and generator;
      (3) the date and time the incident began and ended, or the estimated time of continuation if the discharge is continuing;
      (4) the extent of any injuries and identification of any known personnel hazards that response agencies may face;

(5) the common or scientific chemical name, the U.S. Department of Transportation hazard classification, and the best estimate of amounts of any and all discharged pollutants;
(6) a brief description of the incident sufficient to allow response agencies to formulate their level and extent of response activity.

d. Written Notification Procedures. Written reports for any unauthorized discharge that requires notification under Section D.6.a. or 6.b., or shall be submitted by the discharger to the Office of Environmental Compliance, Assessment Division SPOC in accordance with LAC 33:I.3925 within seven calendar days after the notification required by D.6.a. or 6.b., unless otherwise provided for in a valid permit or other department regulation. Written notification reports shall include, but not be limited to, the following information:
(1) the name, address, telephone number, Agency Interest (AI) number (number assigned by the department) if applicable, and any other applicable identification numbers of the person, company, or other party who is filing the written report, and specific identification that the report is the written follow-up report required by this section;
(2) the time and date of prompt notification, the state official contacted when reporting, the name of person making that notification, and identification of the site or facility, vessel, transport vehicle, or storage area from which the unauthorized discharge occurred;
(3) date(s), time(s), and duration of the unauthorized discharge and, if not corrected, the anticipated time it is expected to continue;
(4) details of the circumstances (unauthorized discharge description and root cause) and events leading to any unauthorized discharge, including incidents of loss of sources of radiation, and if the release point is subject to a permit:
  (a) the current permitted limit for the pollutant(s) released; and
  (b) the permitted release point/outfall ID.

(5) the common or scientific chemical name of each specific pollutant that was released as the result of an unauthorized discharge, including the CAS number and U.S. Department of Transportation hazard classification, and the best estimate of amounts of any and all released pollutants (total amount of each compound expressed in pounds, including calculations);
(6) a statement of the actual or probable fate or disposition of the pollutant or source of radiation and what off-site impact resulted;
(7) remedial actions taken, or to be taken, to stop unauthorized discharges or to recover pollutants or sources of radiation.
(8) Written notification reports shall be submitted to the Office of Environmental Compliance, Assessment Division SPOC by mail or fax. The transmittal envelope and report or fax cover page and report should be clearly marked "**UNAUTHORIZED DISCHARGE NOTIFICATION REPORT**."

Written reports (LAC 33:I.3925) should be mailed to:

Louisiana Department of Environmental Quality
Post Office Box 4312
Baton Rouge, LA 70821-4312
ATTENTION: OFFICE OF ENVIRONMENTAL COMPLIANCE – SPOC "UNAUTHORIZED DISCHARGE NOTIFICATION REPORT"

The Written Notification Report may also be faxed to the Louisiana Department of Environmental Quality, Office of Environmental Compliance, Assessment Division at: (225)-219-4404.

Please see LAC 33:I.3925.B for additional written notification procedures.

e. Twenty-four Hour Reporting. The permittee shall report any noncompliance which may endanger human health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The following shall be included as information which must be reported within 24hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit (see LAC 33:IX.2701.M.3.b.);
(2) Any upset which exceeds any effluent limitation in the permit;
(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the state administrative authority in Part II of the permit to be reported within 24 hours (LAC 33:IX.2707.G.).

7. Other Noncompliance
The permittee shall report all instances of noncompliance not reported under Section D.4., 5., and 6., at the time monitoring reports are submitted. The reports shall contain the information listed in Section D.6.e.

8. Other Information
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the state administrative authority, it shall promptly submit such facts or information.

9. Discharges of Toxic Substances
In addition to the reporting requirements under Section D.1-8, all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Office of Environmental Services, Water Permits Division as soon as they know or have reason to believe:
   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant:
      i. listed at LAC 33:IX.7107, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
         (1) One hundred micrograms per liter (100 μg/L);
         (2) Two hundred micrograms per liter (200 μg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 μg/L) for 2,4 -dinitro-phenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
         (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with LAC33:IX.2501.G.7; or
         (4) The level established by the state administrative authority in accordance with LAC 33:IX.2707.F; or

      ii. which exceeds the reportable quantity levels for pollutants at LAC 33:I. Subchapter E.

   b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant:
      i. listed at LAC 33:IX.7107, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

         (1) Five hundred micrograms per liter (500 μg/L);
         (2) One milligram per liter (1 mg/L) for antimony;
         (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with LAC 33:IX.2501.G.7; or
         (4) The level established by the state administrative authority in accordance with LAC 33:IX.2707.F; or

      ii. which exceeds the reportable quantity levels for pollutants at LAC 33:I. Subchapter E.

10. Signatory Requirements
All applications, reports, or information submitted to the state administrative authority shall be signed and certified.
   a. All permit applications shall be signed as follows:

(1) For a corporation - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
   (a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,
   (b) The manager of one or more manufacturing, production, or operating facilities, provided: the manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to ensure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and the authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

NOTE: DEQ does not require specific assignments or delegations of authority to responsible corporate officers identified in Section D.10.a(1)(a). The agency will presume that these responsible corporate officers have the requisite authority to sign permit applications unless the corporation has notified the state administrative authority to the contrary. Corporate procedures governing authority to sign permit applications may provide for assignment or delegation to applicable corporate positions under Section D.10.a(1)(b) rather than to specific individuals.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively; or
(3) For a municipality, state, federal, or other public agency - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes:
   (a) The chief executive officer of the agency, or
   (b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

b. All reports required by permits and other information requested by the state administrative authority shall be signed by a person described in Section D.10.a., or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   (1) The authorization is made in writing by a person described in Section D.10.a. of these standard conditions;
   (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (a duly authorized representative may thus be either a named individual or an individual occupying a named position; and,
   (3) The written authorization is submitted to the state administrative authority.

c. Changes to authorization. If an authorization under Section D.10.b. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section D.10.b. must be submitted to the state administrative authority prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under Section D.10. a. or b. above, shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

11. Availability of Reports
All recorded information (completed permit application forms, fact sheets, draft permits, or any public document) not classified as confidential information under La. R.S. 30:2030(A) and 30:2074(D) and designated as such in accordance with these regulations (LAC 33:IX.2323 and LAC 33:IX.6503) shall be made available to the public for inspection and copying during normal working hours in accordance with the Public Records Act, La. R.S. 44:1 et seq.

Claims of confidentiality for the following will be denied:
a. The name and address of any permit applicant or permittee;
b. Permit applications, permits, and effluent data.
c. Information required by LPDES application forms provided by the state administrative authority under LAC 33:IX.2501 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

SECTION E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITION

1. Criminal
   a. Negligent Violations
   The Louisiana Revised Statutes La. R. S. 30:2076.2 provides that any person who negligently violates any provision of the LPDES, or any order issued by the secretary under the LPDES, or any permit condition or limitation implementing any such provision in a permit issued under the LPDES by the secretary, or any requirement imposed in a pretreatment program approved under the LPDES is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine of not more than $50,000 per day of violation, or imprisonment of not more than two years, or both.

   b. Knowing Violations
   The Louisiana Revised Statutes La. R. S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any permit condition or limitation implementing any such provisions in a permit issued under the LPDES, or any requirement imposed in a pretreatment program approved under the LPDES is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or imprisonment for not more than 3 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine of not more than $100,000 per day of violation, or imprisonment of not more than six years, or both.

   c. Knowing Endangerment
   The Louisiana Revised Statutes La. R. S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any order issued by the secretary under the LPDES, or any permit condition or limitation implementing any of such provisions in a permit issued under the LPDES by the secretary, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both. A person which is an organization shall, upon conviction of violating this Paragraph, be subject to a fine of not more than one million dollars. If a conviction of a person is for a violation committed after a first conviction of such person under this Paragraph, the maximum punishment shall be doubled with respect to both fine and imprisonment.

   d. False Statements
   The Louisiana Revised Statutes La. R. S. 30:2076.2 provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the LPDES or who knowingly falsifies, tampers with, or renders inaccurate~~,~~ any monitoring device or method required to be maintained under the LPDES, shall, upon conviction, be subject to a fine of not more than $10,000, or imprisonment for not more than

2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this Subsection, he shall be subject to a fine of not more than $20,000 per day of violation, or imprisonment of not more than 4 years, or both.

2. Civil Penalties
The Louisiana Revised Statutes La. R. S. 30:2025 provides that any person found to be in violation of any requirement of this Subtitle may be liable for a civil penalty, to be assessed by the secretary, an assistant secretary, or the court, of not more than the cost to the state of any response action made necessary by such violation which is not voluntarily paid by the violator, and a penalty of not more than $32,500 for each day of violation. However, when any such violation is done intentionally, willfully, or knowingly, or results in a discharge or disposal which causes irreparable or severe damage to the environment or if the substance discharged is one which endangers human life or health, such person may be liable for an additional penalty of not more than one million dollars.

(**PLEASE NOTE**: These penalties are listed in their entirety in Subtitle II of Title 30 of the Louisiana Revised Statutes.)

SECTION F. DEFINITIONS

All definitions contained in Section 502 of the Clean Water Act shall apply to this permit and are incorporated herein by reference. Additional definitions of words or phrases used in this permit are as follows:

1. Clean Water Act (CWA) means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or the Federal Water Pollution Control Act Amendments of 1972) Pub.L.92-500, as amended by Pub.L. 95-217, Pub.L. 95-576, Pub.L. 96-483 and Pub.L. 97-117, 33 U.S.C. 1251 et. seq.).

2. Accreditation means the formal recognition by the department of a laboratory's competence wherein specific tests or types of tests can be accurately and successfully performed in compliance with all minimum requirements set forth in the regulations regarding laboratory accreditation.

3. Administrator means the Administrator of the U.S. Environmental Protection Agency, or an authorized representative.

4. Applicable Standards and Limitations means all state, interstate and federal standards and limitations to which a discharge is subject under the Clean Water Act, including, effluent limitations, water quality standards of performance, toxic effluent standards or prohibitions, best management practices, and pretreatment standards under Sections 301, 302, 303, 304, 306, 307, 308 and 403.

5. Applicable water quality standards means all water quality standards to which a discharge is subject under the Clean Water Act.

6. Commercial Laboratory means any laboratory, wherever located, that performs analyses or tests for third parties for a fee or other compensation and provides chemical analyses, analytical results, or other test data to the department. The term commercial laboratory does not include laboratories accredited by the Louisiana Department of Health and Hospitals in accordance with La. R.S.49:1001 et seq.

7. Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day. Daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample.

8. Daily Maximum discharge limitation means the highest allowable "daily discharge".

9. Director means the U.S. Environmental Protection Agency Regional Administrator, or the state administrative authority, or an authorized representative.

10. Domestic septage means either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from grease trap at a restaurant.

11. Domestic sewage means waste and wastewater from humans, or household operations that is discharged to or otherwise enters a treatment works.

12. Environmental Protection Agency or (EPA) means the U.S. Environmental Protection Agency.

13. Grab sample means an individual sample collected over a period of time not exceeding 15 minutes, unless more time is needed to collect an adequate sample, and is representative of the discharge.

14. Industrial user means a nondomestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly owned treatment works.

15. LEQA means the Louisiana Environmental Quality Act.

16. Loading, is presented in the permit and reported in the DMR as the total amount of a pollutant entering the facility or discharged in the effluent. It is calculated by knowing the amount of flow, the concentration, and the density of water. Results should be rounded off and expressed with the same number of significant figures as the permit limit. If the permit does not explicitly state how many significant figures are associated with the permit limit, the permittee shall use two.

    For Industrial Facilities: Loading (lbs/day) = Flow (in MGD) x Concentration (mg/L) x 8.34*

    For POTWs: Loading (lbs/day) = Design Capacity Flow (in MGD) x Concentration (mg/L) x 8.34*

    *8.34 is the unit conversion for the weight of water

    Please note that the equations above may not be appropriate for production based effluent guideline limitations.

17. Louisiana Pollutant Discharge Elimination System (LPDES) means those portions of the Louisiana Environmental Quality Act and the Louisiana Water Control Law and all regulations promulgated under their authority which are deemed equivalent to the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act in accordance with Section 402 of the Clean Water Act and all applicable federal regulations.

18. Monthly Average, other than for fecal coliform bacteria, discharge limitations are calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes monthly average concentration effluent limitations or conditions, and flow is measured as continuous record or with a totalizer, the monthly average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily discharge concentration, F = daily flow and n = number of daily samples; monthly average discharge =

$$\frac{C_1F_1 + C_2F_2 + ... + C_nF_n}{F_1 + F_2 + ... + F_n}$$

When the permit establishes monthly average concentration effluent limitations or conditions, and the flow is not measured as a continuous record, then the monthly average concentration means the arithmetic average of all "daily discharge(s)" of concentration determined during the calendar month.

The monthly average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

19. National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Clean Water Act.

20. POTW means Publically Owned Treatment Works.

21. Sanitary Wastewater Term(s):

    a. 3-hour composite sample consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) over the 3-hour period and composited according to flow, or a sample continuously collected in proportion to flow over the 3-hour period.

    b. 6-hour composite sample consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) over the 6-hour period and composited according to flow, or a sample continuously collected in proportion to flow over the 6-hour period.

    c. 12-hour composite sample consists of 12 effluent portions collected no closer together than one hour over the 12-hour period and composited according to flow, or a sample continuously collected in proportion to flow over the 12-hour period. The daily sampling intervals shall include the highest flow periods.

    d. 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample continuously collected in proportion to flow over the 24-hour period.

22. Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

23. Sewage sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. *Sewage sludge* includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, domestic septage, portable toilet pumpings, Type III marine sanitation device pumpings (33 CFR Part 159), and sewage sludge products. *Sewage sludge* does not include grit or screenings, or ash generated during the incineration of sewage sludge.

24. Stormwater Runoff—aqueous surface runoff including any soluble or suspended material mobilized by naturally occurring precipitation events.

25. Surface Water: all lakes, bays, rivers, streams, springs, ponds, impounding reservoirs, wetlands, swamps, marshes, water sources, drainage systems and other surface water, natural or artificial, public or private within the state or under its jurisdiction that are not part of a treatment system allowed by state law, regulation, or permit.

26. Treatment works means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Clean Water Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof. (See Part 212 of the Clean Water Act)

27. For fecal coliform bacteria, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

28. The term MGD shall mean million gallons per day.

29. The term GPD shall mean gallons per day.

30. The term mg/L shall mean milligrams per liter or parts per million (ppm).

31. The term SPC shall mean Spill Prevention and Control. Plan covering the release of pollutants as defined by the Louisiana Administrative Code (LAC 33:IX.Chapter 9).

32. The term SPCC shall mean Spill Prevention Control and Countermeasures Plan. Plan covering the release of pollutants as defined in 40 CFR Part 112.

33. The term µg/L shall mean micrograms per liter or parts per billion (ppb).

34. The term ng/L shall mean nanograms per liter or parts per trillion (ppt).

35. Visible Sheen: a silvery or metallic sheen, gloss, or increased reflectivity; visual color; or iridescence on the water surface.

36. Wastewater—liquid waste resulting from commercial, municipal, private, or industrial processes. Wastewater includes, but is not limited to, cooling and condensing waters, sanitary sewage, industrial waste, and contaminated rainwater runoff.

37. Waters of the State: for the purposes of the Louisiana Pollutant Discharge Elimination system, all surface waters within the state of Louisiana and, on the coastline of Louisiana and the Gulf of Mexico, all surface waters extending there from three miles into the Gulf of Mexico. For purposes of the Louisiana Pollutant Discharge Elimination System, this includes all surface waters which are subject to the ebb and flow of the tide, lakes, rivers, streams, (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, impoundments of waters within the state of Louisiana otherwise defined as “waters of the United States” in 40 CFR 122.2, and tributaries of all such waters. “Waters of the state” does not include waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act, 33 U.S.C. 1251 et seq.

38. Weekly average, other than for fecal coliform bacteria, is the highest allowable arithmetic mean of the daily discharges over a calendar week, calculated as the sum of all “daily discharge(s)” measured during a calendar week divided by the number of “daily discharge(s)” measured during that week. When the permit establishes weekly average concentration effluent limitations or conditions, and flow is measured as continuous record or with a totalizer, the weekly average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar week where C = daily discharge concentration, F = daily flow and n = number of daily samples; weekly average discharge

$$= \frac{C_1F_1 + C_2F_2 + ... + C_nF_n}{F_1 + F_2 + ... + F_n}$$

When the permit establishes weekly average concentration effluent limitations or conditions, and the flow is not measured as a continuous record, then the weekly average concentration means the arithmetic average of all "daily discharge(s)" of concentration determined during the calendar week.

The weekly average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

APPENDIX C-4

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 6 PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AIR PERMIT APPLICATION (PUBLIC)

Note: Full version filed as privileged and confidential

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ENERGY
TRANSFER

September 28, 2020

Ms. Melanie Magee
Environmental Engineer
Air Permits Section (APRE)
U.S. Environmental Protection Agency, Region 6
Mail Code: ARPE
1201 Elm Street, Suite 500
Dallas, TX 75201
magee.melanie@epa.gov

RE: Prevention of Significant Deterioration Application for Blue Marlin Offshore Port LLC

Dear Ms. Magee:

Blue Marlin Offshore Port (BMOP) LLC (Applicant) is providing U.S. Environmental Protection Agency (EPA) Region 6 the enclosed Prevention of Significant Deterioration (PSD) application Volumes 1 and 2. BMOP is proposing to develop the BMOP Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, BMOP will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block 509 (WC 509). At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year.

This application is being submitted to the EPA Region 6 for a PSD permit to authorize the direct emissions sources proposed for the offshore DWP under the Clean Air Act PSD permitting program.

The enclosed documents describe an overview of the BMOP Project, its location, and air quality impacts. Volume 1 of the PSD application presents the project details, proposed equipment, potential air emissions calculations, regulatory applicability analysis, and a best available control technology (BACT) analysis. BMOP has completed Louisiana Department of Environmental Quality (LDEQ) air permit application forms to assist with the evaluation of the project equipment and potential emissions in the context of LDEQ and EPA regulations.

Volume 2 of the PSD application describes the approach to evaluating air quality impacts and includes the results of air dispersion modeling. BMOP evaluated air quality impacts of ozone from the Project by performing a Tier I Modeled Emission Rates for Precursors (MERPS) analysis. The analysis demonstrates that the Project will not result in a violation of the national ambient air quality standard (NAAQS) for ozone. Toxic air pollutant (TAP) emissions from the Project were evaluated in accordance with LDEQ requirements. Model results demonstrate that the Project will comply with the TAP ambient air standards (AAS) of Louisiana Administrative Code (LAC) 33:III Chapter 51.

BMOP appreciates the EPA's review of this PSD application. If you have any questions about this application, please contact Weston Threeton, P.E., PMP, at (713) 989-7733 or email at Weston.threeton@energytransfer.com.

Sincerely,

Gregory Mcilwain
SVP – Operations
Energy Transfer Partners, LLC

Enclosure

PREVENTION OF SIGNIFICANT DETERIORATION AIR CONSTRUCTION PERMIT APPLICATION

PSD Volume 1

BLUE MARLIN OFFSHORE PORT LLC

Prepared By:

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September 2020

Project 191001.0117

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1. EXECUTIVE SUMMARY

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, BMOP will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block (WC) 509, WC 508, and East Cameron (EC) Block 263. At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year.

The proposed project will require a DWP license in accordance with the Deep Water Port Act (DWPA). The U.S. Environmental Protection Agency (EPA) is identified as a cooperating agency in the review of a DWP license, in accordance with Title 33 of the Code of Federal Regulations (CFR) §148.3(d). The DWPA also requires evaluation of the DWP in accordance with the Clean Air Act (CAA). The Project consists of both onshore and offshore components. As defined in 33 CFR §148.5, a deep water port is:

> *"[A]ny fixed or floating manmade structures other than a vessel, or any group of structures, located beyond State seaward boundaries that are used or are intended for use as a port or terminal for the transportation, storage, or further handling of oil or natural gas for transportation to any State, except as otherwise provided in the Deepwater Port Act of 1974, as amended, and for other uses not inconsistent with the purposes of the Deepwater Ports Act, including transportation of oil or natural gas from the United States' OCS… Must be considered a 'new source' for the purposes of the Clean Air Act…"*

As such, this application is being submitted to the EPA Region 6 for a Prevention of Significant Deterioration (PSD) air permit to authorize the direct emissions sources proposed for the DWP under the CAA New Source Review (NSR) program.

The Applicant has separately evaluated air permit authorizations for the onshore components of the Project, in accordance with the requirements of the Louisiana Department of Environmental Quality (LDEQ) and the Texas Commission on Environmental Quality (TCEQ).

1.1 Air Permit Applicability Overview

The DWP site will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.[1] The nearest Parish onshore is Cameron Parish, Louisiana. Cameron Parish is designated by EPA as "attainment" or "unclassifiable" with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.[2] Therefore, the Project is not subject to Nonattainment New Source Review (NNSR) permitting requirements for any criteria pollutants.

---

[1] The DWP will be approximately 99 statute miles from where the pipe leaves the shore, also in Cameron Parish, Louisiana.

[2] 40 CFR §81.319

Based on potential air emissions calculations, the Project will be subject to preconstruction review under the federal PSD permitting program, as potential emissions of volatile organic compounds (VOC) are greater than the 250 tons per year (tpy) major source threshold. The project does not result in a significant emissions increase of any other regulated pollutant.

1.2 Application Contents

In accordance with 40 CFR §52.21(n)(1), the following source information shall be submitted in an application for a project triggering PSD permitting:

i. *A description of the nature, location, design capacity, and typical operating schedule of the source or modification, including specification and drawings showing its design and plant layout;*

In addition to the description of the Project provided in Section 2 of this report, additional project details defining the characteristics, design capacity, and expected operating schedule for the equipment associated with the Project are provided in Section 3 of this report. Site maps and plot plans describing the Project are provided in Appendix A of this application. Application forms are included in Appendix B of this application.

ii. *A detailed schedule for construction of the source of modification;*

A proposed construction schedule is provided in Section 2.

iii. *A detailed description as to what system of continuous emission reduction is planned for the source of modification, emission estimates, and any other information necessary to determine best available control technology would be applied;*

Emissions estimates are described in Section 3 and detailed emissions calculations are provided in Appendix C of this application. An analysis of potentially applicable state and federal air regulations is provided in Section 4 and a case-by-case best available control technology (BACT) determination, meeting the requirements of 40 CFR §52.21(j), is detailed in Section 5. The following list delineates a summary of the BACT determination following a “top-down” approach, as suggested by EPA:

Table 1-1. Proposed VOC BACT Summary

Emission Source	Pollutant	Selected BACT	Emission / Operating Limit	Compliance Method
Marine Loading	VOC	Submerged fill; VOC BMP	Max TVP 10.99 psia; Max TVP 9.0 psia, annual avg.	Crude analyses; Monitor adherence to VOC BMP
Natural Gas-Fired Engine-Driven Generator	VOC	Oxidation catalysts	0.7 g/hp-hr, or 60 ppmvd @ 15% O_2	Performance Testing Per Table 2 of Subpart JJJJ
Emergency Diesel-Fired Engine-Driven Generator	VOC	Good combustion practices	6.4 g/kW-hr of NMHC + NO_X	Certified engine; Maintenance records
Diesel-Fired Crane Engines	VOC	Good combustion practices	0.29 g/kW-hr	Certified engine; Maintenance records
Emergency Diesel-Fired Engine-Driven Firewater Pumps	VOC	Good combustion practices	4.0 g/kW-hr of NMHC + NO_X	Certified engine; Maintenance records
Fugitive Emissions	VOC	Component design; Good operating practices	Leak monitoring program	Leak monitoring records
Storage Vessels	VOC	Submerged fill	Installation of conforming tanks	Fixed roof tanks with submerged fill pipes

Supporting documentation for the BACT evaluation is included as Appendix D of this application.

In accordance with 40 CFR §52.21(n)(2), the following information shall also be provided:

i. *The air quality impact of the source or modification, including meteorological and topographical data necessary to estimate such impact; and*

ii. *The air quality impacts, and the nature and extent of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the source or modification would affect.*

The air quality impacts of the Project, as well as the source impact analysis required under 40 CFR §52.21(k) are addressed in Volume 2 of this PSD application.

2. PROJECT DESCRIPTION

The Applicant is proposing to develop the BMOP Project in the GOM to load crude oil into VLCCs, and other crude oil carriers, for export to the global market.

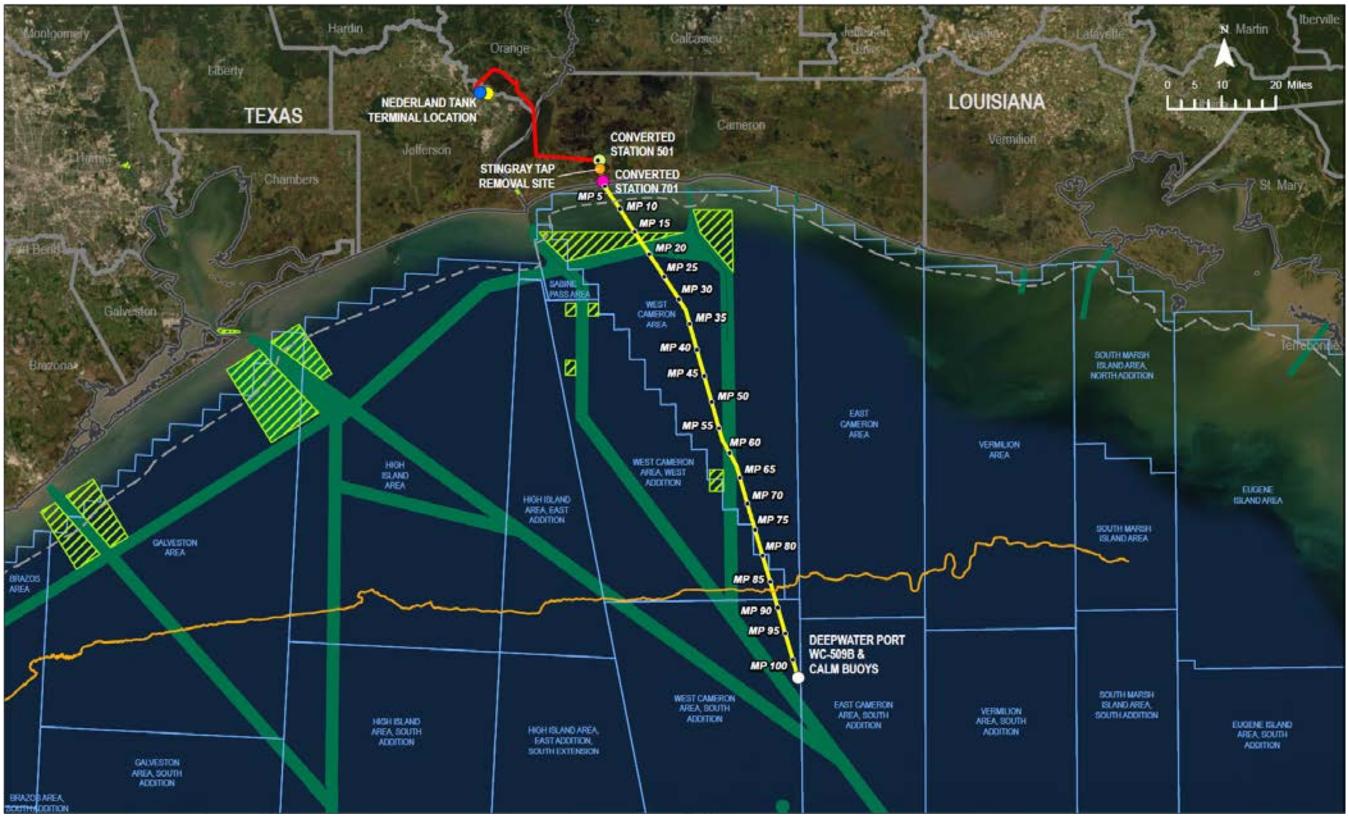
The primary purpose of the Project is to provide for safe and reliable long-term supply of crude oil for export to the global market. To fulfill the primary purpose, the Project must be capable of fully loading the international fleet of crude-carrying marine vessels to accommodate the safe and efficient transport of crude. Accordingly, the Project requires a DWP that can accommodate the draft and berth of a fully loaded VLCC with the ability to load in varying meteorological conditions. This ensures safety in transfer and transit by minimizing risks of transportation incidents (e.g., spills, allisions, collisions). It is not possible for existing onshore terminals in the GOM to fully load a VLCC due to limited draft. There are only a couple existing onshore terminals in the GOM that can partially load a VLCC; loading is completed offshore via reverse lightering. The proposed DWP design avoids the inefficiency and cost of idled time at a fixed port for partial VLCC loading while offering the benefit of avoiding dock-constrained ports to free up dock space for other commodities. This approach also resolves the logistical challenges and added vessel traffic of reverse lightering while mitigating the risks and additional environmental impacts of multiple loadings for a single fully-loaded VLCC.

2.1 Project Overview

The proposed Project utilizes many existing facilities, both onshore and offshore. Crude oil for export at BMOP will be transported out of the existing Sunoco Partners Marketing and Terminals, L.P. terminal and storage facility in Jefferson County, Texas (Nederland Terminal or NT). This terminal is connected to multiple crude oil pipelines from across the U.S. In addition, an affiliate of the Applicant owns the Stingray Pipeline System (Stingray) and has confirmed that its existing subsea pipeline and offshore platforms are suitable for conversion to facilitate crude oil export from a DWP in the northern GOM.

The existing terminal and existing offshore pipeline and platforms provide direct access to supply for export with minimal impacts necessary for new infrastructure to access the market. Only minor additions and new equipment are needed, with minimal footprint. The new equipment will support the existing infrastructure and include a new onshore pump station located at the Nederland Terminal to control loading rates up to the pipeline capacity of 80,000 barrels per hour (bbl/hr). Crude oil will be routed from the NT pump station through a new 37.02 mile, 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at the existing Station 501, and from there through the existing 36” OD Stingray Mainline to the existing offshore platform complex at WC 509. The following figure presents a map of the Project. This figure is reproduced in Appendix A with additional detail.

Figure 2-1. Project Overview Map



The DWP will be located in federal waters within and adjacent to the OCS in WC 509, WC 508 and EC 263. The DWP will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.[3] The crude oil will be metered at the pump station on the NT and on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline End Manifolds (PLEMs) located on the seafloor below two CALM Buoys located in WC 508 and in EC 263. From each PLEM, the crude oil will be routed to its respective floating CALM Buoy through submerged flexible hoses. VLCCs (or other large seafaring crude oil vessels) will moor at a CALM Buoy, retrieve and connect the floating crude oil hoses connected to the CALM Buoy and the crude oil will then route from the Buoy to the VLCC for loading. Up to 365 VLCCs (or other crude oil carriers) will load per year.

The crude oils that will be exported range from light to heavy grade crudes and will be sent from the existing NT facility. The Project will accommodate loading up to 365 large seafaring crude oil vessels with the use of two CALM buoys. Loading will not occur at both buoys simultaneously. During the time necessary for a loaded vessel to disconnect and depart the safety zone, and for a subsequent vessel to approach the same buoy, moor, and attach to the loading hoses, the second buoy will be loading a moored ship at up to 80,000 bbl/hr. The loading operation will then switch to the alternate buoy, providing the ability to continuously load one ship at a time.

This application is for the aggregated stationary sources subject to preconstruction permitting under PSD at the proposed offshore DWP. Site maps and plot plans at WC 509 are included in Appendix B to this application. The following subsections identify the stationary emissions sources.

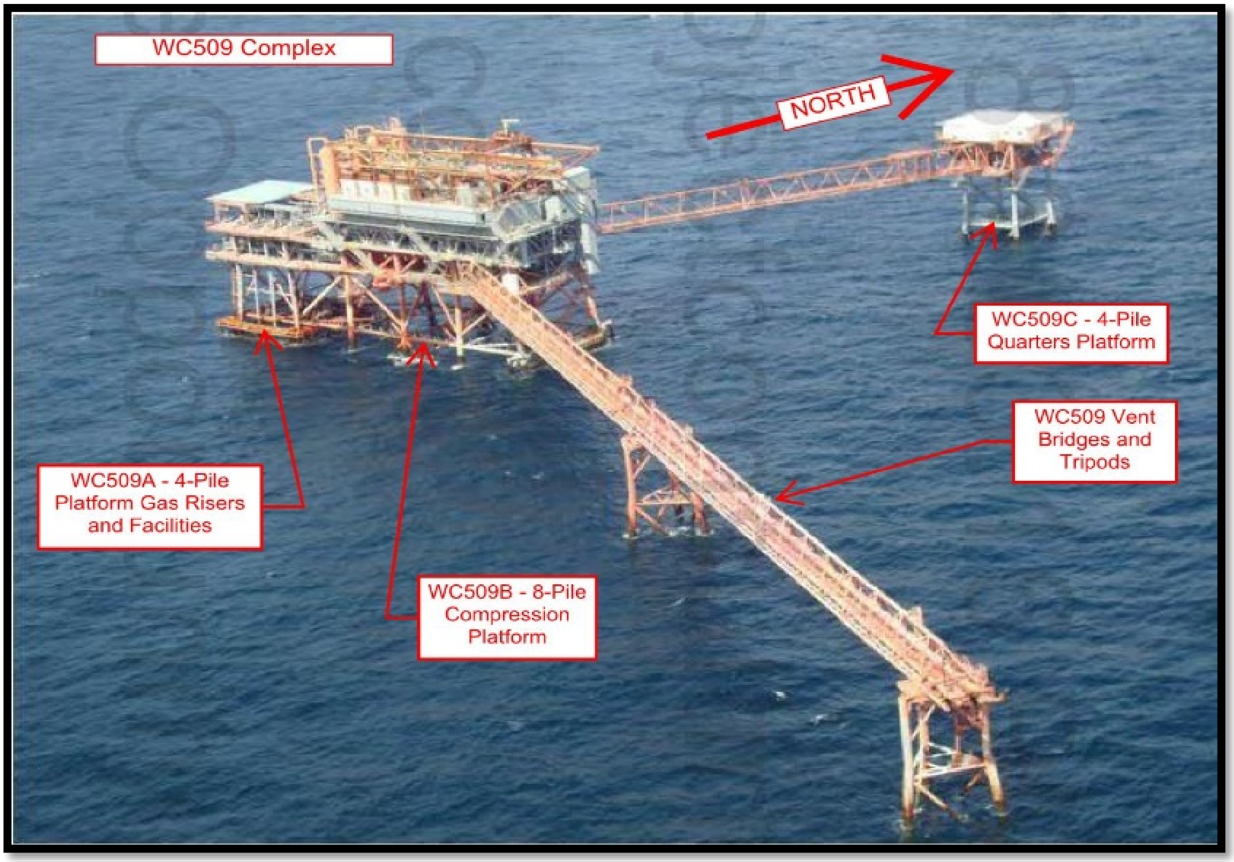
---

[3] The DWP will be approximately 99 statute miles from where the pipe leaves the shore, also in Cameron Parish, Louisiana.

2.1.1 Modified WC 509 Operations

Flow through the existing offshore Stingray Pipeline will be reversed to transfer crude oil from the existing Station 501 onshore to the existing WC 509 platform complex.

Figure 2-2. Existing WC 509 Platform Complex



This existing platform complex is near existing shipping channels currently used by large seafaring crude oil vessels with a water depth >160 feet. The platform complex has access to offshore natural gas supply to serve basic platform utilities without necessitating that all utilities be powered by fuel delivered from shore.[4]

The proposed Project will repurpose the WC 509B platform from natural gas service to dual purpose oil and gas service. This will entail removal of natural gas compressors and ancillary equipment with some equipment remaining to support gas operations. The following equipment will remain:

- Existing natural gas piping and risers on 509A platform;
- Natural gas blowdown Vent Boom on 509VBT platform;
- Natural gas separation systems for natural gas blowdowns on 509B platform;
- Heliport on 509A platform;

---

[4] While the Project has the benefit of natural gas supply for basic utilities at the WC 509 complex, there is insufficient natural gas supply at WC 509 for supporting additioinal platforms or vapor combustion assist gas, discussed further in Section 5 of this application.

- Helicopter fuel tank on 509A platform; and,
- Expansion and continued use of WC 509C for crew quarters.

To support the crude oil export operation, new components for oil service and other ancillary utility equipment will be installed at the WC 509 platform complex. The following new emission sources will be added at WC 509:

- Fugitive Emissions from crude oil piping components;
  - New 36” OD risers;
  - Batch switching/pigging capability;
  - Crude oil meter and meter prover;
- Crude oil 1,000 barrel (bbl) capacity surge vessel and surge system;
- Fugitive Emissions from lube oil, waste oil, and sump collection systems;
- Ancillary utility equipment;
  - Two (2) redundant 1,736 kilowatt (kW) natural gas-fired engine-driven generators, Caterpillar G3516C, or similar;
  - One (1) 1,500 kW emergency diesel-fired engine-driven generator, Caterpillar 3512C, or similar;
    - Primary diesel fuel tank;
  - Two (2) 475 horsepower (hp) diesel-fired engine-driven crane, Caterpillar G13, or similar;
    - Two (2) diesel fuel tanks (one for each crane); and
  - Two (2) 650 hp emergency diesel-fired engine-driven firewater pumps, one on WC 509B and one on WC 509C.

2.1.2 New Offshore Equipment for Marine Loading

From the existing WC 509 platform complex, new equipment will be added offshore to serve the DWP, including:

- **Two new CALM Buoys**
  - The CALM Buoys will be anchored to the seafloor using a multiple-point, chain anchoring system. Each CALM Buoy will have floating hoses for vessel loading.
- **Two new PLEMs** connecting to each of the CALM Buoys, one for each buoy.
- **Two 36-inch, lateral subsea pipelines** installed from the existing WC 509 Platform Complex to the PLEM locations, one for each PLEM.

The location of the new equipment for marine loading in comparison to the existing WC 509 Platform Complex is delineated in the following table.

Table 2-1. DWP Components for Offshore Loading

Component	Latitude (N) (degrees minutes seconds)	Longitude (W) (degrees minutes seconds)	Water Depth (feet)
WC 509 Platform Complex [a]	28° 26' 00.01”	93° 00' 15.23”	162
CALM Buoy No. 1 and PLEM (WC 508)	28° 26’ 47.33”	93° 00’ 13.30”	156
CALM Buoy No. 2 and PLEM (EC 263)	28° 26’ 34.37”	92° 59’ 19.21”	159

a. Riser #1.

CALM Buoy No. 1 is 4,710 feet from its WC 509B riser, while CALM Buoy No. 2 is 6,085 feet from its WC 509B riser. VLCCs or other crude carrying vessels will moor to the CALM buoys. As an SPM system, the vessels will be able to weathervane around the CALM buoy while moored and loading. No fixed structures or platforms will be located within ~ 4,500 feet of the buoy to allow safe vessel movement. This capability is an important design characteristic due to the DWP location of approximately 82 statute miles (71 nautical miles) from the nearest point on land. This location is classified as "exposed waters" by the United States Coast Guard (USCG), as it is greater than 20 nautical miles from the nearest harbor of safe refuge.[5] As well, the National Weather Service (NWS) provides distinct wind, wave, and weather forecasts for "offshore waters" greater than 60 nautical miles from shore, in comparison to "coastal water" forecasts inside of 60 nautical miles in the GOM.[6]

Floating and flexible 20- or 24-inch diameter hoses approximately 1,500 feet long will be installed for loading from the CALM Buoy to the VLCC, or other large seafaring crude carrier. The floating hoses will be recovered by one of the DWP support vessels, lifted to the VLCC, or other crude carrier, loading manifold, and connected to the receiving flange. The floating hoses will simply float on the surface of the water and will weathervane depending on the current when not being used for loading. The floating hoses will contain a butterfly valve on the end that will be utilized to isolate the hose after loading is complete and prior to placing the hoses back in the water. Additionally, a blind flange will be installed to further prevent any potential contamination or leakage while the hose is floating and waiting for the next VLCC (or other large seafaring crude carrier) to be loaded.

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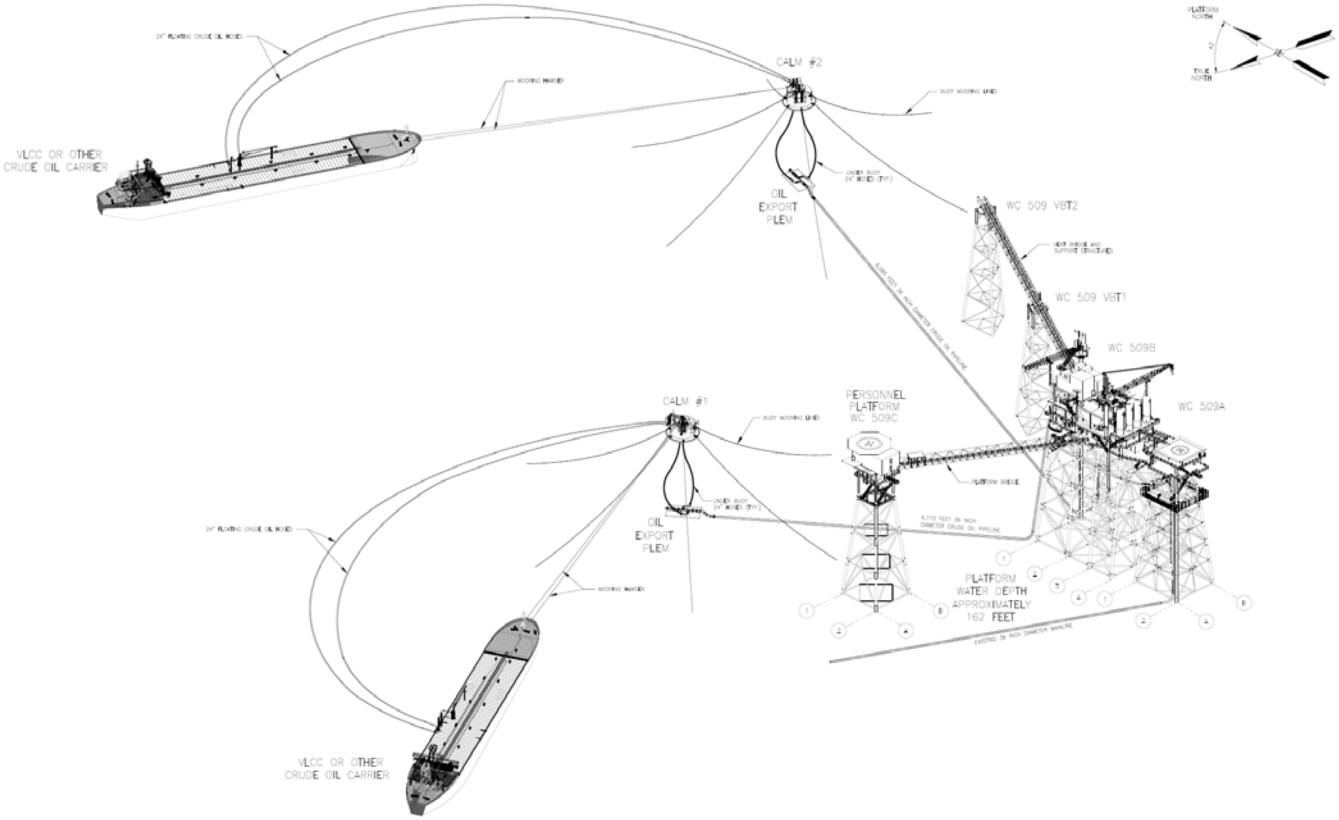
[5] 46 CFR §170.050.

[6] https://www.nhc.noaa.gov/abouttafbprod.shtml

Figure 2-3. Schematic of Proposed Offshore Loading from WC 509



The schematic is presented again in Appendix A to this application.

The BMOP Project is unique from other sources and contemporary crude oil export operations because of its conversion of existing offshore facilities to support new CALM buoys in loading crude oil for export into an international fleet of VLCCs, or other crude oil carriers.

2.2 Proposed Schedule

Refurbishment of the existing WC 509 Platform Complex will begin in May 2021. The on-site installation of the crude oil subsea pipelines, PLEMs, and CALM buoy systems is expected to commence in December 2022. The expected completion date of construction is May 2023. Commissioning is planned to occur in May, June, and July 2023, with the anticipated date of startup as August 5, 2023.

3. EMISSIONS QUANTIFICATION

3.1 Potential Emissions Summary

A summary of the potential emissions of oxides of nitrogen (NO_X), carbon monoxide (CO), VOC, sulfur dioxide (SO_2), particulate matter (PM) with an aerodynamic diameter less than 10 microns (PM_{10}), PM with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), hydrogen sulfide (H_2S), sulfuric acid mist (H_2SO_4), hazardous air pollutants (HAPs), and greenhouse gases (GHG), represented as carbon dioxide-equivalents (CO_2e) is shown in Table 3-1.

Table 3-1. Potential Emissions Summary

	NO_X (tpy)	CO (tpy)	VOC (tpy)	SO_2 (tpy)	PM_{10}[7] (tpy)	$PM_{2.5}$ (tpy)	H_2S (tpy)	H_2SO_4 (tpy)	HAPs (tpy)	CO_2e (tpy)
Marine Loading										
Crude Oil Loading	--	--	21,840	--	--	--	9.49	--	1,224	--
Platform A Sources										
Aviation Fuel Tank	--	--	5.12E-4	--	--	--	--	--	7.65E-5	--
Platform B Sources										
Natural Gas Generators (x2)	22.48	44.96	15.74	0.05	0.80	0.80	--	2.34E-3	4.22	12,871
Emergency Diesel Generator	1.06	0.58	1.06	0.07	0.04	0.04	--	2.23E-3	1.11E-3	115.2
Platform B Cranes (x2)	2.05	11.97	0.97	1.48	0.21	0.21	--	0.05	0.06	2,383
Platform B Cranes Diesel Tank #1	--	--	1.93E-3	--	--	--	--	--	2.65E-4	--
Platform B Cranes Diesel Tank #2	--	--	1.93E-3	--	--	--	--	--	2.65E-4	--
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	--	7.22E-4	3.58E-4	37.22
Primary Diesel Tank	--	--	0.01	--	--	--	--	--	1.17E-3	--
Surge Tank #1	--	--	3.73	--	--	--	--	--	0.07	--
Platform C Sources										
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	--	7.22E-4	3.58E-4	37.22
Fugitive Sources										
Total Fugitive Emissions	--	--	18.65	--	--	--	0.005	--	1.91	1,060
Total	**26.02**	**57.88**	**21,881**	**1.64**	**1.07**	**1.07**	**9.50**	**0.05**	**1,230**	**16,503**

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[7] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emissions.

3.2 Detailed Emissions Calculations

Potential emissions were calculated for the stationary offshore sources by using the following calculation methodologies.

3.2.1 Marine Loading

VOC emissions from marine loading of crude oil are calculated based on the maximum hourly loading rate (gallons per hour [gal/hr]) and Equations 2 and 3 of EPA's AP-42, Section 5.2 (07/08), which was developed specifically for loading crude oil into ships and ocean barges,[8] and has also been utilized by EPA in the development of the National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart Y for onshore/near shore loading of crude oil.[9] The Project will load only crude oil, and no refined products. In addition to EPA's explicit direction in AP-42 to utilize Equations 2 and 3 for crude oil loading into ocean-going ships, this methodology is consistent with other marine loading of crude and permitting determinations in Louisiana,[10] which is the nearest onshore state. To align with the nearest state consistent with the DWPA,[11] and based on Louisiana's recent determinations for crude loading into ships, Equations 2 and 3 are most appropriate to estimate emissions for the Project.

The application of Equations 2 and 3 are described below.

$$C_L = C_A + C_G$$

Where:

$C_L = Total\ Loading\ Loss, pounds\ per\ 1000\ gallons\ \left(\frac{lb}{10^3 gal}\right) of\ crude\ oil\ loaded$

$C_A = Arrival\ emission\ factor, contributed\ by\ vapors\ in\ the\ empty\ tank\ compartment\ before\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

$C_G = Generated\ emission\ factor, contributed\ by\ evaporation\ during\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

BMOP conservatively uses the average arrival emission factor for an uncleaned ship/ocean barge tank, as provided in AP-42 Table 5.2-3. The generated emissions factor, C_G is calculated based on Equation 3 of AP-42, Section 5.2, as described below.

$$C_G = 1.84 \times (0.44 \times P - 0.42) \times \frac{MG}{T}$$

Where:

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[8] AP-42 Chapter 5.2 Transportation and Marketing of Petroleum Liquids, 6/08.

[9] "*We agree with the commenter that the emission factors for ships and barges, as applicable to the type of marine vessel being loaded, should be considered for estimating VOC and HAP emissions. We have revised the emission estimates using the barge and ship emission factors from AP–42,"* referenced from 76 FR 22582, April 21, 2011, left column. Also see Subpart Y: Email from Michelle Herman, Chevron to Steve Shedd, EPA Chevron Pipe Line Nederland TX Emissions Data for MVL, 5/18/2010, ID: EPA-HQ-OAR-2010-0600-0044, which uses AP-42 Eq. 2 and 3 for crude oil loading into ships, and Eq. 1 for gasoline loading.

[10] See examples: Part 70 Permit No. 2520-00033-V-14 for International Matex Tank Terminals – IMTT – St. Rose, Louisiana, 8/14/2019, based on crude loading emissions from Eq. 2 and 3 from application for Title V Revision, dated June 3, 2019, and also Part 70 Permit No. 2560-00034-V9 for Sugarland Pipeline Station/Terminal, Shell Pipeline Company, LP, St. James, Louisiana, based on crude loading emissions from Eq. 2 and 3.

[11] 33 USC §1518(b).

$P = True\ vapor\ pressure\ of\ loaded\ crude\ oil, psia$
$M = Molecular\ weight\ of\ vapors, \frac{lb}{lb-mol}$
$G = Vapor\ growth\ factor, 1.02\ (dimensionless)$
$T = Temperature\ of\ vapors, °R$

BMOP estimates a maximum hourly loading rate of 80,000 bbl/hr of crude oil and the annual loading rate is equivalent to continuous (e.g. 8,760 hours per year) loading at the maximum hourly loading rate.[12] The project will be able to load 700,800,000 barrels per year (bbl/yr). To calculate the VOC loading loss rate (in lb/10^3 gal), maximum hourly and annual average crude loading temperatures and crude true vapor pressures are used, based on Project design specifications. Because the crude oil will be subsea for approximately 100 nautical miles, the long-term temperature representative of the sea floor was used to estimate the loading temperatures.[13] The molecular weight of the crude oil (liquid and vapor) is based on AP-42, Chapter 7, Table 7.1-2 (06/20). A summary of the characteristics used to calculate VOC emissions are provided in Table 3-2.

3.2.1.1 Marine Loading – H_2S Emissions

Emissions of H_2S from marine loading are based on the hourly maximum and annual average H_2S content in the crude oil, and the following mass balance equation.

$$H_2S\ Emission\ Rate\ \left(\frac{lb\ H_2S}{lb\ VOC}\right) = \frac{X}{1x10^6} \times \frac{M_{crude}}{M_{H2S}} \times \frac{M_{H2S}}{M_{Vapor}} \times k$$

Where:
$X = Crude\ H_2S\ Content, parts\ per\ million\ by\ weight\ (ppmw)$
$M_{crude} = Molecular\ weight\ of\ crude\ liquid, \left(\frac{lb}{lb-mol}\right)$
$M_{H_2S} = Molecular\ weight\ of\ H_2S, \left(\frac{lb}{lb-mol}\right)$
$M_{Vapor} = Molecular\ weight\ of\ crude\ vapor, \left(\frac{lb}{lb-mol}\right)$
$k = Vapor\ to\ liquid\ H_2S\ partition\ factor$[14]

A summary of the characteristics used to calculate H_2S emissions are also provided in the table below.

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[12] 80,000 bbl/hr is approximately 3,360,000 gal/hr.

[13] Temperature data from ROMS Texas A&M University Outputs, Location: WC509, Depth 150.672 feet. Long-term average of 72.66°F used for annual average conditions and a maximum of 90°F used for short-term maximum conditions (max of dataset is 85.4°F.

[14] Per the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93.

Table 3-2. Marine Loading Emissions Specifications

	Maximum Hourly	**Annual Average**
Crude Loading Rate (bbl/hr)	80,000	80,000
Arrival Emission Factor	0.86	0.86
Loading Temperature (°R)	550	532
Vapor Molecular Weight (lb/lbmol)	50	50
Liquid Molecular Weight (lb/lbmol)	207	207
True Vapor Pressure [TVP] (psia)[15]	10.99	9.00
Liquid H_2S Partition	25	21
H_2S Concentration (ppmw)[16]	125	5
H_2S Molecular Weight (lb/lbmol)	34.1	34.1

3.2.1.2 Marine Loading – HAP Emissions

Emissions of HAP are based on an identified maximum crude oil vapor HAP speciation, by individual HAP, provided in weight percent (wt%) of the vapor. These maximum individual HAP concentrations were determined from thirteen samples of various crude types at the Nederland Terminal from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.[17] The analytical results provided an extensive speciation of the crude oil, of which >99.9% was identified as VOCs. From these 13 samples, the average total HAP concentration in the liquid was 3.2 wt%. This identifies the expected average HAP concentration to be less than 5%, by weight, in the liquid.

For calculating potential emissions, the concentration in the vapor phase was calculated. Consistent with AP-42, Chapter 7.1.4 (06/2020), Raoult's Law was followed to determine the HAP content in the vapor phase of the crude oil from the HAP content in the liquid phase. Raoult's Law states that the mole fraction in the liquid of a speciated component, when multiplied by the vapor pressure of that component is equal to the partial pressure of that component, or:

$$P_i = (P)(x_i)$$

Where:

$P_i = partial\ pressure\ of\ component\ i, psia$

$P = vapor\ pressure\ of\ pure\ component\ i\ at\ the\ average\ daily\ liquid\ surface\ temperature, psia$

$x_i = liquid\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

The vapor pressure of each HAP species was determined using published Antoine Coefficients at the average daily temperature, described above.

The liquid mole fraction was determined from the liquid weight fraction of the component in the samples per:

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[15] Maximum short-term and annual average true vapor pressure aligned with the permit limits for the origination of the crude oil for the BMOP Project – the Nederland Terminal. Note that the purpose of the project is to load a variety of both heavy and light crude oils, so using the permit limits is a conservative estimate of potential emissions for the Project.

[16] H_2S concentration aligned with permit limits for the origination of the crude oil for the BMOP Project – the Nederland Terminal. Annual mass H_2S emissions calculated from a conservative assumption of 5 ppmw. The average of all samples from Nederland (>3000 samples) is 1.31 ppmw.

[17] 49 CFR §171.7(h)(45).

$$x_i = \left(\frac{Z_{Li} M_L}{M_i}\right)$$

Where:

$x_i = liquid\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$Z_{Li} = weight\ fraction\ of\ component\ i\ in\ the\ liquid, lb/lb$

$M_L = molecular\ weight\ of\ liquid\ stock, \left(\frac{lb}{lb - mol}\right)$

$M_i = molecular\ weight\ of\ component\ i, \left(\frac{lb}{lb - mol}\right)$

The vapor mole fraction was determined by:

$$y_i = \frac{P_i}{P_{VA}}$$

Where:

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$P_i = partial\ pressure\ of\ component\ i, psia$

$P_{VA} = total\ vapor\ pressure\ of\ liquid\ mixture, psia$

The weight fraction in the vapor phase can then be determined from the mole fractions in the vapor phase.

$$Z_{Vi} = \frac{y_i M_i}{M_V}$$

Where:

$Z_{Vi} = vapor\ weight\ fraction\ of\ component\ i, lb/lb$

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$M_i = molecular\ weight\ of\ component\ i, \left(\frac{lb}{lb - mol}\right)$

$M_V = molecular\ weight\ of\ vapor\ stock, \left(\frac{lb}{lb - mol}\right)$

The resulting total HAP in the vapor averaged 2.4% for all 13 samples.

In order to ensure a conservative representation of potential emissions on a short-term basis, the 99% upper prediction limit (UPL) was calculated for each individual HAP identified in the 13 samples. The data and approach to calculating the UPL of the vapor weight percent of each HAP is discussed in the Case-by-Case MACT Application, submitted concurrently with this PSD application.

BMOP used the higher of the 99% UPL from the 13 samples, or the Nederland Terminal Permit basis for each individual HAP, whichever was greater. The result is a conservative estimate for each individual HAP, and the total HAP (which is the sum of the highest values for each individual HAP).

BMOP has used the following crude oil vapor HAP speciation to estimate emissions.

Table 3-3. Crude Oil Vapor HAP Speciation

HAP	Vapor Weight %
Hexane	4.09
Benzene	0.80
Toluene	0.36
Ethylbenzene	0.05
1,2,4-Trimethylbenzene	0.01
1,3-dimethylbenzene	0.05
1,4-dimethylbenzene	0.03
1,2-dimethylbenzene (Xylene)	0.21
i-propylbenzene (Cumene)	0.01
Biphenyl	0.00002
Cresols	0.001
Naphthalene	0.001
Phenol	0.001
Total HAP	5.60

Hourly and annual VOC emissions are multiplied by each HAP speciation, above, to determine the hourly and annual HAP mass emission rates.

Table 3-4. Potential VOC and HAP Mass Emissions from Marine Loading

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC	5,422	21,840
HAP speciation:		
Hexane	221.8	893.2
Benzene	43.40	174.8
Toluene	19.27	77.61
Ethylbenzene	2.69	10.85
1,2,4-Trimethylbenzene	0.58	2.33
1,3-dimethylbenzene	2.58	10.41
1,4-dimethylbenzene	1.80	7.25
1,2-dimethylbenzene (Xylene)	11.26	45.36
i-propylbenzene (Cumene)	0.32	1.28
Biphenyl	0.001	0.004
Cresols	0.04	0.16
Naphthalene	0.03	0.14
Phenol	0.08	0.33
Total HAP	303.8	1,244

3.2.1.3 Marine Loading – GHG Emissions

None of the 13 samples of varying crude types identified methane (CH_4) or carbon dioxide (CO_2) in the crude. Although produced crude may have some amount of methane, methane is highly volatile and will quickly be released in vapor prior to being loaded into a marine vessel in the BMOP DWP, after many steps of production (which is initially extracted at pressure, then stored in atmospheric tanks where the majority of light ends flash off), processing, storage, and hundreds of miles of transmission. Referred to as "weathering," it is typical for the lightest volatile compounds, including methane and carbon dioxide, to be released well before reaching a storage terminal. This is evident in that none of the 13 samples contained even a small fraction of methane or carbon dioxide in the crude at the Nederland Terminal.

Accordingly, GHG emissions from crude oil loading at the BMOP project are not expected or will be negligible.

3.2.2 Natural Gas Generators

The Project will operate two (2) natural gas-fired generators. BMOP design identifies that the make/model of each generator will be similar to a Caterpillar G3516C, each rated at approximately 2,000 hp. To conservatively estimate emissions from the proposed units, a maximum power of 2,328 hp was used, per the manufacturer's specification sheet at 100% load.

Emissions from NO_X, CO, and VOC are based on the applicable emission standards provided in Table 1 of New Source Performance Standards (NSPS) Subpart JJJJ, in grams per horsepower-hour (g/hp-hr).[18] Emissions from formaldehyde are limited to 14 ppmvd or less at 15% O_2, based on Table 2a of NESHAP Subpart ZZZZ.[19] Emissions from CO_2 and CH_4 are estimated based on the manufacturer's specifications sheet, in grams per kilowatt hour (g/kW-hr). Emissions from filterable PM_{10}, $PM_{2.5}$, condensable PM, SO_2, and the remaining HAPs were estimated based on emission factors from AP-42 Chapter 3, Table 3.2-2 (07/00), *Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines*, in pounds per million British thermal units (lb/MMBtu). Filterable PM emissions are assumed to be equivalent to filterable PM_{10} and $PM_{2.5}$ emissions. H_2SO_4 emissions are assumed to be 5% of SO_2 emissions. The natural gas specific emission factor from 40 CFR §98 Subpart C, Table C-2, *Default CH_4 and N_2O Emission Factors for Various Types of Fuel,* was used to estimate N_2O emissions, in kilograms per MMBtu (kg/MMBtu). The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O emission rates, weighted according to their global warming potentials (GWP) of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a natural gas higher heating value (HHV) of 1,020 British thermal units per standard cubic foot (Btu/scf)[20] and average brake-specific fuel consumption rate of 17,820 scf per hour (scf/hr) were used.[21]

Based on current Project design, only one engine will be operating at any given time to continuously power the sources of the DWP platform. Therefore, potential annual emissions are based on the continuous operation of a single engine at 100% load.

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[18] For non-emergency spark ignition natural gas engines greater than 500 hp manufacturered after July 1, 2010.

[19] Table 2a of NESHAP Subpart ZZZZ for four-stroke lean burn (4SLB) stationary RICE.

[20] Per footnote b of AP-42, Table 3.2-2.

[21] Per the manufacturer's specification sheet at 100% load.

3.2.3 Emergency Diesel Generator

The Project will operate one (1) emergency, diesel-fired generator. BMOP design identifies that the make/model of the emergency generator will be similar to a Caterpillar G3512C, rated at approximately 1,500 kW (~2,000 hp).

Emissions from filterable PM, NO_X, VOC, and CO are estimated based on the emissions standards provided in 40 CFR §60.4205(b), in g/kW-hr.[22] Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions. Condensable PM and HAP emissions were estimated based on emission factors from AP-42 Chapter 3, Table 3.4-1, 2, and 3 (10/96), *Emission Factors for large Stationary Diesel and All Stationary Dual-Fuel Engines,* in lb/MMBtu. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 British thermal units per pound (Btu/lb) and average brake-specific fuel consumption (BSFC) rate of 7,000 British thermal units per horsepower-hour (Btu/hp-hr) were used. [23]

The emergency diesel-fired generator will only operate during periods where both natural gas generators are unavailable or for maintenance and readiness testing. Therefore, to estimate potential emissions, BMOP conservatively assumes that the emergency generator will not operate more than 100 hours per year, operating at 100% load.

3.2.4 Platform Crane Engines

The Project will operate a number of platform cranes for various types of operation. Based on current design specifications for the Project, the following diesel-fired crane engines will be located at the WC 509 platform complex:

- Two (2) 354 kW (~475 hp) diesel engines.

Emissions from filterable PM, NO_X, CO, and VOC are estimated based on the emissions standards provided in 40 CFR §60.4204(b), in g/kW-hr.[24] To conservatively estimate emissions from the crane engines, emissions of PM, NO_X, and VOC are multiplied by the appropriate Not to Exceed (NTE) multiplier provided in 40 CFR §1039.101(e), which, for engines with a NO_X standard less than 2.5 g/kW-hr and PM standard less than 0.07 g/kW-hr is 1.5. Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions.

Emissions from HAP were estimated based on emission factors from AP-42 Chapter 3, Tables 3.3-1 and 2 (10/96), *Emission Factors for Uncontrolled Gasoline And Diesel Industrial Engines*. AP-42 Chapter 3.3 does

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[22] Per 40 CFR §60.4205(b) and 40 CFR §89.112, for 2007 model year or later emergency combustion ignition internal combustion engines less than 3,000 hp with a displacement less than 10 liters per cylinder. It is conservatively assumed that NO_X and VOC emissions are equivalent to the $NMHC+NO_X$ emission limit.

[23] Per footnote e of AP-42 Table 3.4-1.

[24] Per 40 CFR §60.4204(b) and 40 CFR §1039.101, for 2014 model year or later combustion ignition internal combustion engines between 130 kW to 560 kW.

not provide an emission factor for condensable PM, therefore, the condensable PM emission factor provided in AP-42, Table 3.4-2, *Emission Factors for Large Uncontrolled Stationary Diesel Engines,* was conservatively used. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 Btu/lb and average BSFC rate of 7,000 Btu/hp-hr were used. [25]

To conservatively estimate emissions from the crane engines, BMOP assumes that each crane engine will operate up to 4,380 hours per year.

3.2.5 Firewater Pump Engines

The Project will operate two (2) firewater pump engines. Current design specifications for the Project identify that the engines will be rated at approximately 485 kW (~650 hp).

Emissions from filterable PM, NO_X, CO, and VOC are estimated based on the emissions standards provided in Table 4 of NSPS Subpart IIII[26] and 40 CFR §60.4204(b), in g/kW-hr.[27] Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions.

Emissions from HAP were estimated based on emission factors from AP-42 Chapter 3, Tables 3.3-1 and 2 (10/96), *Emission Factors for Uncontrolled Gasoline And Diesel Industrial Engines*. AP-42 Chapter 3.3 does not provide an emission factor for condensable PM, therefore, the condensable PM emission factor provided in AP-42, Table 3.4-2, *Emission Factors for Large Uncontrolled Stationary Diesel Engines,* was conservatively used. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 Btu/lb and average BSFC rate of 7,000 Btu/hp-hr were used. [28]

The emergency firewater pump engines will only operate during periodic maintenance testing and during emergencies. Therefore, to estimate potential emissions, BMOP conservatively assumes that the firewater pump engines will not operate more than 100 hours per year, operating at 100% load.

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[25] Per footnote c of AP-42 Table 3.3-1.

[26] Per 40 CFR §60.4205(c) for firewater pump engines with a displacement of less than 30 liters/cylinder between 225 kW and 450 kW. Conservatively assume that NO_X and VOC emissions are equivalent to the $NMHC+NO_X$ emissions limit.

[27] Per 40 CFR §60.4204(b) and 40 CFR §1039.101, for 2014 model year or later combustion ignition internal combustion engines between 130 kW to 560 kW.

[28] Per footnote c of AP-42 Table 3.3-1.

3.2.6 Storage Tanks

The Project will operate a number of fuel and petroleum liquid storage tanks. Current design specifications for the Project predict that the following storage tanks will be located at each platform:

- Platform A
  - One (1) 3,000 gallon aviation fuel (estimated as jet kerosene) tank.
- Platform B
  - Two (2) 4,400 gallon diesel storage tanks associated with each platform crane.
  - One (1) 18,000 gallon primary diesel storage tank.
  - One (1) 42,000 gallon crude oil surge tank.

TankESP^{TM} software was utilized to estimate potential annual emissions consistent with the methodology of AP-42 Chapter 7.1 using the following dimensions and usage assumptions.

Table 3-5. Storage Tank Representation

Tank	**Tank Dimensions**				**Volume (gal)**	**Max. Filling Rate (gal/hr)**	**Annual Throughput (gal/yr)**	**Orientation**
	L (ft)	**W (ft)**	**H (ft)**	**Dia. (ft)**				
Aviation Fuel Tank	10	5	8	--	3,000	200	13,000	Horizontal
Crane Diesel Storage Tank #1	--	--	30	5	4,400	400	114,400	Vertical
Crane Diesel Storage Tank #2	--	--	30	5	4,400	400	114,400	Vertical
Primary Diesel Storage Tank	16	15	10	--	18,000	400	468,000	Horizontal
Crude Oil Surge Tank	47.5	--	--	12.67	42,000	80,000	42,000	Horizontal

The chemical characteristics for jet kerosene and diesel fuel were based on standard TankESP^{TM} defaults, while the chemical characteristics for crude oil were based on the same annual average values as described for loading emissions, provided in Table 2-3 above. It was assumed that all tanks will have fixed roofs and will be operated continuously.

3.2.7 Fugitive Emissions

Fugitive emissions were calculated based on the synthetic organic chemical manufacturing industry (SOCMI) average emission factor (in pounds per hour [lb/hr])[29], using the following equation.

$$E_{VOC} = F_A \times WF_{VOC} \times N$$

Where:

$E_{VOC} = Emission\ rate\ of\ VOC\ from\ all\ equipment\ in\ the\ stream, \frac{lb}{hr}$

$F_A = SOCMI\ average\ emission\ factor, \frac{lb}{hr}$

$WF_{VOC} = Weight\ fraction\ of\ VOC\ in\ the\ stream, \%$

$N = number\ of\ components\ in\ the\ stream$

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[29] As provided in EPA's Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017 https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf

This factor was chosen to ensure a conservative representation of the collection of piping components in various services (i.e. crude oil, diesel, etc) at the WC 509 DWP. It should be noted that no reduction from these average emissions factors has been applied for these estimates, to ensure a conservative representation. Actual emissions will be much lower, as piping components will be monitored and repaired, if found to be leaking, based on the applicable leak detection and monitoring requirements.

The total number of piping components for each applicable stream are based on current design estimates for the Project. The different streams are categorized as gas/vapor or light liquid service based on the contents of the stream. The total number of components are then multiplied by the appropriate SOCMI emission factor. For piping components servicing natural gas streams, it is assumed that the components are in gas/vapor service. For piping components servicing diesel fuel, crude oil, or aviation fuel (assumed to be equivalent to jet kerosene), it is assumed that the components are in light liquid service.

To determine the VOC emission rate, the stream is multiplied by the VOC wt% of the stream. For components in natural gas service, the total VOC composition of the stream is based on an April 13, 2020 sample at the DWP platform. For components in diesel fuel or jet kerosene service, the total VOC composition is consistent with the TankESP^{TM} defaults. For components in crude oil service, the total VOC composition is based on the maximum vapor wt% used for crude oil loading emissions calculations.

Similar to VOC emissions, HAP emissions for the fugitive components were calculated using the same approach as above. Fugitive emissions also consider H_2S emissions from components in crude oil service and GHG emissions from components in natural gas service, using the same methodology as above. Annual emissions for all fugitive components are based on continuous operation (i.e. 8,760 hours of operation).

3.2.8 Maintenance, Startup, and Shutdown

BMOP has evaluated potential emissions not already identified above that may occur during maintenance, startup, and shutdown (MSS).

The existing WC 509 platform complex includes a vent boom for natural gas blowdowns. Following the repurposing of the platform complex from natural gas service to dual purpose oil and gas service, the vent boom will remain, but for emergency natural gas blowdowns only. Normal maintenance blowdowns will not occur through the vent boom at the WC 509 platform complex. Accordingly, no MSS emissions are attributed to the Project from this source.

The Project includes pig launchers and receivers on WC 509B. During maintenance activities requiring pigging, BMOP will utilize marine vessels for collection of the liquid pushed by the pigs. BMOP will follow the same Best Management Practices (BMP) as marine vessel loading, and identify records as “maintenance.” Because potential VOC and HAP emissions have been calculated based on continuous loading, emissions from loading losses as a result of pigging are already included in the potential emissions estimates above.

4. REGULATORY ANALYSIS

The Project is subject to certain federal and state air quality regulations. This section summarizes the air permitting requirements and key air quality regulations that would apply to the operation of the proposed DWP. Specifically, applicability to air permitting programs such as NSR, federal emissions standards such as NSPS and NESHAP, and applicable state air regulations are addressed.

4.1 Federal Permitting Programs

Federal permitting programs comprise requirements for construction of new sources or modification of existing sources (NSR) and for operation of major sources of air pollutants (Title V Air Operating Permit Program).

4.1.1 New Source Review

NSR requires that construction of new emission sources or modifications to existing emission sources be evaluated when significant net emission increases result. Two distinct NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant; nonattainment NSR permitting is required for facilities located in nonattainment areas, while PSD permitting is required for facilities located in attainment areas.

The DWP will be located approximately eighty-two (82) statute miles from the nearest point of the Louisiana coastline. The nearest Parish onshore is Cameron Parish, Louisiana. Cameron Parish is designated by the EPA as “attainment” or “unclassifiable” with NAAQS for all criteria pollutants.[30]

Therefore, the Project is not subject to offshore NNSR permitting requirements for any criteria pollutants. Under PSD permitting rules, the major source threshold is 250 tpy unless the facility is listed specifically in 40 CFR §52.21(b)(1)(i)(a) as having a lower 100 tpy threshold. The Project is not included on the list of operations subject to the more stringent 100 tpy threshold. As such, the Project will be subject to PSD permitting should emissions from the facility exceed the major source threshold of 250 tpy of any regulated NSR pollutant.

The following table presents the Project potential emissions in comparison to the major source thresholds.

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[30] 40 CFR §81.319.

Table 4-1. Major Stationary Source Determination

Regulated NSR Pollutant	Potential Emissions (tpy)	PSD Major Source Threshold (tpy)	Major Source?
NO_X	26.02	250	No
CO	57.88	250	No
VOC	21,881	250	**YES**
SO_2	1.64	250	No
PM-filterable	0.16	250	No
PM_{10}	1.07	250	No
$PM_{2.5}$	1.07	250	No
H_2S	9.50	250	No
H_2SO_4	0.05	250	No

Based on the potential operating emissions calculations for stationary sources, the Project is a major stationary source as potential emissions of VOC will exceed 250 tpy. As a new major stationary source, BMOP calculated emissions increases from the project in accordance with 40 CFR §52.21(d).

> *A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit… from each emissions unit following completion of the project and the baseline actual emissions… of these units before the project equals or exceeds the significant amount for that pollutant…*

The baseline emissions are considered zero for this analysis, and the project emissions increase is equal to the Project potential emissions. The following summarizes the project emissions increase in comparison to the significant emission rates (SER) for relevant regulated NSR pollutants (per 40 CFR §52.21(b)(23)).

Table 4-2. Project Emissions Increase Evaluation

Regulated NSR Pollutant	Potential Emissions (tpy)	Significant Emissions Rate[a] (tpy)	Above SER?
NO_X	26.02	40	No
CO	57.88	100	No
VOC	21,881	40	**YES**
SO_2	1.64	40	No
PM-filterable	0.16	25	No
PM_{10}	1.07	15	No
$PM_{2.5}$	1.07	10	No
H_2S	9.50	10	No
H_2SO_4	0.05	7	No
GHG (CO_2e)	16,503	75,000	No

a. "Significant" for GHG is defined under 40 CFR §52.21(b)(49)(iii).

As identified in the table above, the Project exceeds the SER for VOC. Accordingly, PSD review is required for VOC only. BMOP is submitting this application encompassing the requirements for a PSD air permit application.

4.1.2 Title V Air Operating Permit Program

Title V air operating permits are required for major stationary sources of air pollutants on the OCS, beyond state's seaward boundaries, as defined in 40 CFR §71. Based on potential emission calculations provided in Table 3-1, the Project will be a Title V major source since potential emissions exceed the Title V major source threshold for VOC and HAP. BMOP has submitted an application for a Title V Air Operating Permit under separate cover.

4.1.3 State Permitting Program

The DWPA identifies that the law of the nearest adjacent coastal state will apply to a DWP, such as the proposed Project.[31] The nearest adjacent coastal state is Louisiana.

4.1.3.1 Louisiana Permitting Program

Louisiana's State Implementation Plan (SIP) provides the requirements for state permitting of construction or modification of emissions sources and operation of emission sources in Louisiana Administrative Code (LAC) 33.III.Chapter 5 – Permit Procedures, regulated by the LDEQ.

The LDEQ permitting provisions of this Chapter apply to the owner and operator of any source which emits, or has the potential to emit any air contaminant.

Such sources include, but are not limited to:

- Any major source as defined LAC 33:III.502.A;
- Any nonmajor (area) source of hazardous air pollutants required to obtain an operating permit pursuant to regulations promulgated under Section 112 of the federal Clean Air Act; and
- Any nonmajor (minor) source that does not meet the exemptions specified in LAC 33:III.501.B and is thus required to obtain an air quality permit.

The Project will be subject to federal major source permitting under the PSD pre-construction program, as discussed previously. As such, this application is submitted to EPA for review and a permitting determination by EPA Region 6 of, and will be subject to regulations under Louisiana's SIP, as applicable.

4.2 Air Quality Regulations

The Project is potentially subject to federal and state regulations for air quality control. This section describes the applicability, criteria and principal requirements of federal, state, and local regulations that result in permit conditions for the offshore components of the Project.

4.2.1 Federal Regulations

This section outlines the federal applicability analysis. Both NSPS and NESHAP are evaluated.

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[31] 33 USC §1518(b).

4.2.1.1 New Source Performance Standards (NSPS)

NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of Subpart A, except as noted. Following is a discussion of potentially applicable subparts for the Project.

4.2.1.1.1 NSPS Subpart Kb – Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, regulates storage vessels with a capacity greater than or equal to 75 cubic meters (m^3) (19,813 gallons) that are used to store volatile organic liquids for which construction, reconstruction, or modification commenced after July 23, 1984.

NSPS Subpart Kb has provisions in §60.110b(b) to exempt tanks based on size and the maximum TVP of the material stored. Specifically, NSPS Subpart Kb "does not apply to storage vessels with a capacity greater than or equal to 151 m^3 (39,890 gallons) storing a liquid with a maximum TVP less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 (19,813 gallons) but less than 151 m^3 (39,890 gallons) storing a liquid with a maximum TVP less than 15.0 kPa." Vessels permanently attached to mobile vehicles such as trucks, railcars, barges, or ships are not subject to this subpart. In addition, process vessels do not meet the definition of a storage vessel per 40 CFR §60.111b.

The offshore Project includes the following storage vessels with a capacity greater than 19,813 gallons:

- One (1) 42,000 gallon crude oil surge tank located at the DWP platform.

However, the surge tank is considered a process vessel and is therefore not subject to NSPS Subpart Kb. EPA provided additional guidance that process tanks are exempt from Subpart Kb and that vessels used for pipeline surge control (not storage) are considered to be process tanks.[32] As such, the Project is not subject to the requirements of NSPS Subpart Kb.

4.2.1.1.2 NSPS Subpart IIII – Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) that commenced construction, reconstruction or modification after July 11, 2005 and were manufactured after April 1, 2006 if not fire pump engines, and after July 1, 2006 if certified fire pump engines.

BMOP proposes the following CI ICE, located on the DWP platform, that are subject to the requirements of NSPS Subpart IIII:

- One (1) 1,500 kW (~2,012 hp) emergency diesel generator (40 CFR §60.4100(a)(2)(i));
- Two (2) 354 kW (~475 hp) non-emergency diesel crane engines (40 CFR §60.4100(a)(2)(i)); and
- Two (2) 485 kW (~650 hp) emergency diesel firewater pump engines (40 CFR §60.4100(a)(2)(ii)).

The one (1) 1,500 kW (~2,012 hp) emergency diesel generator will be subject to 40 CFR §60.4205(b), which states that owners or operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with emission

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[32] 68 FR 59329-59330, October 15, 2003.

standards for new CI engines in 40 CFR §60.4202. Per 40 CFR §60.4202(a)(2), 2007 model year or later emergency CI ICE <3,000 hp and displacement <10 L/cylinder that are not fire pump engines, must meet standards in 40 CFR §89.112. Table 1 of 40 CFR §89.112 limits emissions standards to the following for engines >560 kW:

- Non-methane hydrocarbons (NMHC) + NO_X - 6.4 g/kW-hr
- CO - 3.5 g/kW-hr
- PM - 0.2 g/kW-hr

The two (2) 354 kW (~475 hp) non-emergency diesel crane engines at WC 509 will be subject to 40 CFR §60.4204(b), which states that owners or operators of 2007 model year or later non-emergency stationary CI ICE with a displacement of less than 30 liters/cylinder must comply with emission standards for new CI engines in 40 CFR §60.4201. Per 40 CFR §60.4201(a), 2007 model year or later non-emergency CI ICE <3,000 hp and displacement <10 liters/cylinder must meet standards in 40 CFR §89.112 or 40 CFR §1039.101 (as applicable). Per Table 1 of 40 CFR §1039.101, for engines that are model year 2014 or later, between 130 kW and 560 kW, emission standards are as follows. Per 40 CFR §1039.101(e), exhaust emissions from the engines may not exceed the applicable NTE standards, which for the applicable pollutants (NO_X, NMHC, and PM) is 1.5 times the standard. The following emissions standards have included the appropriate NTE multiplier for the engines.

- PM - 0.03 g/kW-hr
- NO_X - 0.6 g/kW-hr
- NMHC (VOC) - 0.29 g/kW-hr
- CO - 3.5 g/kW-hr

The two (2) 485 kW (~650 hp) emergency diesel firewater pumps will be subject to 40 CFR §60.4205(c), which states that owners or operators of fire pump engines with a displacement of <30 liters/cylinder must comply with emission standards in Table 4 of NSPS Subpart IIII. Per Table 4, model year 2009 or later engines with a maximum engine power greater than or equal to 450 kW and less than or equal to 560 kW must meet the following emission standards:

- NMHC + NO_X - 4.0 g/kW-hr (3.0 g/bhp-hr)
- CO - 3.5 g/kW-hr (2.60 g/bhp-hr)
- PM - 0.2 g/kW-hr (0.15 g/bhp-hr)

Per 40 CFR §60.4209(a) and §60.4214(b), owners of emergency stationary CI ICE that do not meet the standards applicable to non-emergency engines must install a non-resettable hour meter prior to startup of the engine and keep records of the operation of the engine in emergency and non-emergency service. For all the CI ICEs, the owner must purchase an engine certified to the emission standards and install and configure the engine according to manufacturer's specifications, per 40 CFR §60.4211(c).

4.2.1.1.3 NSPS Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

NSPS Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* applies to owners or operators of spark ignition ICE that commenced construction or were modified or reconstructed after June 12, 2006.

The two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators at the proposed DWP are considered spark ignition ICE and are subject to NSPS Subpart JJJJ per 40 CFR §60.4230(a)(4)(i). Per 40

CFR §60.4233(e), engines greater than 100 hp must comply with the emission standards in Table 1 of Subpart JJJJ.

Non-emergency lean burn engines greater than 1,350 hp manufactured after July 1, 2010 must meet the following emission standards, according to Table 1 of NSPS Subpart JJJJ:

- NO_X - 1.0 g/hp-hr or 1.36 g/kW-hr (82 ppmvd at 15% O_2)
- CO - 2.0 g/hp-hr or 2.72 g/kW-hr (270 ppmvd at 15% O_2)
- VOC - 0.7 g/hp-hr or 0.95 g/kW-hr (60 ppmvd at 15% O_2)

Per 40 CFR §60.4243(b), the owner must either purchase a certified engine, or if purchasing a non-certified engine, complete performance testing per 40 CFR §60.4244 to demonstrate compliance with emission limits. Initial performance testing is required within 180 days of startup (per Subpart A) and subsequent testing every 8,760 hours or 3 years, whichever comes first. Per 40 CFR §60.7(a)(3), initial notification is due within 15 days of startup.

4.2.1.1.4 NSPS Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution

NSPS Subpart OOOO establishes emission standards and compliance schedules for the control of VOC and SO_2 emissions from affected facilities that commence construction, modification, or reconstruction after August 23, 2011. Only onshore affected facilities are subject, which exclude all facilities located in the territorial seas or on the OCS.[33] Therefore, NSPS Subpart OOOO does not apply to the Project.

4.2.1.1.5 NSPS Subpart OOOOa – Crude Oil and Natural Gas Facilities

NSPS Subpart OOOOa establishes emission standards and compliance schedules for the control of GHG, VOC, and SO_2 emissions from affected facilities that commence construction, modification, or reconstruction after September 18, 2015. Similar to Subpart OOOO, above, affected facilities include only onshore operations. Therefore, NSPS Subpart OOOOa does not apply to the Project.

4.2.1.2 National Emission Standards for Hazardous Air Pollutants

NESHAP are emission standards for HAP and are applicable to major and area sources of HAP. A HAP major source is defined as having potential total HAP emissions in excess of 25 tpy and/or potential individual HAP emissions in excess of 10 tpy. An area source is a stationary source that is not a major source. Part 61 NESHAPs are chemical based NESHAPs, while Part 63 NESHAP allowable emission limits are established on the basis of a MACT determination for a particular source category. NESHAP apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. The Project is a major source of HAP, as potential individual and total HAP emissions are greater than 10 and 25 tpy, respectively.

Similar to NSPS, any source subject to a NESHAP is also subject to the general provisions of the respective NESHAP Subpart A, unless specifically excluded.

4.2.1.2.1 40 CFR §61 Subpart V - Equipment Leaks (Fugitive Emission Sources)

NESHAP Subpart V, *NESHAP for Equipment Leaks (Fugitive Emission Sources)* applies to the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps,

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[33] Definition of “onshore” at 40 CFR §60.5430.

compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by the subpart.

A ‘VHAP’ and ‘in VHAP’ service are respectively defined in 40 CFR §61.241 as:

> *VHAP means a substance regulated under this part for which a standard for equipment leaks of the substance has been proposed and promulgated. Benzene is a VHAP. Vinyl chloride is a VHAP.*
>
> *In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of §61.245(d). The provisions of §61.245(d) also specify how to determine that a piece of equipment is not in VHAP service.*

The crude oil to be handled and loaded at the DWP will contain benzene at less than 10% by weight. As such, the pipeline components regulated by this subpart will not operate “in VHAP service”, as defined in 40 CFR §61.241. Therefore, Subpart V does not apply to the Project.

4.2.1.2.2 40 CFR §63 Subpart B – Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections 112(g) and 112(j)

The proposed marine loading activity at the DWP is not regulated under another subpart of Part 63, as discussed below. Per 40 CFR §63.40(b), the use of CALM-buoys in exposed waters to load crude oil into VLCCs (and other crude oil carriers) for export to the global market is subject to Subpart B of Part 63.

> *The requirements of §63.40 through §63.44 of this subpart apply to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants after the effective date of section 112(g)(2)(B) (as defined in §63.41) and the effective date of a title V permit program in the State or local jurisdiction in which the major source is (or would be) located unless the major source in question has been specifically regulated or exempted from regulation under a standard issued pursuant to section 112(d), section 112(h), or section 112(j) and incorporated in another subpart of part 63, or the owner or operator of such major source has received all necessary air quality permits for such construction or reconstruction project before the effective date of section 112(g)(2)(B).*

BMOP is proposing to “construct a major source” per 40 CFR §63.41. Accordingly, a case-by-case MACT application has been prepared and submitted concurrently under separate cover.

4.2.1.2.3 40 CFR §63 Subpart H – Equipment Leaks

NESHAP Subpart H, *NESHAP for Equipment Leaks* applies to pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent systems required by this subpart that are intended to operate in organic hazardous air pollutant service 300 hours or more during the calendar year within a source subject to the provisions of a specific subpart in 40 CFR §63 that references this subpart. No Part 63 subpart that applies to the Project references this Subpart H. Furthermore, “in organic HAP service” is defined in 40 CFR §63.161 as:

> *... a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP's as determined according to the provisions of §63.180(d) of this*

> *subpart. The provisions of §63.180(d) of this subpart also specify how to determine that a piece of equipment is not in organic HAP service.*

The Project will not operate pipeline components that are in organic HAP service; therefore, BMOP has determined that NESHAP Subpart H is not applicable to the Project.

4.2.1.2.4 40 CFR §63 Subpart Y – Marine Tank Loading Operations

NESHAP Subpart Y, NESHAP for Marine Tank Loading Operations, applies to marine tank loading operations located at major or area sources of HAP emissions. BMOP has determined that NESHAP Subpart Y is not applicable to the Project.

A detailed NESHAP Subpart Y non-applicability discussion is provided in the Case-by-Case MACT application submitted under separate cover.

4.2.1.2.5 40 CFR §63 Subpart HH – Oil and Natural Gas Production Facilities

NESHAP Subpart HH, *NESHAP from Oil and Natural Gas Production Facilities,* applies to owners and operators of affected sources at oil and natural gas production facilities at major or area sources of HAP emissions. The Project is not considered an oil and natural gas production facility per 40 CFR §63.760(a)(3), as it does not process, upgrade or store natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user. Therefore, the Project is not subject to Subpart HH.

4.2.1.2.6 40 CFR §63 Subpart VV – Oil-Water Separators and Organic-Water Separators

NESHAP Subpart VV, *NESHAP for Oil-Water Separators and Organic-Water Separators,* applies to the control of air emissions from oil-water separators and organic-water separators for which another subpart of 40 CFR Parts 60, 61, or 63 references the use of this subpart for such air emission control. No Part 63 subpart that applies to the Project references Subpart VV. Therefore, BMOP has determined that NESHAP Subpart VV is not applicable to the Project.

4.2.1.2.7 40 CFR §63 Subpart HHH – Natural Gas Transmission and Storage Facilities

Per 40 CFR §63.1270(a) and (b), Subpart HHH applies to glycol dehydration units at major sources of HAP. The Project does not involve any glycol dehydration units; therefore, Subpart HHH is not applicable.

4.2.1.2.8 40 CFR §63 Subpart EEEE – Organic Liquids Distribution (Non-Gasoline)

NESHAP Subpart EEEE, *NESHAP for Organic Liquids Distribution (Non-Gasoline),* applies to organic liquids distribution (OLD) operations at or part of a major source of HAP emissions. Subpart EEEE includes standards for the following sources (40 CFR §63.2338):

- Storage tanks storing organic liquids
- Transfer racks at which organic liquids are loaded into or unloaded out of transport vehicles and/or containers
- All equipment leak components in organic liquid service that are associated with:
  - Storage tanks
  - Transfer racks
  - Pipelines between storage tanks and transfer racks
  - Transport vehicles and containers.

The proposed 1,000 barrel surge vessel is not a storage tank, as explicitly excluded in the definition of "storage tank" at 40 CFR §63.2406. The other storage tanks proposed do not store an organic liquid (excludes diesel, and fuels used for refueling). In addition, the project will not include a transfer rack, as the delivery of crude is to marine vessels, not to a cargo tank or tank car.

As such, the Project is not subject to requirements under Subpart EEEE.

4.2.1.2.9 40 CFR §63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

NESHAP Subpart ZZZZ, *NESHAP for Stationary Reciprocating Internal Combustion Engines*, applies to reciprocating internal combustion engines (RICE) located at major or area sources of HAP emissions. A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. For engines located at a major source of HAP emissions, a stationary RICE is 'new' if the unit commenced construction or reconstruction on or after December 19, 2002 and if the engine has a site rating of more than 500 hp or on or after June 12, 2006 and if the engine has a site rating of less than or equal to 500 hp (40 CFR §63.6590(a)(2)(i) and (ii)). All the proposed engines associated with the WC 509 platform complex are considered 'new'.

Per 40 CFR §63.6590(c)(7), new CI stationary RICE with a site rating of less than or equal to 500 brake hp located at a major source of HAP emissions must meet the requirements of NESHAP ZZZZ by demonstrating compliance with NSPS Subpart JJJJ or IIII, respectively. This applies to the following RICE associated with the DWP project:

- Two (2) 354 kW (~475 hp) non-emergency diesel crane engines.

These engines have no further requirements under Subpart ZZZZ.

The two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators are four-stroke, lean burn spark ignition ICE and must comply with the emissions limitations in Table 2a and the operating limitations in Table 2b, per 40 CFR §63.6600(b), as provided below:

- Four-stroke lean burn engines must reduce CO emissions by 93% or more or limit the concentration of formaldehyde in the stationary RICE exhaust to 14 ppmvd or less at 15% O_2 [Table 2a];
- Maintain catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test [Table 2b]; and
  - Demonstrate initial compliance with CO reduction or formaldehyde limit in accordance with Table 5 [§63.6630(a)].
  - During the initial performance test, establish each operating limitation described above [§63.6630(b)].
  - Conduct initial performance testing per Table 4 of this subpart within 180 days of startup and in accordance with §63.7(a)(2) [§63.6610(a) and Table 4].
  - Submit a notification of compliance status containing the results of the initial compliance demonstration according to the requirements of §63.6645 [§63.6630(c)].
  - Conduct semi-annual performance tests for CO to demonstrate that the required CO percent reduction is achieved [§63.6615, §63.6640(a), Table 3 and Table 6].
- Maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450°F and less than or equal to 1350°F [Table 2b].
  - Install, operate, and maintain a temperature continuous parameter monitoring system (CPMS) that meets the requirements of §63.6625(b) [§63.6625(b)].

    - Continuously collect and reduce data to 4-hour averages [§63.6635, §63.6640(a) and Table 6];
- Per 40 CFR §63.6605, at all times you must be in compliance with the emission limitations, operating limitations, and operate and maintain the engine, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions;
- Per 40 CFR §63.6625(h), any new stationary engine must minimize engine idle time at startup and limit startup period to less than 30 minutes;
- Report each instance in which the engine did not meet the emission or operating limitations as deviations according to the requirements in §63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE. Deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations. [§63.6640(b) and (d)];
- Per 40 CFR §63.6650 and Table 7, submit compliance reports semi-annually according to the requirements of §63.6650(b)(1)-(5). These reports are due July 31 and January 31 for the periods of January 1 – June 30 and July 1 – December 31, respectively. These reports must contain the information included in §63.6650(c), (d), and (e), if applicable; and
- Maintain records as specified in §63.6655(a),(b)&(d) for 5 years [§63.6655 and §63.6660].

The one (1) 1,500 kW (~2,012 hp) emergency diesel generator and two (2) 485 kW (~650 hp) emergency diesel firewater pump engines do not need to comply with the emissions limitations or operating limitations of Tables 1a, 2a, 2c, and 2d, per 40 CFR §63.6600(c). However, the engines must comply with the following:

- Maintenance checks and readiness testing is limited to 100 hours per year (40 CFR §63.6640(f)(2));
- The engine may only be operated for 50 hours per year outside of emergency operation and maintenance and testing; however, these 50 hours are counted towards the 100 hours provided for maintenance and testing (40 CFR §63.6640(f)(3));
- Submit all applicable notifications described in 40 CFR §63.6645 by the appropriate dates specified (40 CFR §63.6645);
- Submit semiannual compliance reports that meet the requirements of 40 CFR §63.6650, if applicable (40 CFR §63.6640 and §63.6650);
- Maintain all applicable records described in §63.6655, including, but not limited to, all notifications, performance tests, and maintenance conducted on the engine (40 CFR §63.6655(a), (b), (d), and (e));
- Per 40 CFR §63.6605(b), at all times you must operate and maintain the engine, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions; and
- Per 40 CFR §63.6625(h), any new stationary engine must minimize engine idle time at startup and limit startup period to less than 30 minutes.

4.2.1.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) applies to a pollutant-specific emissions unit at a major source that is required to obtain a Part 70 or 71 permit, if the unit is not exempt by the limitations or standards specified in 40 CFR §64.2(b), and satisfies the following criteria as detailed in 40 CFR §64.2(a):

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof);

(2) The unit uses a control device to achieve compliance with any such limitation or standard; and

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits. For a subject unit using a control device whose post-controlled emissions exceed the major source threshold (referred to as large pollutant-specific emission units [PSEU] in the rule), a CAM plan is required to be submitted with the initial Title V air operating permit application. Additionally, these units must be subject to an emission limitation or standard and use control devices to achieve compliance with any such emission limit. For a subject unit whose post-control emissions are less than the major source threshold, a CAM plan does not have to be submitted until the first Title V air operating permit renewal application.

The only equipment associated with the Project that will utilize a control device to achieve compliance with an emission limit or standard are the two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators.[34] These generators will be equipped with an oxidation catalyst to achieve compliance with the VOC BACT requirements as detailed in Section 5, such that CAM potentially applies to these units. However, the unit's potential pre-control device emissions of VOC are less than 100 tpy. Therefore, CAM does not apply to these units or this Project.

4.2.1.4 Risk Management Program

Requirements under 40 CFR §68, Chemical Accident Provisions, require submittal of a Risk Management Plan if the facility stores a regulated material above the applicable concentration and threshold values. Since BMOP will not store a regulated material above the applicable threshold limits, the Project is only subject to the General Duty Clause requirements and must review materials as purchased to verify if additional requirements must be met.

4.2.1.5 Greenhouse Gas Mandatory Reporting Rule

Under the Consolidated Appropriations Act of 2008 (P.L. 110–161), EPA authorized funding to develop a rule requiring mandatory reporting of GHG emissions above appropriate thresholds. EPA has authority under sections 114 and 208 of the Clean Air Act (42 USC §7414, 7542) to collect information about sources of air pollution and has issued regulations at 40 CFR §98.

The EPA has promulgated monitoring, reporting, and recordkeeping rules for GHGs. The proposed DWP is not a listed source category in either Table A-3 nor Table A-4 to Subpart A of Part 98. For source categories not delineated in Table A-3 nor Table A-4, the facility is required to report its GHG emissions if its aggregate maximum rated heat input from all combustion sources is greater than 30 million British thermal units per hour (MMBtu/hr) and it emits more than 25,000 metric tpy of CO_2e.[35] The Project will include stationary combustion sources located on the WC 509 platform complex, but the aggregate total of all combustion sources that could be used at one time is less than 30 MMBtu/hr. There are no other proposed sources that are included as categories under Part 98. Accordingly, the Project will not be subject to the requirements of the GHG Mandatory Reporting Rule.

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[34] Per 40 CFR §64.2(b)(i), CAM requirements do not apply to emission limits or standards proposed after November 15, 1990 pursuant to section 111 or 112 of the CAA.

[35] 40 CFR §98.2(a)(3).

4.2.2 State Regulations

For Deepwater Port License Applications (DPLAs), EPA administers CAA requirements and reviews air permit applications using adjacent state's regulations. The nearest adjacent state to the DWP project's offshore location is Louisiana. Therefore, the LDEQ rules and regulations will apply to the offshore portion of the Project. Following is a discussion of potentially applicable LAC 33:III chapters for the Project.

4.2.2.1 Louisiana Air Quality Regulations

Following is a discussion of potentially applicable LAC 33:III chapters for the Project.

As discussed above, the Project is subject to Title V permitting under 40 CFR §71. For consistency with the applicable Louisiana SIP requirements, the LDEQ-required Title V Part 70 forms have been completed as part of the application.

The following LDEQ required application forms are provided in Appendix B of this application:

- The Application for Approval of Emissions of Air Pollutants from Part 70 Sources;
- Emissions Inventory Questionnaire (EIQ) Forms; and
- The Environmental Assessment Statement (EAS or "IT" Question Responses).

4.2.2.1.1 LAC 33:III Chapter 11 – Control of Emissions of Smoke

This regulation prohibits impairment of visibility due to emissions of smoke and provides an opacity limit of 20 percent from combustion smoke except during periods of maintenance. Also provided are restrictions for outdoor burning. The opacity standards set forth in LAC 33:III.1101 do not apply to combustion units when combusting only natural gas and combustion units subject to a federal standard promulgated pursuant to section 111 or 112 of the Clean Air Act that limits average opacity to less than or equal to 20 percent, except for one six-minute period or less per hour.

The diesel combustion sources located at the DWP platform will be subject to this Chapter. However, all of the combustion sources combusting only natural gas will be exempt from this rule as they meet the criteria of LAC 33:III.1107.B.1.

4.2.2.1.2 LAC 33:III Chapter 13 – Emission Standards for Particulate Matter

This regulation prohibits impairment of visibility due to emissions of PM. According to LAC 33:III.1311.C, this regulation provides an opacity limit of 20 percent from emissions of PM. This regulation applies to all combustion sources of the offshore project.

4.2.2.1.3 LAC 33:III Chapter 15 – Emission Standards for Sulfur Dioxide

This regulation applies to new or existing sulfuric acid production units, sulfur recovery plants, and all other single point sources that emit or have the potential to emit 5 tpy or more of SO_2 into the atmosphere. Since no single point source for the Project emits or has the potential to emit 5 tpy or more of SO_2, this regulation does not apply.

4.2.2.1.4 LAC 33:III Chapter 21, Section 2103 – Storage of Volatile Organic Compounds

This regulation applies to storage tanks greater than 40,000 gallons which store VOC products with a maximum TVP of 1.5 psia or greater at storage conditions. The diesel storage tanks proposed as part of the Project are not subject to this regulation since the vapor pressure of diesel is less than 1.5 psia. The

42,000 gallon crude oil surge vessel located at the WC 509B platform is exempt from this regulation per LAC 33:III 2103.G.1, since the tank has a nominal storage capacity of less than 420,000 gallons and is not subject to NSPS.

4.2.2.1.5 LAC 33:III Chapter 21, Section 2108 – Marine Vapor Recovery

This regulation applies to any marine loading operation serving ships and/or barges loading crude oil, gasoline, or VOC with uncontrolled emissions of 25 tpy or more of VOC in the parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge, or 100 TPY or greater of VOC in any other parish of the State of Louisiana.

Since this is an offshore project and is not located onshore in any of the Louisiana parishes, BMOP has determined that this regulation is not applicable to the Project.

4.2.2.1.6 LAC 33:III Chapter 21, Section 2111 – Pumps and Compressors

Rotary pumps and compressors that handle VOCs having a TVP greater than or equal to 1.5 psia at handling conditions must be equipped with mechanical seals or other equivalent equipment or means as approved by the administrative authority. The WC 509 platform complex does not include crude oil pumps, nor natural gas compressors. The diesel equipment does not handle VOCs having a TVP greater than or equal to 1.5 psia. Only the condensate system for the existing natural gas lines, the surge vessel, and the sump system will have pumps that may be subject to this requirement.

4.2.2.1.7 LAC 33:III Chapter 21, Section 2113 – Housekeeping

This regulation defines the practices required to maintain the "best practical housekeeping and maintenance" for area VOC control. These practices include activities such as cleaning up spills, keeping containers closed, and properly storing waste. The Project is subject to this regulation.

4.2.2.1.8 LAC 33:III Chapter 21, Section 2121 – Fugitive Emission Control

This Section is applicable to each process unit at petroleum refineries, natural gas processing plants, synthetic organic chemical manufacturing industry facilities, methyl tertiary butyl ether manufacturing facilities, and polymer manufacturing facilities. The Project is not one of the listed facility types and is not subject to this regulation.

4.2.2.1.9 LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program

The provisions of the Comprehensive Toxic Air Pollutant (TAP) Program (LAC 33:III.Chapter 51) apply to owners and operators of any major source that emits, or has the potential to emit, 10 tpy or more of any individual TAP, or 25 tpy or more of any combination of TAPs, listed in Table 51.1 of LAC 33:III.5112. The Project will be subject to this chapter. An evaluation of the TAP program is included as part of the air quality impacts analysis in Volume 2 of this PSD application.

4.2.2.1.10 LAC 33:III Chapter 56 - Prevention of Air Pollution Emergency Episodes

This regulation is designed to prevent the buildup of excess concentrations of air contaminants during periods of high air pollution potential. The Project is subject to this regulation.

4.2.2.1.11 LAC 33:III Chapter 59 - Chemical Accident Prevention and Minimization of Consequences

This regulation does not apply to the Project since it does not produce, process, handle, or store any substance listed in LAC 33:III.5907 in greater than the threshold amounts.

5. BACT ANALYSIS

This section discusses the regulatory basis for BACT, the approach used in completing the BACT analyses, and the BACT analyses for the Project. Supporting documentation is included in Appendix D of this application.

A BACT analysis was performed for VOC as the only pollutant with both a significant emissions increase and a significant net emissions increase from the proposed project. This BACT analysis follows the "top-down" approach suggested by EPA, as described in more detail below.

The following emission units were considered in the BACT analysis and detailed discussions of each unit are included in the following subsections.

- Marine Loading
- Combustion Sources
  - Natural Gas-Fired Engine-Driven Generators
  - Emergency Diesel-Fired Engine-Driven Generator
  - Diesel-Fired Crane Engines
  - Emergency Diesel-Fired Engine-Driven Firewater Pumps
- Fugitive Emissions
- Storage Vessels

5.1 BACT Definition

The requirement to conduct a BACT analysis is set forth in the PSD regulations [40 CFR §52.21(j)(2)]:

> *(j) Control Technology Review.*
> *(2) A new major stationary source shall apply best available control technology for each regulated NSR pollutant that it would have the potential to emit in significant amounts.*

BACT is defined [40 CFR §52.21(b)(12) as:

> *...an emission limitation (including a visible emissions standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant.*

The underlined terms in the primary BACT definition above are addressed further below.

5.1.1 Emission Limitation

BACT is "an emission limitation," not an emission reduction rate or a specific technology. The BACT limit is an emissions limitation and does not require the installation of any specific control device. While BACT is prefaced upon the application of technologies reflecting the maximum reduction rate achievable, the final result of BACT is an emission limit. Typically, when quantifiable and measurable[36], this limit would be expressed as an emission rate limit of a pollutant (e.g., lb/MMBtu, ppm, or lb/hr).[37]

5.1.2 Each Pollutant

The BACT evaluation process is typically conducted for each regulated pollutant individually and not for a combination of pollutants. For the proposed Project, only VOC triggers a BACT review.

5.1.3 Achievable

BACT is to be set at the lowest feasible value that is achievable. However, there is an important distinction between emission rates achieved at a specific time on a specific unit, and an emission limitation that a unit must be able to meet continuously over its operating life.

As discussed by the DC Circuit Court of Appeals,

> *In National Lime Ass'n v. EPA, 627 F.2d 416, 431 n.46 (D.C. Cir. 1980), we said that where a statute requires that a standard be "achievable," it must be achievable "under most adverse circumstances which can reasonably be expected to recur."* [38]

EPA has reached similar conclusions in prior determinations for PSD permits.

> *Agency guidance and our prior decisions recognize a distinction between, on the one hand, measured 'emissions rates,' which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the 'emissions limitation' determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility's life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the "emissions limitation" that is "achievable" for that pollution control method over the life of the facility. Accordingly, because the "emissions limitation" is applicable for the facility's life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over a long term.* [39]

Thus, BACT must be set at the lowest feasible emission rate recognizing that the emission unit must be in compliance with that limit for the lifetime of the unit on a continuous basis. Thus, while viewing individual unit performance can be instructive in evaluating what BACT might be, any actual performance data must be viewed carefully, as rarely will the data be adequate to truly assess the performance that a unit will feasibly achieve during its entire operating life. While statistical variability of actual performance can be used to infer what is "achievable," such testing requires a detailed evaluation akin to the development of MACT standards. BMOP has presented a detailed evaluation and statistical variability specific to HAP in the Case-by-Case MACT application. For VOC BACT, BMOP must consider production processes or available methods, systems or techniques, as long as those considerations do not redefine the source (see "Defining

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[36] The definition of BACT allows use of a work practice where emissions are not easily measured or enforceable.

[37] Emission limits can be broadly differentiated as "rate-based" or "mass-based."

[38] As quoted in Sierra Club v. EPA (97-1686).

[39] EPA Environmental Appeals Board decision, In re: Newmont Nevada Energy Investment L.L.C. PSD Appeal No. 05-04, decided December 21, 2005. Environmental Administrative Decisions, Volume 12, Page 442.

the Source" section below). In contrast to limited snapshots of actual performance data, emission limits from similar sources can reasonably be used to infer what is "achievable."[40]

5.1.4 Floor

> *Emissions [shall not] exceed … 40 CFR §60 and §61.*

The least stringent emission rate allowable for BACT is any applicable limit under either NSPS – Part 60 or NESHAP – Part 61. State SIP limitations must also be considered when determining the floor. The regulatory applicability analysis in Section 4 of this application identifies the floor for BACT for the following sources:

- ► Natural gas-fired engine-driven generators
  - NSPS Subpart JJJJ, VOC standard of 0.95 g/kW-hr (40 CFR §60.4233(e) and Table 1 of Subpart JJJJ)
- ► Emergency diesel-fired engine-driven generator
  - NSPS Subpart IIII, NMHC + NO_X standard of 6.4 g/kW-hr (40 CFR §60.4202)
- ► Diesel-fired crane engines
  - NSPS Subpart IIII, NMHC standard of 0.29 g/kW-hr (40 CFR §60.4201)
- ► Emergency diesel-fired engine-driven firewater pumps
  - NSPS Subpart IIII, NMHC + NO_X standard of 4.0 g/kW-hr (40 CFR §60.4205(c))

5.2 BACT Assessment Methodology

The primary document referenced for the general BACT methodology is EPA's 1990 *NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting* ("NSR Workshop Manual").[41] To assist applicants and regulators with the case-by-case process, EPA issued a Draft Manual on NSR permitting in 1990 which included a "top-down" BACT analysis.

The five steps in a top-down BACT evaluation can be summarized as follows:

- ► **Step 1**. Identify all possible control technologies;
- ► **Step 2**. Eliminate technically infeasible control options;
- ► **Step 3**. Rank the technically feasible control technologies based upon emission reduction potential;
- ► **Step 4**. Evaluate ranked control technologies based on energy, environmental, and/or economic considerations; and
- ► **Step 5**. Select BACT.

While the top-down BACT analysis is a procedural approach suggested by EPA policy, this approach is not specifically mandated as a statutory requirement of the BACT determination. The process is conducted on a unit-by-unit, pollutant-by-pollutant basis and only considers the portions of the facility that are considered "emission units" as defined under 40 CFR §52.21(b)(7).

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[40] Emission limits must be used with care in assessing what is "achievable." Limits established for facilities that were never built must be viewed with care, as they have never been demonstrated and that company never took a significant liability in having to meet that limit. Likewise, permitted units that have not yet commenced construction must also be viewed with special care for similar reasons.

[41] EPA, October 1990. https://www.epa.gov/nsr/nsr-workshop-manual-draft-october-1990

5.3 BACT “Top Down” Approach

BACT in this report has been evaluated via a “top-down” approach that includes the steps outlined in the following subsections. The minimum control efficiency to be considered in a BACT assessment must result in an emission rate less than or equal to any applicable NSPS or NESHAP emission rate for the source. [42]

5.3.1 Identification of Potential Control Technologies (Step 1)

Available control technologies with the practical potential for application to the emission unit are identified. The application of demonstrated control technologies in other similar source categories to the emission unit in question can also be considered. While identified technologies may be eliminated in subsequent steps in the analysis based on technical and economic infeasibility or environmental, energy, economic or other impacts, control technologies with potential application to the emission unit under review are identified in this step. Under Step 1 of a criteria pollutant BACT analysis, the following resources are typically consulted when identifying potential technologies:

1. EPA’s Reasonably Available Control Technology (RACT)/Best Available Control Technology (BACT)/Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC) database;
1. Determinations of BACT by regulatory agencies for other similar sources or air permits and permit files from federal or state agencies;
2. Engineering experience with similar control applications;
3. Information provided by air pollution control equipment vendors with significant market share in the industry; and/or
4. Review of literature from industrial technical or trade organizations.

BMOP performed searches of the RBLC database to identify the emission control technologies and emission levels that were determined by permitting authorities as BACT within the past ten years for comparable emission sources. There are no existing similar sources for marine loading at CALM buoys in exposed offshore waters, 82 statute miles to the nearest point on shore. RBLC was evaluated for the following process types:

- 17.000 Internal Combustion Engines
  - 17.100 – Large Internal Combustion Engines (>500 hp)
    - 17.110 – Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel)
      - **One (1) 1,500 kW (~2,012 hp) emergency diesel-fired engine-driven generator**
      - **Two (2) 485 kW (~650 hp) emergency diesel-fired engine-driven firewater pumps**
    - 17.130 – Natural Gas (includes propane & liquefied petroleum gas)
      - **Two (2) 1,736 kW (~2,328 hp) natural gas-fired engine-driven generators**
  - 17.200 – Small Internal Combustion Engines (≤500 hp)
    - 17.210 – Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel)
      - **Two (2) 354 kW (~475 hp) diesel-fired crane engines**
- 42.000 Organic Liquid Storage & Marketing (Petroleum, Gasoline, VOL)
  - 42.004 – Petroleum Liquid Marketing (except 42.001-003 & 42.005-006)
    - **Fugitive emissions from piping components**
  - 42.005 – Petroleum Liquid Storage in Fixed Roof Tanks
    - **Storage vessels (diesel fuel storage tanks, aviation fuel storage tank, surge vessel)**

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[42] 40 CFR §52.21(b)(12).

5.3.2 Elimination of Technically Infeasible Control Options (Step 2)

After the available control technologies have been identified, each technology is evaluated with respect to its technical feasibility in controlling emissions from the source in question. The first question in determining whether or not a technology is feasible is whether or not it is demonstrated. If so, it is feasible.

Demonstrated means that it has been installed and operated successfully elsewhere on a similar facility. “This step should be straightforward for control technologies that are demonstrated--if the control technology has been installed and operated successfully on the type of source under review, it is demonstrated and it is technically feasible.”[43]

An undemonstrated technology is only technically feasible if it is “available” and “applicable.” A control technology or process is only considered available if it has reached the licensing and commercial sales phase of development and is “commercially available”.[44] Control technologies in the R&D and pilot scale phases are not considered available. Based on EPA guidance, an available control technology is presumed to be applicable if it has been permitted or actually implemented by a similar source. Decisions about technical feasibility of a control option consider the physical or chemical properties of the emissions stream in comparison to emissions streams from similar sources successfully implementing the control alternative. The NSR Manual explains the concept of applicability as follows: “An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration.”[45] Applicability of a technology is determined by technical judgment and consideration of the use of the technology on similar sources as described in the NSR Manual.

5.3.3 Rank of Remaining Control Technologies (Step 3)

All remaining technically feasible control options are ranked based on their overall control effectiveness for the pollutant of interest.

5.3.4 Evaluation of Most Stringent Control Technologies (Step 4)

After identifying and ranking available and technically feasible control technologies, the economic, environmental, and energy impacts are evaluated to select the best control option. If adverse collateral impacts do not disqualify the top-ranked option from consideration it is selected as the basis for the BACT limit. Alternatively, in the judgment of the permitting agency, if unreasonable adverse economic, environmental, or energy impacts are associated with the top control option, the next most stringent option is evaluated. This process continues until a control technology is identified.

Economic analyses were performed to compare total costs (capital and annual) for potential control technologies. Capital costs include the initial cost of the components intrinsic to the complete control system. Annual operating costs include the financial requirements to operate the control system on an annual basis and include overhead, maintenance, outages, raw materials, and utilities.

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[43] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.17.

[44] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.18.

[45] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.18.

The capital cost estimating technique used is based on a factored method of determining direct and indirect installation costs. That is, installation costs are expressed as a function of known equipment costs. This method is consistent with the latest EPA's Office of Air Quality Planning and Standards (OAQPS) guidance manual on estimating control technology costs.[46]

Total capital investment (TCI) represents the delivered cost of the control equipment, auxiliary equipment, and instrumentation (purchased equipment costs). Auxiliary equipment consists of all the structural, mechanical, and electrical components required for the efficient operation of the device. Auxiliary equipment costs are estimated as a straight percentage of the equipment cost. Direct installation costs consist of the direct expenditures for materials and labor for site preparation, foundations, structural steel, erection, piping, electrical, painting and facilities. Indirect installation costs include engineering and supervision of contractors, construction and field expenses, construction fees, and contingencies. Other indirect costs include equipment startup, performance testing, working capital, and interest during construction.

Annual costs are comprised of direct and indirect operating costs. Direct annual costs include labor, maintenance, replacement parts, raw materials, utilities, and waste disposal. Indirect operating costs include plant overhead, taxes, insurance, general administration, and capital charges. Replacement part costs, such as the cost of replacement of catalysts for the oxidation catalysts, were included where applicable. With the exception of overhead, indirect operating costs were calculated as a percentage of the total capital costs. The indirect capital costs were based on the capital recovery factor (CRF) defined as:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

11

where i is the annual interest rate and n is the equipment life in years.

The equipment life is based on the normal life of the control equipment and varies on an equipment type basis. The same interest rate applies to all control equipment cost calculations. For this analysis, an interest rate of 7% was used based on information provided in the most recent OAQPS Control Cost Manual.[47] Detailed BACT cost calculations are included in Appendix D to this report.

The primary focus of the environmental impact analysis is the reduction in ambient concentrations of the pollutant being controlled. Increases and decreases in other criteria or non-criteria pollutants may occur with some technologies and should also be identified. Non-air impacts, such as solid waste disposal and increased water consumption, may be an issue as well.

5.3.5 Selection of BACT (Step 5)

In the final step, the BACT emission limit is determined for each emission unit under review based on evaluations from the previous step.

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[46] EPA, *OAQPS Control Cost Manual*, 6th edition, EPA 452/B-02-001, July 2002. Some sections updated more recently: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution#cost%20manual

[47] https://www.epa.gov/sites/production/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf

Although the first four steps of the top-down BACT process involve technical and economic evaluations of potential control options (i.e., defining the appropriate technology), the selection of BACT in the fifth step involves an evaluation of emission rates achievable with the selected control technology. BACT is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed.

5.4 Defining the Source

The EPA's NSR Workshop Manual states: "Historically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives."[48] The courts have confirmed EPA's use of a two-part test for determining when a considered control for the purposes of BACT illegitimately redefines the proposed source.

The United States Court of Appeals for the Ninth Circuit has summarized and adopted the EPA's two-part test for determining when the evaluation of an alternative production process as a control technology[49] veers into an illegitimate redefinition of the source proposed by the permit applicant.

> *First, "the permit applicant initiates the process and … defines the proposed facility's end, object, aim or purpose—that is the facility's basic design." The purpose must be "objectively discernable." Additionally, the applicant's proposed definition "must be for reasons independent of air permitting" and cannot be motivated by cost savings or avoidance of risks.*
>
> *Second, EPA takes a "hard look" at the proposed definition to determine which design elements are inherent to the applicant's purpose and which elements can be changed to reduce pollutant emissions without disrupting the applicant's basic business purpose.*[50]

The Court's two-part test can be further characterized by examples in the NSR Workshop Manual and prior permitting decisions, which are outlined as:

- Step 1: The applicant defines the project in a way that addresses:
  - The purpose of the project
  - The basic design and location to meet the project purpose
- Step 2: EPA reviews the Applicant's stated purpose and basic design elements:
  - Are the design elements inherent to the purpose?
  - Could any basic design element change without impacting the project purpose?

The following presents the Applicant's stated purpose of the project and the corresponding basic design and location.

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[48] NSR Workshop Manual, page B-13.

[49] Again, such an evaluation is disallowed under Massachusetts regulations. Algonquin sets out this test here as an alternative method of demonstrating that EMD improperly redefines the source.

[50] *Helping Hands Tools v. Envtl. Prot. Agency*, 848 F.3d 1185, 1194 (9th Circuit 2016).

5.4.1 Purpose of the Project and Key Design Criteria

The primary purpose of the Project is to provide for a safe and reliable long-term supply of crude oil for export to the global market. To fulfill this purpose, the Project must be capable of fully loading the international fleet of crude-carrying marine vessels to accommodate the safe and efficient transport of crude. Accordingly, the Project requires a DWP that can accommodate the draft and berth of a fully loaded VLCC with the ability to load in varying meteorological conditions. This ensures safety in transfer and transit by minimizing risks of transportation incidents (e.g., spills, allisions, collisions). It is not possible for existing onshore terminals in the GOM to fully load a VLCC due to limited draft. There are only a couple existing onshore terminals in the GOM that can partially load a VLCC; loading is completed offshore via reverse lightering. The proposed DWP design avoids the inefficiency and cost of idled time at a fixed port for partial VLCC loading while offering the benefit of avoiding dock-constrained ports to free up dock space for other commodities. This approach also resolves the logistical challenges and added vessel traffic of reverse lightering while mitigating the risks and additional environmental impacts of multiple loadings for a single fully-loaded VLCC.

The following are key design considerations for the siting criteria, consistent with the primary purpose of the Project:

- Location with deep water
- Location that is distant from sensitive coastal resources and that would minimize vessel traffic at inland waterways and eliminate the need for dredging
- Location near, but without interference to, designated shipping fairways
- Sufficient restricted safety area for safe transiting, maneuvering, and loading of an international fleet of VLCCs and other large seafaring crude vessels
- Loading a ship from a floating buoy, as opposed to a fixed berth for maximum availability and safety in exposed deep water subject to unique offshore weather and wave conditions
- Ability to fully load a VLCC in approximately 1 day
- A DWP design that can be called upon by the existing worldwide fleet of VLCCs or other crude oil carriers by matching worldwide fleet piping manifold pressure limitations, and that utilizes proven design that is safe to operate
- Use of existing infrastructure and facilities with a local fuel source, where possible
- Operational control and communications to enable safe loading
- Location with access to U.S. crude oil supply infrastructure, such as the Nederland Terminal, which is a key supply hub for domestic crude
- Flexibility to export a wide variety of crude oil types

These factors were specifically used in guiding the development of the proposed source, with the following conclusions dictating the basic design of the proposed source:

- Use of an existing offshore pipeline system provides access to the siting criteria to meet the Project purpose while minimizing total project impacts.
- Use of CALM buoys to provide safe, efficient, and high availability to load large seafaring vessels, including VLCCs, in the varying sea states of exposed deep water.
- Availability of an existing platform complex provides operational control and communications without requiring new structures and impacts.
- Access to the existing Nederland Terminal with the ability to provide a variety of domestic crude types for export.

With this project-specific evaluation, BMOP has identified the existing Stingray Pipeline System, which provides an existing 36-inch OD subsea pipeline from Cameron Parish, Louisiana to an existing platform complex in federal waters within and adjacent to the OCS in West Cameron Lease Block 509.

The primary purpose and identified objectives defining the basic design of the Project cannot be attained with traditional crude export and existing operations. As such, existing operations with the following design characteristics do not fit the purpose and objective of the Project, and would not be similar sources:

- Fully loading VLCCs through reverse lightering of smaller vessels shuttling back and forth to existing onshore terminals;
- Use of a fixed loading berth; or
- Customized vessels dedicated to operations shuttling uniform product types between limited, defined locations.

5.4.2 Control Alternatives that Redefine the Source

The NSR Workshop Manual and the courts have identified characteristics of control alternatives that would redefine the source inappropriately for a BACT evaluation. Relevant precedent includes an opinion by the Environmental Appeals Board (EAB), holding that design elements of a facility that support the reliability of the process are inherent to the purpose of the facility. In *City of Palmdale*, the applicant proposed to construct a hybrid natural gas-solar power plant with the purpose of providing 570 MW of baseload power. In response to a challenge that the BACT should have considered all solar power as a control alternative, the EAB concluded:

> *According to the record, however, "solar power plants alone do not produce reliable energy generation night and day." Thus, "[e]nergy production would either have to be supplemented by a storage facility to produce during the evening and night hours or would be available only throughout the daylight hours. Because of the limited energy during night hours, [the applicant] would not increase its level of assurance that residential, commercial, and industrial power needs in the City would be met, which is one of the … project objectives." In other words, such a design would be incompatible with PHPP's overarching purpose: a reliable, baseload facility… The Board concludes the [permitting authority's] determination here that an all-solar alternative would redefine the source was eminently reasonable…"*[51]

A control technology that may be consistent with the basic design and purpose of one facility does not necessarily make it so for other facilities. For the BMOP project, control technology applied to marine loading terminals that interrupt the Project purpose of a **safe** and **reliable** long-term supply of **crude oil export for the global market** redefines the source, just as applying less reliable electricity generation redefines the source for *City of Palmdale*.

The VOC BACT for each emission unit considers the project purpose and definition of the source in completing the "top-down" BACT analysis per the NSR Workshop Manual draft guidance.

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[51] *In re City of Palmdale*, PSD App. No. 11-07, 2012 WL 4320533 (EAB September 17, 2012).

5.5 VOC BACT – Marine Loading

5.5.1 Background on Pollutant Formation

Evaporative emissions of VOC occur as organic vapors in cargo tanks on marine vessels are displaced during marine loading activities. The displaced vapors include evaporated residual product from the prior load, crude oil vapors generated in the cargo tank as the crude oil is being loaded, and inert gases added to the cargo tank for safety. The VOC emissions from marine loading at the Project are a function of the following parameters:[52]

- Physical and chemical characteristics and method of unloading the previous cargo;
- Physical and chemical characteristics of the crude oil loaded; and
- Method of loading the crude oil.

In regard to the previous cargo, these emissions are estimated by a constant arrival emissions factor, and represent an inerted vessel. The displaced vapors from marine vessel cargo tank are not uniform throughout loading. For the proposed Project, inerted vessels will arrive blanketed with inert gases to maintain oxygen concentration below 8% - specifically to make them noncombustible.[53] As well, hydrocarbon vapors are denser than air.

> *Because of its high density the gas forms a layer at the bottom of the tank which rises with the oil surface as the tank is filled. Once it has been formed the depth of the layer increases only slowly over the period of time normally required to fill a tank, although ultimately an equilibrium gas mixture is established throughout the ullage space.*
>
> *Above this layer the atmosphere originally present in the tank persists almost unchanged and it is this gas which in the early stages of loading enters the venting system. In an initially gas free tank, therefore, the gas vented at first is mainly air (or inert gas) with a hydrocarbon concentration below the Lower Explosive Limit (1 percent HC).*[54]

The physical and chemical characteristics of the crude oil loaded are dependent upon the source. For the proposed Project, the physical and chemical characteristics are based on the crude oil handling requirements and limitations of the Nederland Terminal.

The method of loading crude oil affects the rate of evaporation. Because VOC emissions from marine loading are, in part, a result of evaporated crude oil, the rate of evaporation affects total loading emissions. The Marine Board for the National Research Council has noted that faster, efficient loading can minimize air emissions.

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[52] AP-42 Chapter 5.2 Transportation and Marketing of Petroleum Liquids, 6/08.

[53] 33 CFR §154.2001.

[54] International Chamber of Shipping, *International Safety Guide for Oil Tankers and Terminals*, (ISGOTT), 2d Ed, London: Witherby & Co.

> *Atmospheric emissions while loading cargo are minimized by filling each compartment as rapidly as possible, to reduce the amount of evaporation into the ullage space (an exception to this is at the start of loading when rapid rates may cause splashing, which increases evaporation)* [55]

As noted, reducing splashing in an effort to minimize surface area and convection-driven evaporation also minimizes VOC emissions from marine loading.

5.5.2 Identification of Potential Control Technologies (Step 1)

The following VOC emissions control technologies have been identified:

- Vapor Combustion Control
- Vapor Recovery Control
- Vapor Balancing
- Vapor Control System Onboard VLCC
- Vapor Control System Onboard Support Vessel
- Submerged Fill and VOC Best Management Practices (BMP)

5.5.2.1 Vapor Combustion Control

A common approach for marine loading at onshore terminals is the use of a vapor combustion unit (VCU) to control displaced organic vapors. Vapor capture systems are necessary for use of a VCU. For onshore terminals with fixed berths, dockside vapor collection hoses or arms are connected to the vessel's inert gas vapor system on the deck of the ship to capture displaced loading loss vapors. The terminal's facility vapor control system (VCS) must meet USCG safety requirements at 33 CFR Part 154. The USCG regulations require safety protection devices to be as close as possible to the vessel's connection with the facility VCS. Compliance with the safety device requirements is typically met at marine terminals with a dock safety unit (DSU), an entire skid that includes the required detonation arrester, pressure control, oxygen analyzer, and inerting/enrichment equipment. Blowers/fans are utilized to pull the displaced vapors through the facility VCS and to the VCU, and for combustion air/quench air in the combustor control.

A VCU utilizes burners to add the heat energy required to raise the temperature in the enclosed combustor to the point that VOC chemical bonds are broken. However, as discussed above, the displaced vapor composition is not uniform and inerted. A VCU requires supplemental fuel, both to sustain a pilot flame for ignition, as well as assist gas necessary to enable combustion to sustain the high temperatures required for VOC destruction. For marine loading, assist gas is often required until the vessel is loaded to 85% of full capacity, or more. The VCU control utilizes a ceramic refractory to allow quick heating and sustain temperatures to improve VOC destruction.

The following figure presents a simplified VCU control system. A VCU requires a DSU, a large enclosed combustor with ceramic refractory, blowers and fans to both pull the displaced vapors through the facility VCS and sustain proper combustion control in the VCU, and a reliable, plentiful fuel source for pilot fuel and assist gas. When the space, power, and fuel requirements are available at an onshore marine terminal, VCUs can achieve VOC control of 99% of captured vapors.

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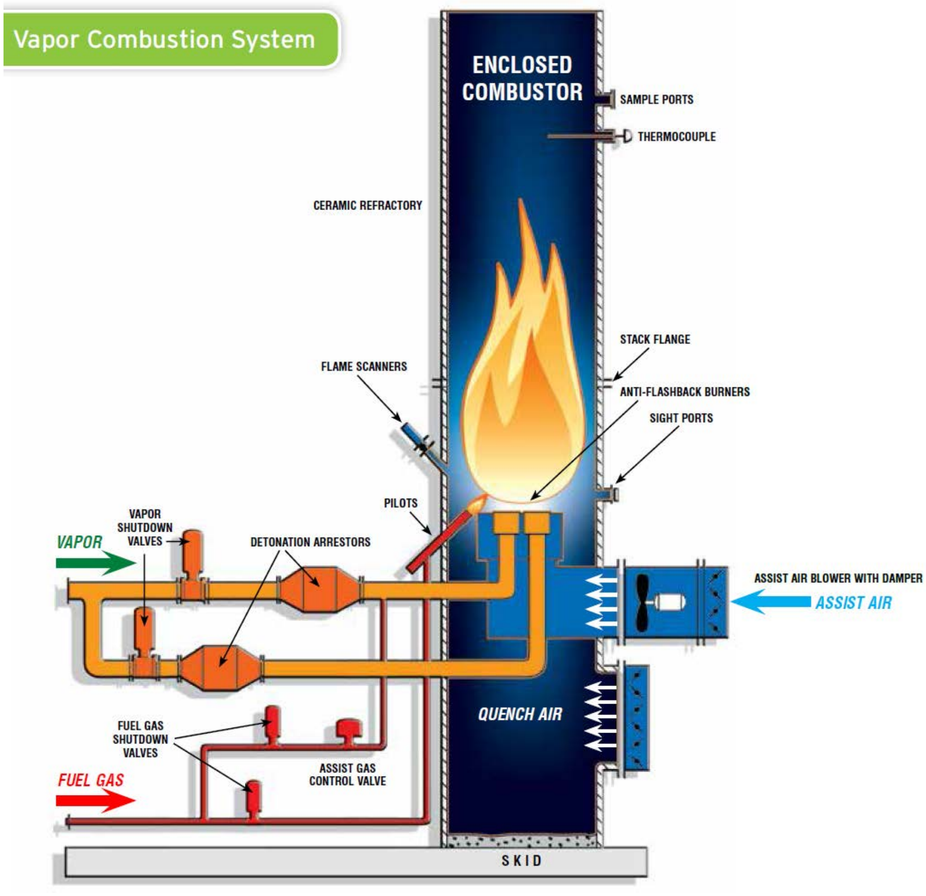
[55] Marine Board, National Research Council, "Controlling Hydrocarbon Emissions from Tank Vessel Loading," 1987, page 82. (Docket A-90-44, II-I-4).

Figure 5-1. Example Vapor Combustion System[56]



Flares are also a common combustion control device used in the “process vent or stack discharges” source classification. Flares require the same vapor capture components as a VCU (i.e., DSU and blowers/fans), as well as supplemental fuel supply. Combustion occurs at the tip of the stack, which is exposed to atmospheric disturbances and precipitation. Therefore, a flare has less residence time and control of combustion temperature in comparison to a VCU. The result is lower control efficiency, typically 98% control of captured vapors. As well, flares require operations that maintain tip velocity and a vapor stream with a net heating value of at least 270 Btu/scf.[57] As discussed for VCUs, the displaced vapors occurring during a majority of the loading time (~85% of full capacity) of marine vessels with crude oil will not sustain combustion. Supplemental fuel will also be required to sustain complete combustion in a flare. Without the insulation and radiative heating from an enclosed combustor, a flare will require more supplemental fuel and/or sustain lower VOC destruction efficiency.

In addition to sufficient space for installation of the required components, flares also require sufficient space for safe operation in consideration of the thermal radiation from the exposed flame.

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[56] https://www.johnzinkhamworthy.com/wp-content/uploads/vapor-combustion-systems.pdf

[57] AP-42, Chapter 13.5 Industrial Flares,02/18.

5.5.2.2 Vapor Recovery Control

Vapor recovery requires the same vapor capture system discussed in the vapor combustion control section, but instead of using a combustor to oxidize the captured hydrocarbons, a vapor recovery unit (VRU) uses one of the following control practices to recover the hydrocarbon as liquid:

- Refrigeration
  - Condense hydrocarbons out of the vapor stream by reducing the temperature below the dewpoint
  - Most effective on vapor-rich streams with low volumetric flow
  - Require significant energy for refrigeration cycle
  - Require storage tank for collection of recovered hydrocarbon liquids
- Adsorption
  - Adsorb hydrocarbons with use of activated carbon (or similar)
  - Require controlled temperature and pressure for effectiveness and safety
  - Carbon replacement requires frequent supply vessel trips and carbon changeout
- Absorption/Adsorption
  - Adsorb hydrocarbons with use of activated carbon (or similar)
  - Utilize two-stage vacuum system to regenerate one carbon bed while alternate carbon bed is controlling the vapor stream
  - Require controlled temperature and pressure for effectiveness and safety
  - Regeneration requires additional equipment including an absorption column and storage tank for lean oil recovered
  - Supply vessels for recovered lean oil or an additional subsea pipeline system would be required to pump lean oil to marine vessels

VRUs can achieve up to 99% control, similar to a VCU. A VRU also would require the addition of a new platform to house the equipment. Propane fuel would not be required for assist gas, but the VRU requires significant electrical power (in addition to the vapor blower). Accordingly, a diesel generator would be required. Storage tanks would be necessary for liquids recovered from the vapor stream, and frequent carbon replenishment would necessitate supply boats and added material consumption/waste.

5.5.2.3 Vapor Balancing

Vapor balancing is a passive measure for vapor capture, and potentially subsequent control of loading emissions. Displaced vapors are simply transferred to another tank or vessel, to subsequently be processed or combusted. While simple, it requires a storage tank with vapor space, or an idle vessel serving as a floating storage tank.

5.5.2.4 Vapor Control System Onboard VLCC

Countries engaged in crude oil loading from production platforms in the North Sea developed requirements for control of VOC emissions that initially required 78% reduction in VOCs from loading marine vessels. Purpose-built shuttle tankers operating in the North Sea were modified to have vapor recovery systems onboard. Recovered hydrocarbons are then bunkered and may be used as fuel for the onboard boilers or engines. The recovery of hydrocarbons requires additional safety consideration for the vessel, as well as customization to add the system on the deck.[58]

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[58] International Maritime Organization, “Technical Information on Systems and Operations to Assist Development of VOC Management Plans,” July 27, 2009 (MEPC.1/Circ. 680).

Figure 5-2. Vapor Recovery Onboard a North Sea Shuttle Tanker

5.5.2.5 Vapor Control System Onboard Support Vessel

Barges have been used in the past to capture and control vapor displaced when loading vessels. The Barge Jovalan and Barge Olympic Spirit have been used at the Ellwood Marine Terminal (no longer in operation), and the Barge San Pedro was utilized at El Segundo Marine Terminal, both in California.

5.5.2.6 Submerged Fill and VOC BMP

Submerged fill loading reduces splashing while still allowing for fast loading times in an effort to minimize surface area and total evaporation over time, to minimize VOC emissions throughout the loading event. In prior rulemaking, such as 40 CFR 63 Subpart Y, the EPA has identified that submerged fill can reduce emissions by 60%.

> *Submerged fill reduces the amount of emissions generated from the loading of vessels by reducing turbulence and misting. Use of this technique results in a 60-percent reduction in emissions compared to splash loading.*[59]

A VOC BMP promotes coordination with the vessel for loading activities to minimize the total loading time while loading safely.

5.5.3 Elimination of Technically Infeasible Control Options (Step 2)

After the identification of potential control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

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[59] 75 FR 65115, October 21, 2010, right column

5.5.3.1 Vapor Combustion Control

In comparison to a VCU, a flare has the same vapor capture system requirements, similar space requirements (would require a new platform), and additional non-air quality environmental, energy, and safety impacts with lower control efficiency. Therefore, BMOP has evaluated a hypothetical vapor combustion control technology utilizing a VCU, because of its additional effectiveness, for the proposed Project.

A VCU control applied to the proposed Project would use floating vapor hoses (~1,500 feet long) to connect the VLCC to the CALM buoys, similar to the crude oil loading hoses, but for vapor return. The vapor hoses would be connected to the VLCC's vapor system to capture displaced vapors, instead of having them released through the vent mast riser. The CALM buoys would have to be modified to accommodate the additional vapor line with an additional swivel path, and vapor PLEMs would have to be constructed with under-buoy vapor hoses (~200 feet). A looped subsea vapor pipeline (~6,000 feet to CALM Buoy No. 2) would have to return the captured vapors to a new platform, where risers (~250 feet) would bring the captured vapor to a safety skid with detonation arresters, and then to three marine VCUs. There are few instances of subsea vapor pipelines utilized at nearshore berths to return collected vapors to shore. However, no subsea vapor pipelines have been demonstrated in operation at the water depth, distance, and vertical return up a riser to an offshore pipeline, as would be required for the proposed Project. Appendix D includes a schematic and plot of the VCU control alternative concept for BMOP.

The operation of any stationary vapor control system applied to the Project necessitates that the vapor collection system and subsea vapor lines successfully route the vapors from the VLCC back to a location that can support a VCU. A vapor capture system that is unreliable or unsafe will prevent a VCU from achieving up to 99% reduction in total hydrocarbons from the marine loading losses.[60] For the BMOP Project, there are additional unique considerations for applying VCU control with an undemonstrated vapor capture system.

First, while the Project includes use of the existing WC 509 Platform Complex to support VLCC loading, the existing platforms cannot support VCUs. The commissioned strength and fatigue analysis does not allow for the installation of three very large VCUs (14 feet in diameter, 90 feet tall) necessary for the control of emissions from crude oil loading into a VLCC at 80,000 bbl/hr. In addition to the modifications to add crude oil piping, meters, and ancillary equipment, the platform complex will continue to house natural gas separators and other equipment for natural gas service. Accordingly, a new platform would need to be constructed, just to house the VCU controls.

Second, while the Project has the benefit of natural gas supply for basic utilities at the WC 509 complex, there is insufficient natural gas supply at WC 509 for the significant fuel consumption rates that would be required for VCUs – both for assist gas for control of captured vapors and for electrical generation to power the large blowers necessary to pull a vacuum on miles of vapor lines. A diesel generator and regular supply of diesel fuel would be required on the VCU platform, as would propane fuel for the pilot and assist gas for the VCUs.

In addition to the two basic VCU requirements of space and fuel/energy needs, there are many challenges impacting the ability to operate vapor capture and control at BMOP.

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[60] This analysis considers a VCU design capable of achieving a control efficiency of 99%, similar to onshore marine terminals, to ensure a conservative evaluation of VOC control.

The practical effectiveness of a VCU control when applied to BMOP presents questions of feasibility, or at the minimum, would limit BMOP's ability to fulfill the Project purpose and design capacity. The vapor capture and control would impart operating constraints that would add significant risks, increase planned and unplanned downtime due to maintenance and additional operating activities, and require additional approval (USCG or Certifying Entity) for non-conforming design. BMOP has considered several challenges in the engineering analysis for the technical feasibility of VCU control on the proposed Project:

- Vapor Hose – reduced operating capacity due to floating vapor hose connections/disconnections and maintenance.
- Location of Safety Devices – physical design prohibits conforming to explicit USCG safety regulations and USCG has not deemed the operating requirements of the Project with vapor capture as safe.
- Vessel Tank Pressure Control Challenges – safe operating pressure for the vessel cargo tanks would be a delicate balance not previously demonstrated for the Project design and would significantly reduce the operating capacity.
- Liquid Condensation – reduced operating capacity for vapor line pigging, added maintenance, and draining of vapor hoses with customized support vessels.
- Substantial Fuel Requirements – added risks to safe operation for frequent fuel tank transit and replacement near large combustors and potential for reduction in operating capacity due to supply interruptions.

BMOP has also considered the operations and maintenance impacts as a result of these challenges. Leveraging the experience of VCU operation at the Nederland Terminal combined with offshore experience, BMOP has determined that even if unproven engineering solutions to overcome the technical difficulties of VCU operation for controlling VLCC loading 82 statute miles offshore could be operated successfully, the application of vapor control would limit the Project operating capacity by 52% of design, or more. The quantification of the operating capacity impact is delineated in Appendix D of this application, and addresses actual operation and availability at the Nederland Terminal applied to the proposed Project, as well as time estimates for specific practices and known maintenance events based on extensive offshore and marine experience.

5.5.3.1.1 Vapor Hose

To implement vapor capture, the CALM buoy would be modified, and additional floating and under buoy vapor hose(s) added. There would be two separate sets of hoses, one set for the crude oil and the other for the vapor return. The hose sets would require customized design to keep them bundled such that they do not separate – like spaghetti – and create obstacles both during the absence of vessel loading and when not attached to the buoy. The VLCCs to call at the DWP have limited crane capacity onboard. Lifting the floating hoses to the deck would need to occur in two separate operations for the crude oil hoses and the vapor hoses. The extra hose lifting and connection time, as well as disconnection time, directly adds time to a single vessel's loading operation and limits the ability to operate the Project at design capacity.

Further, with a customized hose bundling design, it is expected that hose replacement may be required more frequently with abrasion and regular impacts from the Meteorological and Oceanographic (MetOcean) environment at WC 509. The crude oil hoses and vapor hoses would have different diameters, lengths, and buoyancy, and would be affected differently by MetOcean conditions (seas, swell, current, and wind). The potential for damage or normal wear is increased, which would lead to loss of operating capacity for an increase in planned maintenance, and possible interruptions from unplanned maintenance.

5.5.3.1.2 Location of Safety Devices

The USCG has promulgated safety regulations specific to vapor control systems of marine loading. USCG's regulations do not require vapor capture and control, but explicitly state that when vapor capture is used, the system must comply with the requirements for *Marine Vapor Control Systems* (33 CFR 154 Subpart P).[61] For the proposed Project, it is not possible to implement a VCU control that can meet the explicit USCG requirements for the location of necessary safety devices, as discussed below.

Originally promulgated in 1990 and most recently updated in 2015, the purpose of USCG's regulations is to offer protection for both the marine vessel and the marine terminal. To ensure protection, 33 CFR 154 Subpart P specifies necessary safety devices and required locations for design and operation.

Table 5-1. USCG Safety Device Location Requirements

USCG Reg.	Safety Device	Required Location from Ship Vapor Connection
§154.2105	Oxygen Analyzer	<6 meters (19.7 feet)
§154.2105	Detonation Arrester	<18 meters (59.1 feet)
§154.2106	Straight pipe run on either side of Detonation Arrester	>120 times the pipe diameter
§154.2107	Inerting, enriching, or diluting system	<22 meters (72.2 feet)
§154.2109	Vapor recovery or destruction	>30 meters (98.8 feet)

Source: 33 CFR 154 Subpart P.

The short distance requirements above minimize the at-risk components from increased line pressures due to blockages (e.g., condensate) or electrostatic charge accumulation. In addition to USCG requirements, the International Safety Guide for Oil Tankers and Terminals, (ISGOTT) also requires a detonation arrester to be located "in close proximity to the terminal vapor connection at the jetty head in order to provide primary protection against the transfer or propagation of a flame from ship to shore or shore to ship."[62] These safety requirements are met at fixed loading berths of existing marine terminals as the safety devices are located on the dock directly adjacent to the moored vessel.

It is not possible for BMOP to meet these fundamental vapor capture safety requirements for marine loading for a CALM buoy in exposed waters of the ocean. Of particular note is the requirement for "Straight pipe run on either side of Detonation Arrester >120 times the pipe diameter", which for 24" nominal pipe size would be equivalent to 240 feet. The floating vapor hose alone would be greater than 1,500 feet long. Even after the floating vapor hose, the CALM buoy does not have enough surface area to support each of the safety devices, and the DSU with these devices would have to be placed on the VCU platform. With the addition of the under-buoy vapor hoses, subsea vapor return line, and vapor riser to the VCU platform, the closest these safety devices could be located to the vapor connection at the VLCC would be ~8,000 feet. The unique setting and Project design criteria would lead to an exceedance of the safety device location requirements by more than a factor of 100 – exposing the ship to unprotected vapor lines two orders of magnitude outside of safety requirements.

BMOP cannot implement a vapor capture system that meets the explicit USCG requirements for safety device locations. If considered further, VCU control for BMOP would have to undergo scrutiny by the

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[61] 33 CFR §154.2000(h).

[62] ISGOTT, 5th Edition, Section 11.1.13.6.

Assistant Commandant for Marine Safety, Security, and Environmental Protection to grant an exemption from the distance requirements for the safety devices. This exemption process, as delineated in 33 CFR §108, must demonstrate that:

- Compliance with the requirement is economically or physically impractical,
- No alternative procedures, methods, or equipment standards exist that would provide an equivalent level of safety and protection from pollution by oil or hazardous material, and
- The likelihood of oil or hazardous material being discharged is not substantially increased as a result of the exemption.

The safety device location is physically impractical any closer than a VCU platform and no known equipment exists to provide an equivalent level of safety and protection. Operating procedures and methods will be the only option to provide an equivalent level of safety. The operating procedures and methods would need to be made to address a series of hazard analyses conducted per 33 CFR §154.2020(d), and then a certifying entity would need to review the entire plan, calculations, and specifications, including the hazard and failure analysis.

The USCG has never granted an exemption for this magnitude of unprotected vapor lines. The furthest exemption USCG has granted for the location of the safety devices is less than 10% of the distance required for BMOP – meaning that the length of the floating vapor hose alone would be much longer than the USCG has ever previously determined is safe for marine vessel vapor capture and control.

Conservatively assuming that a first-of-its-kind USCG exemption were possible, it is expected that hazards would need to be mitigated through tightly bound-restrictions on operating conditions that would minimize variability and potential for hazards. These operating limitations could include the following:

- Constrained weather conditions to minimize temperature variability between ullage vapors and the sea floor to mitigate liquid drop-out and potential for overpressure and vacuum hazards;
- Constrained sea state conditions to mitigate dynamic conditions that could lead to leaks, vapor hose impairment and pressure fluctuations, etc.;
- Frequent interruptions to loading to inspect vapor hoses, CALM buoy components, and components to identify possible leaks in the vapor lines and mitigate air infiltration for the lines under negative pressure (much of the system will be under vacuum) that could lead to an explosive atmosphere or potential for electrostatic charge accumulation from entrained moisture;
- Shortened vapor hose replacement schedules; and
- Restricted loading rates and interruptions resulting from pressure variations.

Many of the example operating constraints are at odds with the Project location in exposed waters of the ocean at the existing WC 509 platform complex. These constraints and restricted operating practices would greatly impact BMOP's ability to efficiently load VLCCs at the Project capacity. Accordingly, consideration of the feasibility of VCU control for BMOP must consider the impacts of significant reduction in operating capacity.

5.5.3.1.3 Vessel Tank Pressure Control Challenges

A marine vessel tank structure is designed to carry certain loads, including the combined pressure from the liquid cargo and the tank ullage pressure. The tank ullage pressure is also a critical parameter for safe operation; positive pressure is required for inerted vessels to prevent ambient air (and oxygen) from entering the tank space. Operating the tank pressure within certain constraints is thus necessary to maintain the structural integrity and safety of the vessel. The USCG also requires elimination of potential overpressure and vacuum hazards, for this reason.[63]

Most crude oil carriers have a common tank vent and inert gas system. It is through this system that positive operating pressure is maintained, and also where vapors are piped to the mast riser during loading or overpressure events. The design of the marine vessel vapor system is regulated by the International Convention for the Safety of Life at Sea (SOLAS), regulation II-2/11.6 and 5. The design must utilize the following control mechanisms:

- Individual tank pressure/vacuum (P/V) valve
- Common P/V breaker.

Figure 5-3. Main Cargo Deck of a Crude Oil Tanker[64]

The P/V valve is the primary mechanism for protection from over pressure or too much vacuum. The design and operation of these valves is specified at ISO 5364:2000. The typical pressure setting for a P/V valve is 1,400 to 1,800 millimeters of water gauge (2 to 2.5 pounds per square inch, gauge [psig]). For an inert marine vessel tank, the USCG requires that the pressure be maintained greater than 0.2 psi, but less than 80% of the lowest setting of any of the vessel's pressure relief valves.[65] With a typical P/V pressure relief at 2 psi, the marine vessel's tanks must be maintained between 0.2 and 1.6 psi. When loading product without a vapor control system, the vessel can relieve pressure through the vent mast riser, maintaining proper positive pressure (target to between 1.4 and 1.6 psi) to sustain an inerted atmosphere in the tanks, while maintaining VOC management practices.

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[63] 33 CFR §154.2100(a).

[64] International Maritime Organization, "Technical Information on Systems and Operations to Assist Development of VOC Management Plans," July 27, 2009 (MEPC.1/Circ. 680).

[65] 33 CFR §1547.2103(b).

However, when a vapor control system is utilized, the cargo tanks are no longer a self-contained system with a single point of onboard control during loading (vent overpressure through the mast riser). With vapor capture and control at the terminal, controlling the pressure is a multi-variable exercise that requires integrated function of the loading rate, facility vapor connection system blowers, and the vessel's valves and inerting requirements. For safety protection and minimization of operating variables, terminal vapor control systems utilize short-run, dockside controls.

Adding variables such as vertical elevation changes, temperature fluctuations, exaggerations of pressure ripples, liquid dropout, and inherent communication delays for system control design (overshoot versus slow response time) creates a very different operational challenge for the BMOP Project.

At 80,000 bbl/hr crude oil loading rate, the blowers on the vapor control system must have sufficient capacity to pull this volume ~8,000 feet and change in elevation of over 200 feet, twice (from the deck of the VLCC down to the sea floor, and then back up again to the VCU platform deck). Based on extensive experience for less complex dockside controls at the Nederland Terminal, BMOP's affiliates have identified vessel tank pressure control as an operability challenge for a vapor control system of the proposed Project that would result in both planned and unplanned downtime.

This pressure control would be exacerbated with dropout and collection of liquid in the vapor lines, vessel movement due to weather and wave conditions, and other variations in loading. Assuming that yet-to-be-demonstrated design specific to the BMOP Project can be engineered to meet USCG's requirements to eliminate overpressure and vacuum hazards from this system, use of vapor capture would significantly restrict the operating conditions to allow for proper pressure control, and require frequent liquids removal and maintenance of the vapor collection system to minimize inconsistencies in pressure drop.

5.5.3.1.4 Liquid Condensation

Vapor displaced during loading of a marine vessel will contain water entrained in the inert gas as well as condensable vapors. Use of a vapor capture system would undergo pressure differential and changes in temperature as the vapors leave a positive pressure, double-hull insulated vessel and travel ~8,000 feet in total, dropping to the sea floor 160 feet below the surface and then back up through a vertical riser more than 250 feet to the platform deck all while maintaining a significant vacuum in the system. The changes in temperature and pressure would lead to liquid condensation in the vapor capture system. The change in elevation would lead to liquids collecting at all low points in the system, including the floating hoses at the base of the risers to the CALM buoy and the seafloor at the base of the vertical riser at the VCU platform.

In the few instances of vapor capture with subsea vapor lines, the sloped subsea floors returned vapors to onshore terminals. For these unique locations, the velocity of the gas in the vapor capture system can be designed to carry condensed liquids up the slope to a liquid knockout drum prior to the VCU. It is not possible to create enough velocity to carry condensed liquids up a >250 feet vertical lift for the proposed Project.

The condensed liquids can be expected to pool in the floating hoses at the CALM buoy and at the bottom of the riser. With a flat seafloor, there would not be a single low point. As liquid pools in the pipelines, it creates flow restrictions and blockages leading to unsafe variations in the vessel cargo tank pressure control. The physical design requirements at the seafloor prevent simply adding a single sump to "eliminate any liquid condensate," at the CALM Buoy, and thus require other mechanisms to meet USCG requirements for condensate capture.[66] The engineering solution for this challenge is to build a looped subsea vapor line to enable pigging to remove the liquids. HYSYS Modeling was conducted by BMOP to evaluate the liquid drop-out for loading a VLCC at 80,000 bbl/hr. Depending on the ullage temperature and pressure compared to the vapor capture system temperature and pressure, ~30 bbl/day of liquid can condense and collect in the subsea vapor lines.[67] With this potential for liquid drop-out, vapor line pigging would be required after loading each vessel. While pigging the vapor line, loading would be interrupted and possibly incur demurrage fees.

Liquids would also condense in the floating vapor hoses, between the vessel and the CALM buoy. Because these hoses cannot be pigged, they would be periodically disconnected from the CALM buoy and lifted to drain using a customized support vessel to remove the collected liquids.

The frequent subsea vapor line pigging and added maintenance requirements relying on a customized support vessel to drain the floating vapor hoses would lead to significant interruptions to operations.

5.5.3.1.5 Substantial Fuel Requirements

For the first half of loading a vessel, the displaced vapor requires supplemental fuel for combustion in a VCU. This fuel, assist gas, is necessary to sustain safe and effective vapor control until the layer of hydrocarbon vapors above the crude oil provides a sufficiently combustible mixture to allow combustion without assist gas. For the crude types considered for the proposed Project, propane assist gas would be needed until a VLCC was loaded over 85%. The assist gas requirements at startup would be ~ 800 standard cubic feet per minute (SCFM). At the beginning of load temperature control, the assist gas consumption would be 2,100 scfm. Using conservative VCU specifications for the crude types evaluated, over 17,000 gallons of propane would be consumed per VLCC loaded. With this much fuel consumption, very large propane storage would be required on the VCU platform, and replacement propane tanks would be constantly in transit to replenish the consumed fuel. BMOP anticipates that six 18,000-gallon propane tanks would be needed on the platform. The dimensions of each tank are 45 feet by 10 feet by 11.5 feet – the deck space required just for fuel storage is substantial, while adding safety risks for multiple fuel tanks near large combustion units.

In addition, six more propane tanks, each 18,000-gallon capacity, would be required to be in transit for refueling, which would occur more than once per week. The consumption of fuel, delivery of fuel, and propane tanks would add significant operating costs and labor for fuel management and replacement. The near constant deliveries of large volumes of propane would also be weather-dependent, potentially interrupting operations not only for bad weather at WC 509, but also throughout the transit route of fuel replenishment.

The safety risks to both ship and platform personnel that are inherent during lifting the large, heavy propane tanks from the deck of a transportation vessel onto the VCU platform and subsequently returning the emptied tanks to the vessel would be an ongoing, significant concern throughout the life of the DWP.

The operating challenges of assist gas are not a problem at onshore facilities, which have the space for fuel storage and/or access to plentiful natural gas supply. Onshore marine terminals, or even those offshore

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[66] 33 CFR §2100(h).

[67] HYSYS modeling based on a cargo pressure in the marine vessel tanks of up to 2.5 psig, a loading rate of 80,000 bbl/hr, a vessel temperature of 80°F, a sea surface temperature of 73°F, and a sea floor temperature of 62°F. At lower cargo pressures in the vessel, flowrates can increase due to hydrocarbon flashing.

loading terminals that are within 2 miles of shore, do not have this operating challenge which would impact the efficiency and availability of BMOP.

5.5.3.1.6 VCU Control at Ashkelon is Not Demonstrated in Practice for the Project's Purpose

As described in Section 5.4.1, the purpose of the Project and location in exposed waters offshore requires use of CALM buoys. Considering available information specific to CALM buoys – vendors and previous installations – BMOP has identified only a single international SPM system that has retrofitted a SPM with a customized vapor control system for loading of crude oil into VLCCs on a pilot basis. This pilot is a source- and location-specific implementation. The pilot does not reflect vendor offerings or standard engineering. Of the >500 worldwide installations, no other SPM buoys were identified as operating with a vapor control system.
The single controlled SPM buoy is a retrofit using land based vapor capture and control as a pilot project at the Europe Asia Pipeline Company Ltd (EAPC) Ashkelon Oil Port in Israel.

There are several key differences to the operation at the Ashkelon Oil Port that permit effectiveness of the Ashkelon VCU, including:

- Short distance to shore results in resource accessibility and safety design that are closer in operations to an onshore terminal than BMOP,
- Shallow water depth results in engineering design that mitigates operating impacts from liquid dropout,
- Benign MetOcean conditions maximize loading availability with weather and wave operating constraints required by vapor capture, and
- Lower loading rate mitigates technical challenges of vapor capture and does not inhibit the port's capacity.

Details of the actual emissions reduction at Ashkelon Oil Port were not available to BMOP. The near-shore location in calm waters, lower loading rates, and unaffected (or improved)[68] primary business purpose identify that the operating conditions at the Ashkelon Oil Port are vastly different than at BMOP. The application of a VCU at the international location does indicate that the use of vapor capture may be possible with a SPM near shore, but this is consistent with prior understanding of onshore and near shore marine terminals. The Ashkelon Oil Port's location and business purpose provide the flexibility to accommodate vapor capture and control that does not translate to BMOP as confirmation that vapor capture is demonstrated in practice for the Project's purpose.

Additional discussion of the Ashkelon Oil Port control system is provided in the Case-by-Case MACT application, submitted under separate cover.

For the BMOP project, control technology applied to marine loading terminals that interrupt the Project's purpose of a **safe** and **reliable** long-term supply of crude oil export for the global market redefines the source, just as applying less reliable electricity generation redefines the source for *City of Palmdale*.

Based on the evaluation above, a VCU would not meet explicit USCG safety requirements and would significantly affect the reliability of the Project, reducing capacity by at least 50%. Accordingly, a VCU requirement would redefine the source, and can be rejected from consideration in the top-down BACT analysis. To provide further certainty that vapor capture and control is not feasible for the Project, BMOP

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[68] "The VCU enables continues [sic] loading of vessels without dependence of wind directions." See Europe Asia Pipeline Co. Operations Division, "Port of Ashkelon, Information, Operational Procedures, and Regulations Handbook," May 2019.

has continued the evaluation of the VCU into Steps 3 and 4 of the top-down BACT analysis, completing an evaluation of the economic, energy, and environmental impacts of the control technology.

5.5.3.2 Vapor Recovery Control

The same challenges of a vapor capture and control system using combustion (e.g., VCU) would also apply to a control system using vapor recovery technologies (e.g., VRU). Specifically, the operability impacts of vapor capture that would limit the Project capacity by more than 52% of design – vapor hose, location of safety devices, vessel tank pressure control challenges, liquid condensation, and fuel requirements – would also apply to a VRU.

5.5.3.2.1 VRU Control at Gaviota is Not Demonstrated in Practice for the Project's Purpose

BMOP has reviewed historical documents regarding a temporary loading operation in California in the mid-1990s that applied vapor capture and control with VRU to loading marine vessels with crude oil, referred to as the "Gaviota Interim Marine Terminal."

The Gaviota Interim Marine Terminal was driven by a need for company-owned stranded assets and huge project costs to find a temporary solution until the long-term project purpose could be realized. As a result of unique pressure controls not feasible for BMOP, near-shore location with access to extensive onshore equipment and internal floating roof tanks, lower loading rates, and unaffected temporary business need, the Gaviota Interim Marine Terminal vapor recovery system cannot be applied at BMOP. The Gaviota Interim Marine Terminal does not confirm that long-term feasibility, reliability, or operability of controls is demonstrated for BMOP's unique Project purpose.

Additional discussion of the Gaviota Interim Marine Terminal control system is provided in the Case-by-Case MACT application, submitted under separate cover.

Similar to a VCU, a VRU would not meet explicit USCG safety requirements and would significantly affect the reliability of the Project, reducing capacity by at least 50%. Accordingly, a VRU requirement would redefine the source, and can be rejected from consideration in the top-down BACT analysis. To provide further certainty that vapor capture and control is not feasible for the Project, BMOP has continued the evaluation of the VRU into Steps 3 and 4 of the top-down BACT analysis, completing an evaluation of the higher economic, energy, and environmental impacts of the control technology, relative to a VCU.

5.5.3.3 Vapor Balancing

The Marine Board identified the practical limitations of vapor balancing.

> *The technique known as vapor balancing can be used as an adjunct to vapor control to reduce instantaneous processing rates, or for other reasons. For example, at Exxon's offshore Hondo Field in California, loading emissions are pumped into a large tank vessel where they are retained for subsequent burning. The vessel acts as a buffer, permitting loading rates higher than could otherwise be accommodated by the vapor treatment facilities at the site. Vapors are drawn from the holding tanks at a constant rate, not dependent on instantaneous loading rates.*

> *But vapor balancing should not be regarded as a standard procedure. The roofs of many modern storage tanks are designed to float on the surface of the liquid, leaving no space for vapors. There may be applications for vapor balancing at specific sites.*[69]

BMOP does not fit the very specific criteria where vapor balancing would be a practical control, as it adds the need for a vapor storage vessel without the ability to control the emissions – a VCU platform or other control system would still be needed, with the added complication of a storage vessel. Vapor balancing is not a technically feasible control for the proposed Project.

5.5.3.4 Vapor Control System Onboard VLCC

Shuttle tankers are not the same as typical crude carriers, as they are designed and built for a specific purpose – to carry produced oil a short distance to a processing plant. Shuttle tankers are used when the depth or sea conditions of an offshore production area make pipelines to shore economically undesirable.

Shuttle tankers are designed for the North Sea environment and loading from production platforms or floating production, storage & offtake vessels (FPSO). The shuttle tankers are equipped with a bow loading system or a submerged turret loading system. They are equipped with dynamic positioning systems, which include azimuth and tunnel thrusters both forward and aft. North Sea shuttles also have twin-screw propulsion system for redundancy and dynamic positioning. Shuttle tankers also typically have large ballast tank volume to help with stability and positioning at the sacrifice of cargo-carrying efficiency. North Sea shuttle tankers have a capacity of less than half of a VLCC (<850,000 bbls).

Shuttle tankers are alternatives to pipelines and serve as short-run transport between limited receipt points and delivery points. The loading and discharging frequency are comparatively high, with less time in transit (up to 50 loads per year). Some shuttle tankers spend 50% of their life in loading mode in the field.[70] This high frequency of loading of produced oil (not weathered crude from a terminal) provides additional benefit for onboard recovery. In comparison, the VLCCs expected to call at the BMOP DWP will traverse the globe and will have longer hauls with fewer annual loading events. Thus, VLCCs are designed for efficiency of transit – and the larger size of their cargo is critical for this efficiency.

BMOP does not own VLCCs or other crude carrying vessels. The purpose of the project is to serve the existing fleet of international ships for export based on market conditions, not a purpose-built shuttle from the DWP to a few, nearby delivery points. A shuttle tanker does not meet the purpose of the project and cannot feasibly be implemented by BMOP as a single terminal in the international commodity market.

For the BMOP project, control technology applied to marine loading terminals that interrupt the Project purpose of a safe and reliable long-term supply of **crude oil export for the global market** redefines the source, just as applying less reliable electricity generation redefines the source for *City of Palmdale*. Vapor control systems onboard VLCCs would redefine the source and is not a technically feasible control for the proposed Project.

5.5.3.5 Vapor Control System Onboard Support Vessel

The following operational constraints do not allow for application to BMOP:

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[69] Marine Board, National Research Council, "Controlling Hydrocarbon Emissions from Tank Vessel Loading," 1987, page 80. (Docket A-90-44, II-I-4)

[70] https://www.dnvgl.com/expert-story/maritime-impact/Shuttle-tankers-safe-flexible-efficient.html

- Loading Rate Limits. Barges with onboard vapor control limit the loading capacity significantly. The largest of the identified barges that have employed vapor control, the Barge San Pedro, had a maximum loading rate of 15,000 bbl/hr (Ellwood Marine Terminal was limited to a loading rate of 4,200 bbl/hr). This would not conform to the Project purpose, as it would take almost a week to fully load a VLCC.
- VOC Control Limits. The Barge San Pedro was only capable of accommodating gas-free tankers prior to loading – a unique requirement to El Segundo. The carbon canister capacity of the barge would be exceeded if not gas-free, even for vessels with 20% of the capacity of BMOP, and would not be able to accommodate a VLCC. This would require frequent interruption in loading to change out carbon canisters. The refrigeration design of the Barges Jovalan (56,000 bbl capacity) and Olympic Spirit (80,360 bbl capacity) was an onboard recovery, with return to the barge storage capacity (more than 25 times smaller than a VLCC).
- Sea State Limits. The onboard vapor recovery has only been utilized at fixed berth locations near shore in partially-protected coastal waters (Ellwood Marine Terminal was ~0.5 miles offshore Goleta, California in a water depth of 60 feet). This allows for a fendered barge to safely approach the port side of a moored vessel in a fixed position. In the exposed waters of the open ocean with more extreme weather, requiring a vessel to approach and remain tandem to the starboard or port side of a vessel free to weathervane introduces safety risks and further limits the permissible sea state conditions for operations. A smaller barge will react differently than a large VLCC from the impact of wind (size of vessel) and current (draft). Operations will therefore be dependent of restricted sea states and weather to ensure that a barge can safely approach and operate immediately adjacent to the VLCC.

The barges evaluated utilized carbon canisters and refrigeration. Other vapor recovery technologies on barges have been considered and rejected because of the significant equipment size. Chevron has previously noted other vapor recovery technology "is not practicable because the equipment is too large to be installed on a workboat or barge."[71]

Vapor control systems onboard a support vessel is not a technically feasible control for the proposed Project.

5.5.3.6 Submerged Fill and VOC BMP

Submerged fill is common among marine vessels and required by the U.S. Coast Guard (USCG) at 46 CFR §153.282.

> *The Commenter noted that submerged fill, as defined by the Coast Guard, has been standard industry practice for some time, reduces HAP emissions, and eliminates static electricity from free-falling cargo, thereby enhancing operational safety.*[72]

A VOC BMP ensures submerged fill loading and consideration of the vessel's VOC management plan meeting the International Maritime Organization's requirements of MEPC.185(59).

Loading by submerged fill and following a VOC BMP are technically feasible for the Project.

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[71] Letter from J.D. Bellows, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, "Technical Choices for Marine Vapor Controls on Loading Operations at Offshore Terminals, July 21, 1993, IV-D-136 of Docket A-90-44.

[72] 76 FR 22581, April 21, 2011, left column.

5.5.4 Rank of Remaining Control Technologies (Step 3)

Table 5-2. Rank of Remaining VOC Control Technologies for Marine Loading

Control	Efficiency	Rank
Vapor Combustion Control	95-99%	1
Vapor Recovery Control	95-99%	2
Submerged Fill and VOC BMP	60%	3

5.5.5 Evaluation of Most Stringent Control Technologies (Step 4)

The fourth of the five steps in the top-down BACT assessment procedure is to evaluate the most effective control and document the results. This step has been performed for each remaining control technology based on economic, energy, and environmental considerations, and is described in this section. In this step, once an option is selected, no further (i.e., lower ranking) options are assessed.

5.5.5.1 Vapor Combustion Control Environmental and Energy Impacts

To accommodate a VCU, BMOP would essentially need to construct an entirely new offshore facility: a new 6-pile platform with supporting equipment and utilities (e.g., engine-driven generator, crane, fuel storage and handling, frequent supply vessels, sump, waste collection, piping components, etc.). One of the current benefits of the project design is that it uses existing infrastructure and offshore facilities to minimize impacts from construction. A VCU control alternative would generate environmental impacts as a result of constructing a new platform, supporting equipment comprising an entirely new facility, and additional subsea vapor lines.

Added Waste Streams

Collected liquids would need to be managed. In an offshore setting as remote as BMOP's project location, since collected liquids cannot be loaded back into crude carriers, they present a byproduct stream with limited avenues for waste management other than to increase vessel traffic and return the waste to be managed onshore.

Substantial Energy Needs and Fuel Consumption

During operation, a VCU-specific platform would need to have a generator to provide the significant electrical needs for blowers large enough to pull vapors through approximately 8,000 feet of floating hoses and pipe, overcoming pressure drop and liquids dropout. This would require 1,800 hp, and approximately 100 gallons of diesel per hour of consumption at all times during vapor control. For continuous operation, this would result in nearly 1,000,000 gallons of diesel consumed per year.

Further, the VCU itself requires a significant amount of propane for assist gas necessary to ensure safe and efficient destruction throughout a load. With the propane required for the pilot and assist gas, the total propane consumption will be up to 17,245 gallons per VLCC loaded. If the Project were to achieve loading capacity with a VCU, this would result in over 6,000,000 gallons of propane consumed per year.

Vapor Capture and Control Creates a Major Air Pollution Source Otherwise Avoided

A VCU is not a passive device. In other words, the control of VOC results in a tradeoff that generates other pollutants not otherwise emitted. In addition, the supporting equipment on the VCU platform (e.g., combustors, generators, etc.) would result in a stand-alone major source of air pollution. BMOP has evaluated the additional pollution resulting from the VCU control alternative, with the following conservative approach:

- Because the VCU would restrict the Project operations to less than 50% of the design capacity, it is assumed that the vapor combustors, pilot fuel, assist gas, etc., would only operate at the same constraints of capacity (i.e., the VCU operation and fuel consumption was reduced by more than half).
- Only the combustors and diesel generator were quantified, and fuel storage, crane engines, sump, waste handling, piping components, etc. were not included.
- Low NO_X VCUs were assumed to be available, significantly reducing the NO_X rate.
- Only fuel supply vessels were required (at ~50% reduced fuel consumption) and would always travel from the nearest onshore port.

Even with all of these conservative approaches, the VCU platform, by itself, would be a new PSD major source for NO_X, CO, PM_{10}, $PM_{2.5}$, and GHG. The control alternative thus creates a significant source of air pollution for multiple pollutants not otherwise emitted.

Table 5-3. Added Emissions as a Result of VCU Control

	NO_X (tpy)	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**CO_2e (tpy)**
Marine Vapor Combustion Units						
MVCU1	27.43	125.9	3.03	3.41	3.41	75,382
MVCU2	27.43	125.9	3.03	3.41	3.41	75,382
MVCU3	27.43	125.9	3.03	3.41	3.41	75,382
VCU Platform Sources						
Diesel Generator	46.08	4.05	2.72	0.46	0.46	4,384
Fuel Delivery Supply Vessels						
Main and Aux Engines	63.09	12.10	6.35	1.48	1.48	3,412
Total	191.5	394.0	18.17	12.16	12.16	233,941

5.5.5.2 Vapor Combustion Control Economic Impacts

BMOP has prepared an engineering cost estimate for the installation of a VCU control alternative at the proposed Project. A summary of the cost evaluation is provided here, with the detailed cost analysis in Appendix D, developed consistent with EPA's *Control Cost Manual*, Section 3.2, Chapter 2, Table 2.10, Seventh Edition, November 2017.

Procurement and Fabrication

A VCU control would require multiple components to be added to the proposed Project. The following delineates equipment needed just for the VCU controls:

- Three VCUs achieving 99% DRE with estimated heat release of 218 MMBtu/hr, each, plus
  - Combustion stacks,

  - Stack refractory,
  - Anti-flashback vapor burners,
  - Quench air dampers,
  - Pilot gas system,
  - Combustion air blower with 500 hp motor and variable frequency drive,
  - Combustion air manifold, staging valves, and hydrocarbon analyzer,
  - Cooling air blower, and
  - Instrumentation.
- DSU skid
  - Pressure / vacuum relief valve,
  - Remotely operated cargo vapor shutoff valve,
  - Cartridge filter,
  - Detonation arrester,
  - Vapor piping system,
  - Instrumentation and instrument air header,
  - Oxygen analyzer system, and
  - Pressure test panel.
- Vapor blower unit
  - Vapor piping system for the VCUs,
  - Knockout vessel, and
  - Two vapor fans and variable frequency drives.
- Vapor safety unit
  - Liquid seal,
  - Vapor block / staging valves,
  - Detonation arrester,
  - Pilot system,
  - Assist gas system, and
  - Instrumentation.
- Control system

These systems are analogous to a dock-side control for an onshore or near shore fixed berth, but would be sized to accommodate a loading rate of 80,000 bbl/hr.

For this control system to be adapted to the proposed Project location, the following additional equipment is necessary:

- Facility vapor connection to VLCCs
  - Additional floating vapor hoses
  - Modified CALM buoys
  - Under buoy vapor hoses (connection between CALM buoys and PLEMs)
  - Two vapor PLEMS
  - Looped subsea vapor pipelines
  - Pig launchers and receivers
  - Risers to VCU platform
- New 6-pile platform
  - Jacket
  - Piling
  - Topsides structure
  - Bridge to WC 509 complex

- Platform utilities
  - Diesel generator (Caterpillar 3512C or similar)
  - Diesel storage tank
  - Six 18,000-gallon propane storage tanks
  - VCU platform crane
  - Nitrogen generator for pigging activities

The total purchased equipment costs are estimated to be $98,429,000, with an additional $65,350,000 for the new platform structure.

Installation

The installation of the vapor capture and control system and new VCU platform has been estimated for the Project location 82 statute miles offshore. The direct installation costs include electrical work, ductwork and piping, insulation, and painting. These direct installation costs were estimated using the default factors from the *Control Cost Manual*. In addition, the installation of a new platform requires site preparation on the sea floor, estimated for the Project as $2,460,000.

Indirect installation costs have also been estimated specifically for the proposed Project, including engineering, construction and field expenses, contractor fees, start-up, and performance testing. The project-specific estimates for indirect installation costs total $37,184,290.

The project-specific engineering cost estimate was provided with a +30% contingency, and the total capital investment is estimated to be $274,686,893 for a VCU control – over a quarter of a billion dollars due to the unique design requirements for the Project and the location far offshore.

Operating Costs

Building on the experience and knowledge of operations management at the Nederland Terminal and the existing WC 509 platform complex, BMOP has developed operational expense estimates specific to VCU control of the proposed Project. The operating costs consider additional employees required for operating the vapor capture and control equipment, lease fees for the VCU platform location, routine maintenance for the vapor capture and control system, pigging operations, and annual average projected repair/replacement costs.

Additionally, propane consumption from the VCU pilot and assist gas, as well as diesel fuel for the generator required to operate the combustion fan blowers and the vapor system blower have been calculated using project specific modeling provided by the VCU vendor and Caterpillar. Based on the fuel consumption and anticipated maximum availability of the equipment, BMOP has included delivery costs on 63 supply boat deliveries per year.

The direct operating costs total $19,210,167 per year.

Indirect operating costs would have a substantial economic impact of the Project in order to accommodate VCU control. Overhead, administrative charges, and insurance have been calculated consistent with the factors in the *Control Cost Manual*. The capital recovery factor (CRF) has been calculated from the annuity equation provided in the *Control Cost Manual*, and project-specific considerations for the control equipment life and interest rate.

BMOP has also estimated the Project cost impact resulting from the VCU challenges that would adversely impact operations described previously in this report (i.e., floating vapor hose, vessel tank pressure control challenges, liquid condensation, etc.). These challenges would limit the loading capability of the Project, reducing capacity and utilization. As noted previously, BMOP has evaluated the specific operation of VCUs at the Nederland Terminal and applied the additional operational requirements to the Project location, estimating that the vapor capture and control system would reduce the loading capacity by 52% or more.

These outages result in direct costs borne by the project, such as demurrage fees and increased maintenance. Indirect costs would also be borne by the project including increases in operating costs compared to revenue as a result of longer loading times and increased outage duration. The capital recovery for the entire project would be reduced, resulting in opportunity cost and increased interest from longer project funding payback. The entire purpose of the project – safe and efficient export of crude oil – would be impacted, and it is anticipated that reverse lightering would supplant the lost capacity, with its higher costs and greater environmental impacts.

The total annualized cost for VCU control is $421,878,276 per year. With the decrease in loading capacity of the project and resulting decrease in VOC emissions, the project-specific cost effectiveness is:

- $41,125 per ton of VOC

The VCU control is rejected as infeasible due to the poor cost effectiveness, along with significant environmental and energy impacts.

5.5.5.3 Vapor Recovery Control

Vapor recovery control has the following additional environmental, energy, and safety impacts, similar to a VCU:

- Marine impacts from construction of a new control-specific platform,
- Added waste streams from control platform operation, maintenance, and liquids collection,
- Substantial energy needs and fuel consumption for control platform diesel generator,
- Safety risks due to fuel and organic liquids storage and handling, and
- Air pollution not otherwise emitted (e.g., control platform diesel generator), control platform supply vessels.

Furthermore, the conclusion that a VCU is economically infeasible would also apply to a VRU. In comparison, "...the typical capital costs for a carbon based MVRU (a proven technology used by Hess at Port Reading) are about 2.5-3 times higher than for a combustor." In this example, Hess replaced the VRU with a VCU due to high costs and poor effectiveness.[73] The VRU control alternative would present the same or greater operability challenges as the VCU options for BMOP, but with increased costs. The VRU control is rejected ad infeasible due to the poor cost effectiveness, along with significant environmental and energy impacts.

5.5.5.4 Submerged Fill and VOC BMP

Submerged fill and VOC BMP do not have significant additional economic, environmental, or energy impacts.

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[73] Comments of HOVENSA, L.L.C. on National Emission Standards for Hazardous Air Pollutants: Marine Tank Vessel Loading Operations, 75 FR 65067-65149, October 21, 2010 ("MTVLO MACT Proposal"), December 6, 2010, Page 16, ID: EPA-HQ-OAR-2010-0600-0280.

5.5.6 Selection of BACT (Step 5)

Use of submerged fill only, and in accordance with a VOC BMP, are proposed as VOC BACT for marine loading. BMOP shall be limited to loading only crude oil with a maximum TVP of 10.99 psia, at a maximum throughput of 80,000 bbl/hr

Compliance assurance will be provided with the following monitoring and recordkeeping:

5.5.6.1 Monitoring

- BMOP will monitor adherence to the terminal VOC BMP, which includes the use of submerged fill loading of crude carrying vessels and communication with the vessel being loaded.
- BMOP will sample and analyze crude oil at the onshore Nederland Pump Station, at least once per year.
  - The sampling method will follow American Society for Testing and Methods (ASTM) D4057
  - The samples will be analyzed per D6377 to provide the true vapor pressure
- BMOP will monitor the crude oil loading operations
  - Monitoring the crude oil loading rate with a flow meter.
  - Compliance is demonstrated when:
    - The loading rate, averaged over each vessel's loading duration, is 80,000 bbl/hr or less.
    - The rolling 12-month total crude oil loaded is 700,800,000 bbls or less.
    - The rolling 12-month total vessels loaded is 365 vessels or less.
  - Start and end loading time, duration per vessel monitored
  - Limited to 700,800,000 Bbl/yr, on a 12-month rolling total basis
  - Limited to 365 vessels fully loaded on a 12-month rolling total basis.

5.5.6.2 Recordkeeping

- BMOP will maintain analytical results of each crude oil sample
  - The TVP of each sample, in psia
  - Comparison of TVP to the maximum allowed: 10.99 psia
- For each vessel loaded, BMOP will maintain the following records
  - The vessel IMO registry number
  - Confirmation that loading utilized submerged fill
  - Confirmation of adherence to the VOC BMP
  - The date and time loading of each vessel commences
  - The date and time loading of each vessel completes
  - The total crude oil loaded into each vessel (bbls)
  - The average hourly loading rate of crude oil (bbl/hr)

5.6 VOC BACT – Large Non-Emergency Natural Gas Fired Generators

5.6.1 Background on Pollutant Formation

For natural gas-fired reciprocating engines, VOC emissions result from incomplete combustion. In natural gas combustion, some organics are carried over unreacted while others are most likely pyrolysis products of the heavier hydrocarbon fuel constituents. Partially burned hydrocarbons can occur because of incorrect air/fuel ratios in the cylinder during compression due to maladjustment of the engine fuel system. Finally, partially burned hydrocarbons can also occur in reciprocating engines due to low cylinder temperature via excessive cooling through the cylinder walls, or early cooling of the gases by expansion of the combustion volume induced by premature piston motion. [74]

While CI engines inherently operate lean, spark ignition (i.e. natural gas engines) can operate in rich or lean modes of operation based on the combustion model used in the design. The primary distinction between the two is the amount of excess air admitted prior to combustion. Rich-burn engines operate with a minimum amount of air required for combustion and lean-burn engines use 50% to 100% more air than is necessary for combustion.

Natural gas-fired reciprocating engines are separated into three design classes: 2-cycle (stroke) lean-burn, 4-stroke lean-burn, and 4-stroke rich-burn. Two-stroke engines complete the power cycle in a single crankshaft revolution as compared to the two crankshaft revolutions required for 4-stroke engines.

5.6.2 Identification of Potential Control Technologies (Step 1)

The proposed project involves two (2) 1,736 kW (~2,328 hp) large non-emergency natural gas-fired 4-stroke lean-burn generator engines. The RICE will be subject to NSPS Subpart JJJJ and NESHAP Subpart ZZZZ requirements as identified in Section 4 above. Per NSPS Subpart JJJJ, the regulations require purchasing a RICE certified to the applicable Tier standards or conducting performance testing to demonstrate compliance with emission limits, whereas NESHAP ZZZZ requires the engines to reduce CO emissions or alternatively formaldehyde emissions. These standards and accompanying requirements are taken as the baseline for this BACT analysis.

Available VOC emissions control options for lean-burn spark ignition (SI), RICE include:

- Combustion Control - Good combustion practices (GCP); and
- Post-Combustion Control - Oxidation catalyst.

5.6.2.1 Good Combustion Practices

GCP involve parametric monitoring and controlling the operating parameters of the reciprocating engine to ensure the unit continually operates as close to optimum (i.e., minimum emission) conditions as practicable. Control of combustion temperature is the principal focus of combustion process control in natural gas-fired engines. Combustion control requires tradeoffs – higher temperatures favor complete consumption of the fuel and lower residual hydrocarbons (HC) and CO but result in increased NO_X formation. Lean combustion dilutes the fuel mixture and reduces combustion temperatures and therefore reduces NO_X formation. This allows a higher compression ratio or peak firing pressures resulting in higher efficiency. However, if the mixture is too lean, misfiring and incomplete combustion may occur, increasing CO and VOC emissions.[75]

5.6.2.2 Oxidation Catalyst

Oxidation catalysts consist of a substrate made up of thousands of small channels. Each channel is coated with a highly porous layer containing precious metal catalysts, such a platinum or palladium. As exhaust gas travels down the channel, HC and CO react with oxygen within the porous catalyst layer to form carbon dioxide (CO_2) and water. The resulting gases then exit the channels and flow through the rest of the

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[74] AP-42 Section 3.2.3 (7/00)

[75] Technical Report: Technology Characterization: Reciprocating Engines, March 2015, Prepared by Darrow, K. *et al* of ICF International on Behalof EPA and US DOE.

exhaust system. The effectiveness of the control varies for different species of HC. The control requires sufficient exhaust temperature above 700°F.

5.6.3 Elimination of Technically Infeasible Control Options (Step 2)

After the identification of potential control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

5.6.3.1 Good Combustion Practices

GCP allow equipment to operate as efficiently as possible to maintain optimal emission release conditions from the unit. This is considered technically feasible for the control of VOC emissions from the engines.

5.6.3.2 Oxidation Catalyst

A review of EPA's RBLC database shows that oxidation catalysts have been employed as BACT for the control of VOC emissions for engines. BACT emission limits for units controlled by oxidation catalyst range from ~0.2 g/hp-hr to 0.5 g/hp-hr, according to the RBLC search results, included in Appendix D to this application.

Both control options identified in step 1 are technically feasible.

5.6.4 Rank of Remaining Control Technologies (Step 3)

The more effective control option from steps 1 and 2 is oxidation catalyst, which can achieve between 30 and 50% control for total VOC, followed by GCP.

5.6.5 Evaluation of Most Stringent Control Technologies (Step 4)

The fourth of the five steps in the top-down BACT assessment procedure is to evaluate the most effective control and document the results. This step has been performed for each remaining control technology based on economic, energy, and environmental considerations, and is described in this section. In this step, once an option is selected, no further (i.e., lower ranking) options are assessed.

The use of oxidation catalyst reduces the effective power output of RICE and results in a solid waste stream. GCP is part of normal practice for engines so no cost is associated with that option.

5.6.6 Selection of BACT (Step 5)

Use of oxidation catalyst and GCP with lean combustion are proposed as VOC BACT for the natural gas-fired engine-driven generators. BMOP proposes a VOC BACT emission limit consistent with the NSPS Subpart JJJJ VOC emission limit of 0.7 g/hp-hr (0.95 g/KW-hr) or 60 ppmvd at 15% O_2 for the natural-gas fired generators. BMOP will demonstrate compliance with the VOC BACT consistent with the testing requirements of 40 CFR §60.4244 and Table 2 to Subpart JJJJ of Part 60.

At all times, BMOP will maintain the generators and oxidation catalysts in a manner consistent with safety and good air pollution control practices for minimizing emissions per 40 CFR §63.6605. BMOP will ensure proper maintenance of the catalyst such that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test. In addition, BMOP will maintain the temperature of the engine's exhaust so that the catalyst inlet temperature is greater than or equal to 450°F and less than or equal to 1,350°F, consistent with 40 CFR §63.6600(b) and Table 2b Subpart ZZZZ of Part 63. BMOP will install, operate, and maintain a temperature CPMS that meets the requirements of §63.6625(b) to continuously collect temperature data. In instances where the catalyst is changed, BMOP will reestablish the values of the operating parameters measured during the initial performance test and conduct a performance test to demonstrate that the engines are meeting the required emission limitations.

Because the oxidation catalyst is effective only at hot exhaust temperatures (>700°F), the use of GCP and clean fuels will be the BACT work practice standards during startup to control VOC emissions.

5.7 VOC BACT – Large Emergency Diesel Generator

5.7.1 Background on Pollutant Formation

The pollutants commonly classified as hydrocarbons are composed of a wide variety of organic compounds and are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned during the combustion process. Most unburned hydrocarbon emissions result from fuel droplets that were transported or injected into the quench layer during combustion. This is the region immediately adjacent to the combustion chamber surfaces, where heat transfer outward through the cylinder walls causes the mixture temperatures to be too low to support combustion. Partially burned hydrocarbons can occur because of poor air and fuel homogeneity due to incomplete mixing, before or during combustion; incorrect air/fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system; excessively large fuel droplets (diesel engines); and low cylinder temperature due to excessive cooling (quenching) through the walls or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed. [76]

Most of the pollutants from diesel engines are emitted through the exhaust. However, some total organic compounds (TOC) escape from the crankcase as a result of blowby (gases that are vented from the oil pan after they have escaped from the cylinder past the piston rings) and from the fuel tank and carburetor because of evaporation. Nearly all of the TOCs from diesel engines enter the atmosphere from the exhaust. Evaporative losses are insignificant in diesel engines due to the low volatility of diesel fuels. [77]

5.7.2 Identification of Potential Control Technologies (Step 1)

The proposed project involves one (1) 1,500 kW (~2,012 hp) and two (2) 485 kW (~650 hp) large emergency diesel generators. The RICEs will be subject to NSPS Subpart IIII and NESHAP Subpart ZZZZ[78]. These regulations require purchasing RICEs certified to applicable Tier standards, combusting only ultra-low sulfur diesel, and various monitoring, recordkeeping, and reporting requirements. The engines will be subject to the emission standards which are established for nonroad engines in 40 CFR §89 and Table 4 of NSPS Subpart IIII, respectively. These standards and accompanying requirements are taken as the floor for this BACT analysis.

Available VOC emissions control options for diesel-fired CI, RICE include:

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[76] AP-42 Section 3.4.3 (10/96)

[77] Ibid.

[78] Per 40 CFR §63.6600(c), the emergency diesel generator does not need to comply with emissions limitations or operating limits in NESHAP Subpart ZZZZ.

- Combustion Control - GCP; and
- Post-Combustion Control - Oxidation catalyst, or, more specifically, diesel oxidation catalyst (DOC).

5.7.2.1 Good Combustion Practices

GCP for CI RICE for VOC control consist of minimizing startup and idling time. This is achieved in normal practice for emergency-use engines that, by design, only operate for maintenance purposes, readiness testing, and during emergency events.

5.7.2.2 Oxidation Catalyst

DOC utilizes a catalyst such as platinum or palladium to further oxidize the engine's exhaust, which includes HC, e.g., VOC, and converts it to CO_2 and water. Use of DOC can result in up to 90 percent reduction in some HC/VOC species.[79] However, for emergency-use or intermittent-use engines, "[b]ecause these engines are typically used only a few number of hours per year…[s]uch engines rarely if ever use the [DOC] type of emission controls."[80] Queries of the RBLC reveal no installations of DOC on emergency, diesel-fired engines or on nonroad, diesel-fired engines (see Appendix D of this application). DOC is nonetheless carried forward in this BACT analysis.

5.7.3 Elimination of Technically Infeasible Control Options (Step 2)

After the identification of potential control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

Both control options identified in step 1 are technically feasible.

5.7.4 Rank of Remaining Control Technologies (Step 3)

The more effective control option from steps 1 and 2 is DOC, which can theoretically achieve up to 90 percent reduction of certain VOC species. [81] GCP is a part of normal practice for emergency-use engines so no additional VOC reduction can be attributed.

5.7.5 Evaluation of Most Stringent Control Technologies (Step 4)

The fourth of the five steps in the top-down BACT assessment procedure is to evaluate the most effective control and document the results. This step has been performed for each remaining control technology based on economic, energy, and environmental considerations, and is described in this section. In this step, once an option is selected, no further (i.e., lower ranking) options are assessed.

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[79] EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)

[80] EPA, Memorandum: *Response to Public Comments on Proposed National Emission Standards for Hazardous Air Pollutants for Existing Stationary Reciprocating Internal Combustion Engines Located at Area Sources of Hazardous Air Pollutant Emissions or Have a Site Rating Less Than or Equal to 500 Brake HP Located at Major Sources of Hazardous Air Pollutant Emissions*, August 10, 2010, p. 172-173. (EPA-HQ-OAR-2008-0708)

[81] EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)

The use of DOC reduces the effective power output of RICE and results in a solid waste stream. GCP is part of normal practice for emergency-use engines so no cost is associated with that option.

In its 2010 MACT/GACT evaluation for engines, EPA concluded for emergency engines: "Because these engines are typically used only a few number of hours per year [(27 hours per year per NFPA codes)], the costs of emission control are not warranted when compared to the emission reductions that would be achieved."[82] Based on EPA's assessment and the fact that the RBLC contains no records of DOC installation on emergency-use or nonroad engines, DOC is eliminated from consideration as BACT.

5.7.6 Selection of BACT (Step 5)

The remaining control option, GCP, is selected as BACT for the one (1) 1,500 kW (~2,012 hp) and two (2) 485 kW (~650 hp) large emergency diesel engines. As stated above, GCP for emergency engines is normal practice, i.e., operating the engines only for maintenance purposes, readiness testing, and during emergencies. The Project will ensure that the engines are operated only when needed for intermittent purposes. GCP will allow the engines to meet the VOC emission limit in NSPS Subpart IIII of 6.4 g/kW-hr (4.71 g/bhp-hr) and 4.0 g/kW-hr (3.0 g/bhp-hr) for NMHC + NO_X, respectively. BMOP will demonstrate compliance with the BACT standard by installing engines that are certified to meet these emission limits, in accordance with 40 CFR §60.4211(c). BMOP will also install a non-resettable hour meter prior to startup of each engine and keep records of the operation of the engines in emergency and non-emergency service, in accordance with 40 CFR §60.4209(a) and 40 CFR §60.4214(b).

5.8 VOC BACT – Small Non-Emergency Diesel Crane Engines

5.8.1 Background on Pollutant Formation

The pollutants commonly classified as hydrocarbons are composed of a wide variety of organic compounds and are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned during the combustion process. Most unburned hydrocarbon emissions result from fuel droplets that were transported or injected into the quench layer during combustion. This is the region immediately adjacent to the combustion chamber surfaces, where heat transfer outward through the cylinder walls causes the mixture temperatures to be too low to support combustion. Partially burned hydrocarbons can occur because of poor air and fuel homogeneity due to incomplete mixing, before or during combustion; incorrect air/fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system; excessively large fuel droplets (diesel engines); and low cylinder temperature due to excessive cooling (quenching) through the walls or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed. [83]

Most of the pollutants from diesel engines are emitted through the exhaust. However, some TOCs escape from the crankcase as a result of blowby (gases that are vented from the oil pan after they have escaped from the cylinder past the piston rings) and from the fuel tank and carburetor because of evaporation. Nearly all of the TOCs from diesel engines enter the atmosphere from the exhaust. Evaporative losses are insignificant in diesel engines due to the low volatility of diesel fuels. [84]

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[82] Ibid.

[83] AP-42 Section 3.3.3 (10/96)

[84] Ibid

5.8.2 Identification of Potential Control Technologies (Step 1)

The proposed project involves two (2) 354 kW (~475 hp) small non-emergency diesel crane engines. The RICE will be subject to NSPS Subpart IIII and NESHAP Subpart ZZZZ.[85] These regulations require purchasing RICE certified to applicable Tier standards, combusting only ultra-low sulfur diesel, and various monitoring, recordkeeping, and reporting requirements. The engines will be subject to the emission standards in 40 CFR §1039.101 for new and in-use nonroad CI engines. These standards and accompanying requirements are taken as the floor for this BACT analysis.

Available VOC emissions control options for diesel-fired, i.e., CI, RICE include:

- Combustion Control - GCP; and
- Post-Combustion Control - Oxidation catalyst, or, more specifically, DOC.

5.8.2.1 Good Combustion Practices

GCP are typically incorporated into the design of diesel engines. These include features such as electronic engine controls, injection systems, combustion chamber geometry, and turbocharger and after cooler systems. In addition, GCP for CI RICE for VOC control consist of minimizing startup and idling time.

5.8.2.2 Oxidation Catalyst

Oxidation catalysts consist of a substrate made up of thousands of small channels. Each channel is coated with a highly porous layer containing precious metal catalysts, such a platinum or palladium. As exhaust gas travels down the channel, HC and CO react with oxygen within the porous catalyst layer to form CO_2 and water. The resulting gases then exit the channels and flow through the rest of the exhaust system. Use of an oxidation catalyst can result in up to 90 percent reduction of some VOC species. [86]

5.8.3 Elimination of Technically Infeasible Control Options (Step 2)

After the identification of potential control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

5.8.3.1 Good Combustion Practices

GCP allow equipment to operate as efficiently as possible to maintain optimal emission release conditions from the unit. This is considered technically feasible for the control of VOC emissions from the engines.

5.8.3.2 Oxidation Catalyst

A review of EPA's RBLC database shows that oxidation catalysts have been employed as BACT for the control of VOC emissions for engines. Queries of the RBLC reveal no installations of DOC on small diesel-fired engines or on nonroad, diesel-fired engines (see Appendix D of this application). In addition, the cranes will not require continuous operation. The crane engines will cycle through loads intermittently when

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[85] For new RICE with a site rating of less than or equal to 500 hp located at a major HAP source, the only requirement under NESHAP Subpart ZZZZ is to comply with NSPS Subpart IIII per 40 CFR §63.6590(c)(7).

[86] EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)

in use. The non-continuous operation and intermittent cycling of the engines will lead to varying exhaust temperatures. Because oxidation catalysts require consistently high exhaust temperatures in excess of 700°F, the operating duty of the crane engines will lessen the effectiveness of catalysts, in a similar way as emergency engines.

Both control options identified in step 1 are technically feasible.

5.8.4 Rank of Remaining Control Technologies (Step 3)

The more effective control option from steps 1 and 2 is oxidation catalyst, which can theoretically achieve up to 90 percent reduction of some VOC species.[87] GCP is a part of normal practice for engines so no additional VOC reduction can be attributed.

5.8.5 Evaluation of Most Stringent Control Technologies (Step 4)

The fourth of the five steps in the top-down BACT assessment procedure is to evaluate the most effective control and document the results. This step has been performed for each remaining control technology based on economic, energy, and environmental considerations, and is described in this section. In this step, once an option is selected, no further (i.e., lower ranking) options are assessed.

The use of oxidation catalyst reduces the effective power output of RICE and results in a solid waste stream. As well, because of the intermittent operation of the cranes, the costs of oxidation catalysts will be economically infeasible with diminished effectiveness and limited operation.

GCP is part of normal practice for engines so no cost is associated with that option.

5.8.6 Selection of BACT (Step 5)

The remaining control option, GCP, is selected as BACT for the two (2) 354 kW (~475 hp) diesel-fired crane engines. The Project will ensure that the engines are operated only when needed for intermittent purposes, at less than 4,380 hours per year, per engine. GCP will allow the engines to meet the VOC emission limit in NSPS Subpart IIII of 0.29 g/kW-hr. BMOP will demonstrate compliance with the BACT standard by installing engines that are certified to meet these emission limits, in accordance with 40 CFR §60.4211(c). BMOP will also install a non-resettable hour meter prior to startup of each engine and keep records of the operation of the engines to confirm compliance with the operating restriction.

5.9 VOC BACT – Fugitive Emissions

During operation, piping components have the potential to produce fugitive emissions as a result of leaks from: valves, connectors, flanges, pressure relief valves, pump seals, and sampling connections. As discussed in Section 3.2.7., potential fugitive emissions from piping components have been estimated using a conservative SOCMI emissions factor. This factor was chosen to ensure a conservative representation of the collection of piping components in various services such as crude oil, diesel etc., at the WC 509 DWP. It should be noted that no reduction from these average emissions factors has been applied for these estimates.

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[87] EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)

5.9.1 Identification of Potential Control Technologies (Step 1)

The following available control technologies were identified:[88]

- Installing "leakless technology" piping components;
- Implementing a leak detection and repair (LDAR) program; or
- Implementing an audio/visual/olfactory (AVO) monitoring program.

It should be noted that the only fugitive VOC control technology identified by the RBLC for fugitives at marine loading terminals (Process ID 42.004) was LDAR and AVO monitoring. LDAR was required only as lowest achievable emission rates (LAER), while AVO was the result of a BACT determination.

5.9.2 Elimination of Technically Infeasible Control Options (Step 2)

After the identification of potential control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

5.9.2.1 Leakless Technology

Leakless technology valves are primarily used in applications with highly toxic or otherwise hazardous materials. These technologies are generally considered cost prohibitive except for specialized service. Some leakless technologies, such as bellow valves, if they fail, cannot be repaired without a unit shutdown that often generates additional emissions. Further, it is not accurate to assume that "leakless" components do not leak over the lifetime of the component or that their use would result in zero emissions. In the September 27, 2013 response to Sierra Club's comment letter on draft permit PSD-TX-102982-GHG, ExxonMobil stated that, *"For example, the valve packing configurations noted by the BAAQMD permits for refineries noted by the Sierra Club, such as bellow sealed valves and live loaded packed valves do leak. Bellow seals can fail, live load packing wears and leaks, etc."*[89] In addition, temperature changes can cause degradation of leakless components, such as bellow valves, which can reduce the useful life of the component.

The RBLC review did not identify any BACT or LAER determinations for the use of leakless components at marine loading terminals. Accordingly, leakless components are not a feasible solution for all piping components for the Project.

5.9.2.2 LDAR

Instrument monitoring (using EPA's Method 21, 40 CFR §60, Appendix A-7) is effective for identifying leaking VOC components and controlling VOC emissions at onshore locations. LDAR control efficiency ranges from 40 to 97%, depending on the frequency of monitoring, leak definition, and time for repair.[90]

For an offshore platform, the effectiveness of instruments using Method 21 to identify small leaks is not practical with the unique weather conditions and limited personnel of the proposed Project. Much of the

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[88] http://www.epa.gov/region6/6pd/air/pd-r/ghg/cheniere-corpus-response091713.pdf

[89] https://archive.epa.gov/region6/6pd/air/pd-r/ghg/web/pdf/exxonmobil-baytown-olefins-resp2comments.pdf

[90] This is based on emission reductions at refineries that were obtained for various components from EPA's recently collected data for the Uniform Standards (Reference Memorandum from Cindy Hancy, RTI to Jodi Howard, EPA, Analysis of Emission Reduction Techniques for Equipment Leaks, December 21, 2011, EPA-HQ-OAR-2002-0037-0180 as the basis for these reductions).

piping components will not be in continuous service (e.g., natural gas scrubbers), or will contain very low vapor pressure liquids (e.g., diesel). Piping for the loading operation will not all be accessible from the manned platform, as some of the piping components will be at the CALM buoys. For these reasons, LDAR is not considered feasible for the Project

5.9.2.3 AVO

Leaking fugitive components can be identified through audio, visual, or olfactory (AVO) methods. The gases and process fluids in the piping components must have discernable odor, to make them detectable by olfactory means. A significant leak can be detected by sound (audio) and sight. The visual detection can be a direct viewing of leaking gases and fluids, or a secondary indicator such as condensation around a leaking source due to cooling of the expanding gas as it leaves the leak interface. AVO programs are common and in place at onshore loading terminals.

AVO is considered technically feasible for the Project.

5.9.3 Rank of Remaining Control Technologies (Step 3)

AVO is the only control technology remaining.

AVO owes its effectiveness to the frequency of observation opportunities. Those opportunities arise as personnel on the platform make rounds, inspecting equipment during those routine tours of the operating areas. This method cannot generally identify leaks at as low a leak rate as instrument reading can identify; however, low leak rates have lower potential impacts than do larger leaks. This method, due to the frequency of observation is effective for identification of larger leaks.

5.9.4 Evaluation of Most Stringent Control Technologies (Step 4)

As AVO is the only control option remaining, a cost analysis is not required.

5.9.5 Selection of BACT (Step 5)

BMOP proposes the use of AVO monitoring as VOC BACT for fugitive emissions. BMOP will comply with the AVO monitoring as follows:

- During loading, BMOP will conduct AVO checks for leaks once per day for the accessible crude oil components on the offshore platform.
  - As an alternative, BMOP may use an optical gas imaging instrument to identify leaks. If used as an alternative to AVO checks, the optical gas instrument must meet the requirements of 40 CFR §60.18(i)(1) and (2).
  - The date and time of each inspection shall be recorded.
- A repair will be attempted for identified leaks as soon as practicable. An initial repair attempt is required within five in-service days (for example, attempt to tighten a bolt or packing gland). If the initial repair attempt is not successful, additional repair attempts should be completed within fifteen in-service days.
  - The date(s) and time(s) of repairs conducted in response to an identified leak shall be recorded.
- Delay of repair of a leaking component is allowed for the following reasons: repair is technically infeasible without a DWP shutdown, a repair within fifteen days would result in emissions or impacts greater than fugitive emissions resulting from the delay of repair, or the unavailability of parts, resources, or repair conditions (i.e., weather) prevent repair within fifteen days. The component should be placed on a “Delay of Repair” list.

  - The component identification and explanation of why the component cannot be repaired immediately shall be recorded. An estimated date for repairing the component must be included in the facility records.
- BMOP will develop a list of difficult-to-monitor and unsafe-to-monitor components.
  - A difficult-to-monitor component is one that cannot be inspected without elevating personnel more than two meters above a permanent support structure, or requires a permit for confined space entry as defined in 29 CFR §1910.146, December 1, 1998.
  - An unsafe-to-monitor component is one that BMOP determines is unsafe to monitor because personnel would be exposed to immediate danger as a consequence of conducting the monitoring.

In addition to AVO monitoring, BMOP will specify that the Project use low-emitting piping components, where available, including valves that meet the ISO 158-58-1 standard. As well, leak protection is inherent to some of the equipment design at the proposed DWP. For example, the floating hoses used for loading crude oil are designed with elastomeric linings to prevent leaks. The double carcass design of the floating hoses themselves provide a second barrier for possible leaks.

5.10 VOC BACT – Storage Vessels

The Project includes small storage tanks for fuel (diesel fuel and aviation fuel), as well as a crude oil surge vessel.

5.10.1 Identification of Potential Control Technologies (Step 1)

The RBLC was used to obtain potential control technologies for VOC from storage tanks. The RBLC search covered petroleum storage (Process 42.005). The results of the RBLC search are included in Appendix D. A review of NSPS and state standards was also performed (see Section 4 of this application). The following control technology options were evaluated as potentially applicable for controlling VOC emissions from storage tanks:

- Combustion device (e.g., thermal oxidizer);
- Vapor recovery unit;
- Floating roof tanks; or
- Submerged fill.

5.10.2 Elimination of Technically Infeasible Control Options (Step 2)

Add-on control technologies (thermal oxidizer and vapor recovery unit) and floating roofs are eliminated in Step 2 for the diesel and aviation fuel tanks based on low vapor pressure, small size of the tanks, and the extremely small amount of VOC emissions (total potential emissions ~0.01 tpy).

The surge vessel is present to accommodate a surge in pipeline pressure, and the rapid filling of the tank cannot be incumbered for proper operation. Accordingly, add-on control devices which can cause back-pressure are not feasible to apply to the surge vessel. Because the purpose of surge vessels is to provide relief and not to provide liquid storage, a floating roof tank will not provide additional benefits from frequent working losses where air space is minimized by the floating roof. For the surge vessel on the offshore platform, the corrosive marine atmosphere, space and weight constraints, floating roof tanks can impede the operating purpose of the surge vessel with required maintenance. A fixed roof tank is necessary to accommodate the short-term relief in a surge event reliably. Accordingly, a floating roof tank emission control is not feasible for the offshore Project.

5.10.3 Rank of Remaining Control Technologies (Step 3)

The only technology not eliminated in Step 2 for the proposed storage vessels is the use of submerged fill. Submerged fill has an efficiency of 60% emissions control.

5.10.4 Evaluation of Most Stringent Control Technologies (Step 4)

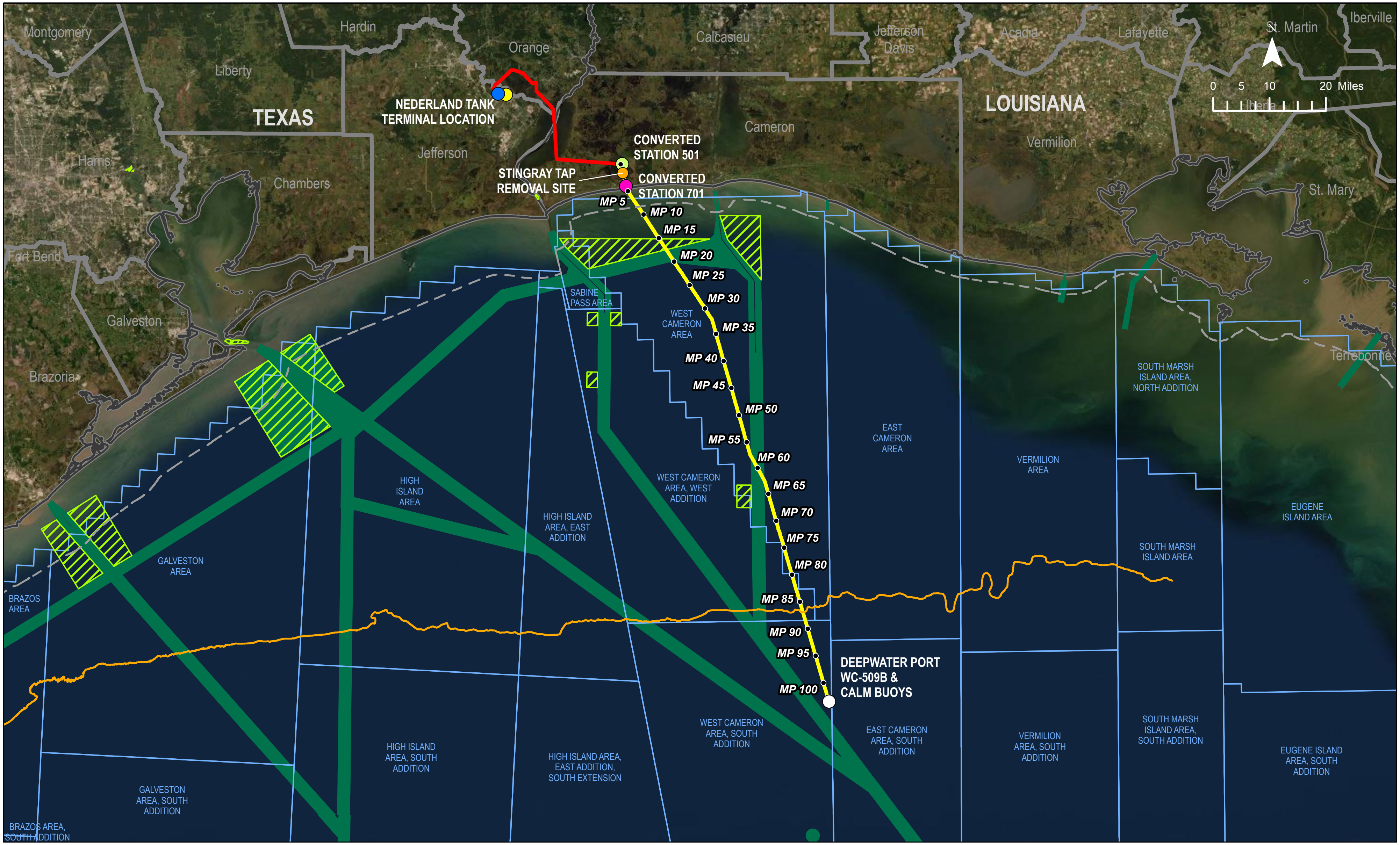
As submerged fill is the only control option listed, a cost analysis is not required.

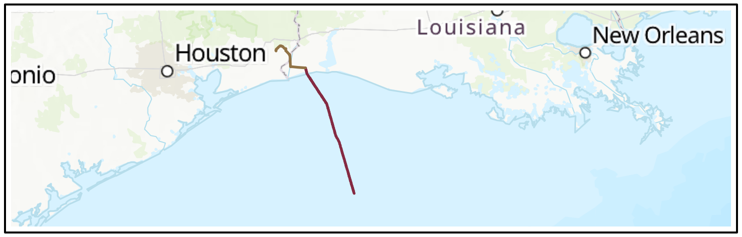
5.10.5 Selection of BACT (Step 5)

BMOP proposes the use of storage vessels designed with submerged fill loading as VOC BACT. Compliance will be based on the installation of tanks equipped with submerged fill pipes.

APPENDIX A. SITE MAPS AND PLOT PLANS

BMOP PROJECT - APPENDIX A FIGURE 1 - PROJECT OVERVIEW MAP





LEGEND

- • EXISTING OFFSHORE PIPELINE MILEPOSTS
- ● STINGRAY TAP REMOVAL SITE
- ● NEDERLAND TANK TERMINAL LOCATION
- ● NEDERLAND PUMP STATION
- ● CONVERTED STATION 701
- ● CONVERTED STATION 501
- ○ DEEPWATER PORT WC-509B AND CALM BUOYS
- ━ PIPELINE PORTION CONVERTED TO OIL SERVICE
- ━ PROPOSED ONSHORE PIPELINE (NEW BUILD)
- ━ DEPTH CONTOUR -108'
- ━ STATE WATERS BOUNDARY
- ▨ SAFETY ANCHORAGES
- ☐ PROTRACTION AREA
- 🟩 SHIPPING FAIRWAY
- ☐ COUNTY / PARISH
- ☐ STATE BOUNDARY

BLUE MARLIN OFFSHORE PORT PROJECT

PROJECT OVERVIEW MAP

COUNTY/PARISH:	VARIOUS	*DRAWN BY:*	JRA
STATE:	TX/LA	*CHECKED BY:*	CW

REV. NO.:	*REVISION*	*DATE*
A	ISSUE FOR REVIEW	2020/07/28

DATE:	2020/07/28	*PROJECTION:*	NAD 1983 UTM Zone 15N

PREPARED BY

EXP Energy Services Inc.
T: +1.850.385.5441
F: +1.850.385.5523
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT
APPENDIX A FIGURE 1

DWG:	0802-01-005	*SHEET:*	1 OF 1

REFERENCE DRAWINGS

REV	DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT	BWC	08-06-20	JHE	TO

FACILITY CODE OR ACCOUNT NO:		
CONSTRUCTION YEAR:	–	
	BY	DATE
DRAWN	BWC	03-12-2020
CHECK		
APPROVED		–
SCALE: AS SHOWN		

PROJECT CONSULTING SERVICES, INC.
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
(504) 833-5321 Fax (504) 833-4940
www.projectconsulting.com

BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
FIELD SCHEMATIC

WBS NO.

OLD DRAWING NO.

DRAWING NO. BMOP-WC509.004

REV. NO. 0

FILENAME: P:\Workspaces\BCook\18220_STINGRAY OFFSHORE\18220_ET WC509.004_1.dwg PLOTTED: 8/7/2020 7:52:50 AM PLOTTED BY: ----

08-07-20 7:47 18220 16 BWC 18220_ET WC509.004_1.DWG

APPENDIX B. LDEQ FORMS

Department of Environmental Quality
Office of Environmental Services
Air Permits Division
P.O. Box 4313
Baton Rouge, LA 70821-4313
(225) 219-3417

LOUISIANA

Application for Approval of Emissions of Air Pollutants from Part 70 Sources

PLEASE TYPE OR PRINT

1. Facility Information [LAC 33:III.517.D.1]

Facility Name or Process Unit Name (if any) Blue Marlin Offshore Port LLC – Deepwater Port (BMOP DWP)	☒ All Process Units ☐ Process Unit-specific Permit
Agency Interest Number (A.I. Number) N/A – New Facility	**Currently Effective Permit Number(s)** N/A – New Facility
Company - Name of Owner Blue Marlin Offshore Port LLC	
Company - Name of Operator (if different from Owner) N/A	
Parent Company (if Company – Name of Owner given above is a division) Energy Transfer LP	
Federal Tax-ID	

☒ corporation, partnership, or sole proprietorship ☐ regulated utility ☐ municipal government

☐ state government ☐ federal government ☐ other, specify ____________

2. Physical Location and Process Description [LAC 33:III.517.D.18, unless otherwise stated]

What does this facility produce? Add more rows as necessary.

The BMOP DWP will receive crude oil from existing production and storage facilities on the US mainland. The BMOP DWP will then be utilized to load crude oil onto very large crude carriers for export to the global market. Refer to section 1 of this application for detail description.

What modifications/changes are proposed in this application? Add more rows as necessary.

Refer to section 1 of this application.

Nearest town (in the same parish as the facility): Cameron		**Parish(es) where facility is located:** Offshore Facility – West Cameron area, lease block 509		
Distance To (mi):	115 Texas	315 Arkansas	240 Mississippi	300 Alabama
Latitude of Facility Front Gate:	28 Deg	26 Min	0.38 Sec	______ Hundredths
Longitude of Facility Front Gate:	93 Deg	0 Min	16.06 Sec	______ Hundredths
Distance from nearest Class I Area:	385	kilometers		

Add physical address and description of location of the facility below. If the facility has no address, provide driving directions. Add more rows as necessary.

The BMOP DWP will be located in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Block (WC) 509 and 508 and East Cameron Block 263. The BMOP DWP will be approximately eighty-two (82) nautical miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.

☒ Map attached (required per LAC 33:III.517.D.1)
☒ Description of processes and products attached (required per LAC 33:III.517.D.2)
☒ Introduction/Description of the proposed project attached (required per LAC 33:III.517.D.5)

3. Confidentiality [LAC 33.I.Chapter 5]

Are you requesting confidentiality for any information *<u>except air pollutant emission rates</u>*? ☒ Yes ☐ No

If "yes," list the sections for which confidentiality is requested below. Add rows as necessary. Confidentiality requests require a submittal that is separate from this application. Information for which confidentiality is requested should not be submitted with this application. Consult instructions.

Appendix D (BACT Supporting Documentation) of the Prevention of Significant Deterioration Air Construction Permit

Application Volume 1

4. Type of Application [LAC 33:III.517.D]

Check all that apply.

☐ Renewal
Select one, if applicable: ☒ Entirely new facility ☐ Significant modification of existing facility (may also include reconciliations) [LAC 33:III.527] ☐ Minor modification of existing facility (may also include reconciliations) [LAC 33:III.525] ☐ Reconciliation only
NSR Analysis: ☒ Prevention of Significant Deterioration (PSD) ☐ Nonattainment New Source Review (NNSR)

Does this submittal update or replace an application currently under review? ☐ Yes ☒ No

If yes, provide date that the prior application was submitted: __________

Select one if this application is for an existing facility that does not have an air quality permit:

☐ Previously Grandfathered (LAC 33:III.501.B.6)
☐ Previously Exempted (e.g., Small Source Exemption; LAC 33:III.501.B.2.d)
☐ Previously Unpermitted

5. Fee Information [LAC 33:III.517.D.17]

Fee Parameter: If the fee code is based on an operational parameter (such as number of employees or capital cost), enter that parameter here. ____

Industrial Category: Enter the Standard Industrial Classification (SIC) and North American Industry Classification (NAICS) Codes that apply to the facility.

Primary SICC: 4612 **NAICS Code:** 486110

Secondary SICC(s): ____

Project Fee Calculation: Enter fee code, permit type, production capacity/throughput, and fee amount pursuant to LAC 33:III.Chapter 2. Add rows to this table as needed. Include with the application the amount in the Grand Total blank as the permit application fee.

FEE CODE	TYPE	EXISTING CAPACITY	INCREMENTAL CAPACITY INCREASE	*SURCHARGES*				
				MULTIPLIER	NSPS	PSD	AIR TOXICS	TOTAL AMOUNT
					☐	☐	☐	$
					☐	☐	☐	$
					GRAND TOTAL			$

Optional **Fee Explanation:** Use the space provided to give an explanation of the fee determination displayed above. Using this area will help to avoid confusion.

Electronic Fund Transfer (EFT): If paying the permit application fee using an Electronic Fund Transfer (EFT), please include the EFT Transaction Number, the Date that the EFT was made, and the total dollar amount submitted in the EFT. If not paying the permit application fee using EFT, leave blank.

EFT Transaction Number	Date of Submittal	Total Dollar Amount
____________	____________	$____________

6. Key Dates

Estimated date construction will commence: May 2021 *Estimated date operation will commence:* August 2023

7. Pending Permit Applications – For Process Unit-Specific Permits Only [LAC 33:III.517.D.18]

List all other process units at this facility for which Part 70 permit applications have been submitted, but have not been acted upon by LDEQ as of the date of submittal of this application. If none, state "none" in the table. *****It is not necessary to update this table during the permit review process, unless requested by LDEQ.*****

Process Unit Name	Permit Number	Date Submitted

8. LAC 33:I.1701 Requirements – Answer all below for new sources and permit renewals - ☒ Yes ☐ No

Does the company or owner have federal or state environmental permits identical to, or of a similar nature to, the permit for which you are applying in Louisiana or other states? (This requirement applies to all individuals, partnerships, corporations, or other entities who own a controlling interest of 50% or more in your company, or who participate in the environmental management of the facility for an entity applying for the permit or an ownership interest in the permit.)
☐ **Yes** ☒ **No**

If yes, list States: ____________________

Do you owe any outstanding fees or final penalties to the Department? ☐ **Yes** ☒ **No**
If yes, explain below. Add rows if necessary.

Is your company a corporation or limited liability company? ☒ **Yes** ☐ **No**
If yes, attach a copy of your company's Certificate of Registration and/or Certificate of Good Standing from the Secretary of State. The appropriate certificate(s) should be attached to the end of this application as an appendix.

9. Permit Shield Request [LAC 33:III.517.E.7] - ☒ Yes ☐ No

See Section 1 of the Title V Air Operating Permit Application for the Permit Shield Request

If yes, check the appropriate boxes to indicate the type of permit shield being sought. Include the specific regulatory citation(s) for which the shield is being requested. Give an explanation of the circumstances that will justify the permit shield request. Attach additional pages if necessary. If additional pages are used, attach them directly behind this page and enter "See Attached Pages" into the Explanation field.

Type of Permit Shield request (check all that apply):

Non-applicability determination for:	**Specific Citation(s)**	**Explanation**
☐ 40 CFR 60		
☐ 40 CFR 61		
☐ 40 CFR 63		
☐ Prevention of Significant Deterioration		
☐ Nonattainment New Source Review		

Interpretation of monitoring, recordkeeping, and/or reporting requirements, and/or means of compliance for:	**Specific Citation(s)**	**Explanation**
☐ 40 CFR 60		
☐ 40 CFR 61		
☐ 40 CFR 63		
☐ Prevention of Significant Deterioration		
☐ Nonattainment New Source Review		
☐ State Implementation Plan (SIP) Regulation(s) referenced in 40 CFR 52 Subpart T		

10. Certification of Compliance With Applicable Requirements

Statement for Applicable Requirements for Which the Company and Facility Referenced In This Application Is In Compliance

Based on information and belief, formed after reasonable inquiry, the company and facility referenced in this application is in compliance with and will continue to comply with all applicable requirements pertaining to the sources covered by the permit application, as outlined in Tables 1 and 2 in the permit application. For requirements promulgated as of the date of this certification with compliance dates effective during the permit term, I further certify that the company and facility referenced in this application will comply with such requirements on a timely basis and will continue to comply with such requirements.

For corporations only: By signing this form, I certify that, in accordance with the definition of Responsible Official found in LAC 33:III.502, **(1)** I am a president, secretary, treasurer, or vice-president in charge of a principal business function, or other person who performs similar policy or decision-making functions; or **(2)** I am a duly authorized representative of such person; am responsible for the overall operation of one or more manufacturing, production, or operating facilities addressed in this permit application; and either the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars); or the delegation of authority has been approved by LDEQ prior to this certification.*

CERTIFICATION: I certify, under provisions in Louisiana and United States law which provide criminal penalties for false statements, that based on information and belief formed after reasonable inquiry, the statements and information contained in this Application for Approval of Emissions of Air Pollutants from Part 70 Sources, including all attachments thereto and the compliance statement above, are true, accurate, and complete.

a. Responsible Official		
Name Gregory Mcilwain		
Title SVP - Operations		
Company Energy Transfer Partners, LLC		
Suite, mail drop, or division		
Street or P.O. Box 1300 Main Street		
City Houston	State TX	Zip 77002
Business phone (713) 989-7120		
Email Address Gregory.Mcilwain@energytransfer.com		

Signature of responsible official (See 40 CFR 70.2):
Date: 9/24/20

*Approval of a delegation of authority can be requested by completing a Duly Authorized Representative Designation Form (Form_7218) available on LDEQ's website at http://deq.louisiana.gov/page/air-permit-applications

CERTIFICATION: I certify that the engineering calculations, drawings, and design are true and accurate to the best of my knowledge.

b. Professional Engineer		
Name Jeanne-Marie Heintz, P.E.		
Title Senior Consultant		
Company Trinity Consultants Inc.		
Suite, mail drop, or division 900		
Street or P.O. Box 301 Main Street		
City Baton Rouge	State LA	Zip 70825
Business phone (225) 346-4003		
Email Address jheintz@trinityconsultants.com		

Signature of Professional Engineer: JeanneMarie Heintz
Date: 09/23/2020
Louisiana Registration No 35141

JEANNE-MARIE HEINTZ
License No. 35141

11. Personnel [LAC 33:III.517.D.1]

a. Manager of Facility who is located at plant site*		
Name	☐ Primary contact	
Title		
Company		
Suite, mail drop, or division		
Street or P.O. Box		
City	**State**	**Zip**
Business phone		
Email address		

*No “on-site” person will be present on the offshore platform.

b. On-site contact regarding air pollution control*		
Name	☐ Primary contact	
Title		
Company		
Suite, mail drop, or division		
Street or P.O. Box		
City	**State**	**Zip**
Business phone		
Email address		

*No “on-site” person will be present on the offshore platform.

c. Person to contact with written correspondence		
Name Weston Threeton	☐ Primary contact	
Title Sr. Engineer		
Company Energy Transfer		
Suite, mail drop, or division		
Street or P.O. Box 1300 Main Street		
City Houston	**State** TX	**Zip** 77002
Business phone (713) 989-7120		
Email address Gregory.mcilwain@energytransfer.com		

d. Person who prepared this report		
Name Michael Ballenger, P.E.	☐ Primary contact	
Title Manager of Consulting Services		
Company Trinity Consultants Inc.		
Suite, mail drop, or division B		
Street or P.O. Box 919 Lake Baldwin Ln		
City Orlando	**State** FL	**Zip** 32814
Business phone (407) 982-2891 Ext.1901		
Email address mballenger@trinityconsultants.com		

e. Person to contact about Annual Maintenance Fees		☐ a ☐ b ☐ c ☐ d ☐ other (specify below)		
Name	☐ Primary contact	**Suite, mail drop, or division**		
Title		**Street or P.O. Box**		
Company		**City**	**State**	**Zip**
Business Phone		**Email Address**		

12. Proposed Project Emissions [LAC 33:III.517.D.3]

List the total emissions following the proposed project for this facility or process unit (for process unit-specific permits). Speciate all criteria pollutants, TAP, and HAP for the proposed project.

Pollutant	Proposed Emission Rate (tons/yr)
Particulate matter (PM_{10})	1.07
Particulate matter ($PM_{2.5}$)	1.07
Nitrogen oxides	26.02
Carbon monoxide	57.88
Sulfur dioxide	1.64
Total VOC (including those listed below)	21,881
CO_2e	16,510
Sulfuric Acid	0.05
Hydrogen sulfide	9.50
Total HAPs*	1,230

* Please see Appendix B for detailed list of HAPs and TAPs.

13. History of Permitted Emissions [LAC 33:III.517.D.18]

List each of the following in chronological order:

- The Permit Number and Date Action Issued for each air quality permit that has been issued to this facility or process unit (for process unit-specific permits) within the last ten (10) years.
- All small source exemptions, authorizations to construct, administrative amendments, case-by-case insignificant activities, and changes of tank service that have been approved since the currently effective Title V Operating Permit or State Operating Permit was issued to this facility or process unit (for process unit-specific permits). It is not necessary to list any such activities issued prior to the issuance of the currently effective Title V Operating Permit or State Operating Permit, if one exists.

Permit Number	**Date Action Issued**
N/A – New Facility	

14.a. Enforcement Actions [LAC 33:III.517.D.18] - ☐ Yes ☒ No

If yes, list all federal and state air quality enforcement actions, settlement agreements, and consent decrees received for this facility and/or process unit (for process unit-specific permits) since the issuance of the currently effective Title V Operating Permit or State Operating Permit. For each action, list the type of action (or its tracking number), the regulatory authority or authorities that issued the action, and the date that the action was issued. Summarize the conditions imposed by the enforcement action, settlement agreement, and consent decree in Section 22, Table 2. It is not necessary to submit a copy of the referenced action. Add rows to table as necessary.

Type of Action or Tracking Number	Issuing Authority	Date Action Issued	Summary of Conditions Included?
			☐ Yes ☐ No
			☐ Yes ☐ No

14.b. Schedule for Compliance [LAC 33:III.517.E.4] ☐ Yes ☒ No

If the facility or process unit for which application is being made is not in full compliance with all applicable regulations, give a description of how compliance will be achieved, including a schedule for compliance below. Add rows as necessary. See instructions.

15. Letters of Approval for Alternate Methods of Compliance - ☐ Yes ☒ No

If yes, list all correspondence with LDEQ, EPA, or other regulatory bodies that provides for or supports a request for alternate methods of compliance with any applicable regulations for this facility or process unit (for process unit-specific permits). List the date of issuance of the letter and the regulation referenced by the letter. **Attach as an appendix a copy of all documents referenced in this table.** Letters that are not included may not be incorporated into a final permit. Add rows to table as necessary.

Date Letter Issued	Issuing Authority	Referenced Regulation(s)	Copy of Letter Attached?
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

16. Initial Notifications and Performance Tests [LAC 33:III.517.D.18] - ☐ Yes ☒ No

If yes, list any initial notifications that have been submitted or one-time performance tests that have been performed for this facility or process unit (for process unit-specific permits) since the issuance of the currently effective Title V Operating Permit or State Operating Permit in order to satisfy regulatory requirements. Any initial notification or one-time performance test requirements that have not been satisfied should be listed in Section 22, Table 2 of this application. Any notifications or performance tests that recur periodically should also be properly noted in Section 22, Table 2 of this application. Add rows to table as necessary.

Initial Notification or One-time Performance Test?	Regulatory Citation Satisfied	Applicable Source(s)	Date Completed/Approved

17. Existing Prevention of Significant Deterioration or Nonattainment New Source Review Limitations [LAC 33:III.517.D.18]

Do one or more emissions sources represented in this permit application currently operate under one or more NSR permits?
☐ **Yes** ☒ **No**

If "yes," summarize the limitations from such permit(s) in the following table. Add rows to table as necessary. Be sure to note any annual emissions limitations from such permit(s) in Section 13 of this application.

Permit Number	Date Issued	Emission Point ID No.	Pollutant	BACT/LAER Limit[1]	Averaging Period	Description of Control Technology/Work Practice Standards

[1]For example, lb/MM Btu, ppmvd @ 15% O_2, lb/ton, lb/hr

18. Air Quality Dispersion Modeling [LAC 33:III.517.D.15]

Was Air Quality Dispersion Modeling as required by LAC 33:III performed in support of this permit application? (Air Quality Dispersion Modeling is only required when applying for PSD permits and as requested by LDEQ.)
☒ **Yes** ☐ **No**

Has Air Quality Dispersion Modeling completed in accordance with LAC 33:III ever been performed for this facility in support of an air permit application previously submitted for this facility or process unit (for process unit-specific permits) or as required by other regulations ***AND*** *approved by LDEQ?*
☐ **Yes** ☒ **No**

If yes, enter the date the most recent Air Quality Dispersion Modeling results as required by LAC 33:III were submitted:

____

If the answer to either question above is "yes," enter a summary of the most recent results in the following table. If the answer to both questions is "no," enter "none" in the table. Add rows to table as necessary.

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Toxic Air Pollutant Ambient Air Standard or (National Ambient Air Quality Standard {NAAQS})
Refer to the PSD Air Construction Permit Application Volume 2			

19. General Condition XVII Activities- ☐ Yes ☒ No

Enter all activities that qualify as Louisiana Air Emissions Permit General Condition XVII Activities.

- Expand this table as necessary to include all such activities.
- See instructions to determine what qualifies as a General Condition XVII Activity.
- Do not include emissions from General Condition XVII Activities in the proposed emissions totals for the permit application.

		Emission Rates – TPY					
Work Activity	**Schedule**	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**	**Other**

20. Insignificant Activities [LAC 33:III.501.B.5] - ☒ Yes ☐ No

Enter all activities that qualify as Insignificant Activities.

- Expand this table as necessary to include all such activities.
- For sources claimed to be insignificant based on size or emission rate (LAC 33:III.501.B.5.A), information must be supplied to verify each claim. This may include but is not limited to operating hours, volumes, and heat input ratings.
- If aggregate emissions from all similar pieces of equipment claimed to be insignificant are greater than 5 tons per year for any pollutant, then the activities can not be claimed as insignificant and must be represented as permitted emission sources. Aggregate emissions shall mean the total emissions from a particular insignificant activity or group of similar insignificant activities (e.g., A.1, A.2, etc.) within a permit per year.

Emission Point ID No.	Description	Physical/Operating Data	Citation
AFST	Aviation Fuel Storage Tank	3,000 Gallons	LAC 33:III.501.B.5.A.3
CDT1	Crane Diesel Tank No. 1	3,000 Gallons	LAC 33:III.501.B.5.A.3
CDT2	Crane Diesel Tank No. 2	3,000 Gallons	LAC 33:III.501.B.5.A.3

21. Regulatory Applicability for Commonly Applicable Regulations – Answer all below [LAC 33:III.517.D.10]

Does this facility contain asbestos or asbestos containing materials? ☐ **Yes** ☒ **No**
If "yes," the facility or any portion thereof may be subject to 40 CFR 61, Subpart M, LAC 33:III.Chapter 27, and/or LAC 33:III.5151, and this application must address compliance as stated in Section 22 of this application

Is the facility or process unit represented in this permit subject to 40 CFR 68, or is any other process unit located at the same facility as the process unit represented in this application subject to 40 CFR 68? ☐ **Yes** ☒ **No**
If "yes," the entire facility is subject to 40 CFR 68 and LAC 33:III.Chapter 59, and this application must address compliance as stated in Section 22 of this application.

Is the facility listed in LAC 33:III.5611?

Table 5 ☐ **Yes** ☒ **No**

Table 6 ☐ **Yes** ☒ **No**

Table 7 ☐ **Yes** ☒ **No**

Does the applicant own or operate commercial refrigeration equipment normally containing more than 50 pounds of refrigerant at this facility or process unit? ☐ **Yes** ☒ **No**
If "yes," the entire facility is subject to 40 CFR 82, Subpart F, and this application must address compliance as stated in Section 22 of this application.

22. Applicable Regulations, Air Pollution Control Measures, Monitoring, and Recordkeeping

Important points for Table 1 [LAC 33:III.517.D.10]:

- List in Table 1, by Emission Point ID Number and Descriptive Name of the Equipment, state and federal pollution abatement programs and note the applicability or non-applicability of the regulations to each source.
- Adjust the headings for the columns in Table 1 as necessary to reflect all applicable regulations, in addition to any regulations that do not apply but require an explanation to substantiate this fact.
- For each piece of equipment, enter "1" for each regulation that applies. Enter "2" for each regulation that applies to this type of source, but from which this source of emissions is exempt. Enter "3" for equipment that is subject to a regulation, but does not have any applicable requirements. Also, enter "3" for each regulation that has applicable requirements that apply to the particular emission source, but the regulations currently do not apply due to meeting a specific criterion, such as it has not been constructed, modified, or reconstructed since the regulations have been in place.
- Leave the spaces blank when the regulations clearly would not apply under any circumstances to the source. For example, LAC 33:III.2103 – Storage of Volatile Organic Compounds would never apply to a steam generating boiler, no matter the circumstances.
- Consult instructions.

Important points for Table 2 [LAC 33:III.517.D.4; LAC 33:III.517.D.7; LAC 33:III.517.D.10]:

- For each piece of equipment listed in Table 2, include all applicable limitations, recordkeeping, reporting, monitoring, and testing requirements. Also, include any one-time notification or one-time performance test requirements that have not been fulfilled.
- Each of these regulatory aspects (limitations, recordkeeping, reporting, etc.) should be addressed for each regulation that is applicable to each emissions source or emissions point.
- For each regulation that provides a choice regarding the method of compliance, indicate the method of compliance that will be employed. It is not sufficient to state that all compliance options will be employed, though multiple compliance options may be approved as alternative operating scenarios.
- Consult instructions.

Important points for Table 3 [LAC 33:III.517.D.16]:

- Each time a 2 or a 3 is used to describe applicability of a source in Table 1, an entry should be made in Table 3 that explains the exemption or non-applicability status of the regulation to that source.
- Fill in all requested information in the table.
- The exact regulatory citation that provides for the specific exemption or non-applicability determination should be entered into the "Citation Providing for Exemption or Non-applicability" column.
- Consult Instructions.

Important points for Table 4 [LAC 33:III.517.D.18]

- List any single emission source that routes its emissions to another point where these emissions are commingled with the emissions of other sources before being released to the atmosphere. Do not list any single emission source in this table that does not route its emissions in this manner.
- List any and all emission sources that are routed as described above. This includes emission sources that do not otherwise appear in this permit application.
- Consult instructions.

TABLE 1: APPLICABLE LOUISIANA AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point	Description	LAC 33.III							LAC 33.III.Chapter								
		509	**2103**	**2108***	**2111**	**2113**	**2115**	**2121**	**2**	**5**	**9**	**11**	**13**	**15**	**51**	**56**	**59**
BMOP DWP Facility	BMOP DWP Facility	1				1		3	1	1	1	1	1	3	1	1	3
NGGEN1	Natural Gas Generator #1											2	1	3			
NGGEN2	Natural Gas Generator #2											2	1	3			
BCRANE1	Platform B Crane #1 (Diesel)											1	1	3	3		
BCRANE2	Platform B Crane #2 (Diesel)											1	1	3	3		
DGEN	Emergency Generator (Diesel)											1	1	3	3		
BFWP	Platform B Firewater Pump (Diesel)											1	1	3	3		
CFWP	Platform C Firewater Pump (Diesel)											1	1	3	3		
PDST	Primary Diesel Storage Tank		3														
SRGT	Surge Tank		2														
FUG	Facility Wide Fugitives				1			3							1		
UNLD1	Uncontrolled Loading at Buoy #1																
UNLD2	Uncontrolled Loading at Buoy #2																
UNLD CAP	Uncontrolled Loading CAP																
NGGEN CAP	Natural Gas Generators CAP																

*BMOP has determined the non-feasibilty of the requirements under this subpart, please refer to Case-by-Case MACT Application for detail discussion.

KEY TO MATRIX

1 (Applicable) The regulations have applicable requirements that apply to this particular emissions source. This includes any monitoring, recordkeeping, or reporting requirements.
2 (Exempt) The regulations apply to this general type of emission source (i.e. vents, furnaces, towers, and fugitives) but do not apply to this particular emission source.
3 (Does Not Apply) The regulations do not apply to this emissions source. The regulations may have applicable requirements that could apply to this emissions source but the requirements do not currently apply to the source due to meeting a specific criterion, such as it has not been constructed, modified or reconstructed since the regulations have been in place.

Blank – The regulations clearly do not apply to this type of emission source.

TABLE 1: APPLICABLE LOUISIANA AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point	Description	40 C.F.R. Part 60 NSPS							40 C.F.R. Part 61 NESHAP	40 C.F.R. Part 63 NESHAP							40 C.F.R. Part			
		A	**K**	**Ka**	**Kb**	**IIII**	**JJJJ**	**OOOOa**	**V**	**A**	**H**	**Y***	**HH**	**VV**	**EEEE**	**ZZZZ**	**64**	**68**	**72**	**82**
BMOP DWP Facility	BMOP DWP Facility	1						3	3	1	3		3	3	3			3	3	1
NGGEN1	Natural Gas Generator #1						1									1				
NGGEN2	Natural Gas Generator #2						1									1				
BCRANE1	Platform B Crane #1 (Diesel)	1				1										1				
BCRANE2	Platform B Crane #2 (Diesel)	1				1										1				
DGEN	Emergency Generator (Diesel)	1				1				1						1				
BFWP	Platform B Firewater Pump (Diesel)	1				1				1						1				
CFWP	Platform C Firewater Pump (Diesel)	1				1				1						1				
PDST	Primary Diesel Storage Tank		3	3	3															
SRGT	Surge Tank		3	3	3															
FUG	Facility Wide Fugitives																			
UNLD1	Uncontrolled Loading at Buoy #1																			
UNLD2	Uncontrolled Loading at Buoy #2																			
UNLD CAP	Uncontrolled Loading CAP																			
NGGEN CAP	Natural Gas Generators CAP																			

*BMOP has determined the non-feasibilty of the requirements under this subpart, please refer to Case-by-Case MACT Application for detail discussion.

KEY TO MATRIX

1 (Applicable) The regulations have applicable requirements that apply to this particular emissions source. This includes any monitoring, recordkeeping, or reporting requirements.
2 (Exempt) The regulations apply to this general type of emission source (i.e. vents, furnaces, towers, and fugitives) but do not apply to this particular emission source.
3 (Does Not Apply) The regulations do not apply to this emissions source. The regulations may have applicable requirements that could apply to this emissions source but the requirements do not currently apply to the source due to meeting a specific criterion, such as it has not been constructed, modified or reconstructed since the regulations have been in place.

Blank – The regulations clearly do not apply to this type of emission source.

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 C.F.R. Part 63 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.6 and § 63.11	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.8	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.10	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.9 and § 63.10	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 63.7.	40 C.F.R. § 63.7	N/A	No
	40 C.F.R. Part 82 - Stratospheric Ozone Provisions	**Requirements that limit emissions or operations-**			
		Comply with the standards for recycling and emissions reduction pursuant to 40 C.F.R. Part 82, Subpart F, except as provided for Motor Vehicle Air Conditioners (MVACs) in Subpart B.	40 C.F.R. 82 Subpart B, E, and F	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility (continued)	LAC 33:III Chapter 2 - Rules and Regulations for the Fee System of the Air Quality Control Programs	**Requirements that limit emissions or operations-**			
		Shall pay the prescribed application fee or annual fee, as determined by LAC 33:III.223, within 90 days after the due date.	LAC 33:III.219	90 Days After Application Due Date	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 9 - General Regulations on Control of Emissions and Emission Standards	**Requirements that limit emissions or operations-**			
		No person or group of persons shall allow particulate matter or gases to become airborne in amounts which cause the ambient air quality standards to be exceeded. The limits stated include normal background levels of particulates and gases.	LAC 33:III.929.A	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		Submit Emission lnventory (EI)/Annual Emissions Statement: Due annually, by the 30th of April to the Office of Environmental Services, for the reporting period of the previous calendar year that coincides with period of ownership or operatorship, until released from reporting, in writing, by DEQ. Submit both an emissions inventory and the certification statement required by LAC 33:III.919.F.1.c, separately for each AI, in a format specified by DEQ. To request a release from reporting, submit a completed Request for Release from Emissions Inventory Reporting form (form# 7365) to the Office of Environmental Services.	LAC 33:III.919	Annually	No
		Shall report the unauthorized discharge of any air pollutant into the atmosphere in accordance with LAC 33:I.Chapter 39. Submit written reports to the department pursuant to LAC 33:I.3925. Submit timely and appropriate follow-up reports detailing methods to be used to prevent similar atmospheric releases.	LAC 33:III.927	Upon Occurrence of an Unauthorized Discharge	No
		Requirements that specify performance testing-			
		New sources shall provide necessary sampling ports in stacks or ducts and such other safe and proper sampling and testing facilities, exclusive of instruments and sensing devices as may be necessary for proper determination of the emission of air contaminants.	LAC 33:III.913	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility (continued)	LAC 33:III Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations-**			
		Emissions of smoke which pass onto or across a public road and create a traffic hazard by impairing visibility as defined in LAC 33:III.111 or intensifying an existing traffic hazard condition are prohibited.	LAC 33:III.1103	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Emissions of particulate matter which pass onto or across a public road and create a traffic hazard by impairment of visibility or intensify an existing traffic hazard condition are prohibited.	LAC 33:III.1303.B	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
BMOP DWP Facility (continued)	LAC 33:III Chapter 21 - Control of Emission of Organic Compounds	**Requirements that limit emissions or operations-**			
		Maintain best practical housekeeping and maintenance practices at the highest possible standards to reduce the quantity of organic compounds emissions. Good housekeeping shall include, but not be limited to, the practices listed in LAC 33:III.2113.A.1-5.	LAC 33:III.2113.A	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 56 - Prevention of Air Pollution Emergency Episodes	**Requirements that limit emissions or operations-**			
		During an Air Pollution Alert, Air Pollution Warning or Air Pollution Emergency, make the standby plan available on the premises to any person authorized by DEQ to enforce these regulations.	LAC 33:III.5611.B.1	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		Submit standby plan for the reduction or elimination of emissions during an Air Pollution Alert, Air Pollution Warning, or Air Pollution Emergency: Due within 30 days after requested by DEQ.	LAC 33:III.5611.A	N/A	No
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
NGGEN1 - Natural Gas Generator #1 (2,328 hp) NGGEN2 - Natural Gas Generator #2 (2,328 hp)	40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		(Excluding Formaldehyde) VOC Total <= 0.7 g/hp-hr (60 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Carbon monoxide (CO) <= 2.0 g/hp-hr (270 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Nitrogen oxides (NO_X) <= 1.0 g/hp-hr (82 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Operate and maintain stationary SI ICE to achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engine.	40 CFR 60.4234	N/A	No
		Purchase a non-certified engine and demonstrate compliance with the emission standards specified in § 60.4233 (e) and according to the requirements specified in § 60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.	40 CFR 60.4243(b)(2)	N/A	No
		Operate using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations. Keep records of such use. If propane is used for more than 100 hours per year and the engine is not certified to the emission standards when using propane, conduct a performance test to demonstrate compliance with the emission standards of 40 CFR 60.4233.	40 CFR 60.4243(e)	N/A	No
		Requirements that specify monitoring -			
		It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.	40 CFR 60.4243(g)	Continuously	No
		Requirements that specify records to be kept and requirements that specify record retention time -			
		Keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	40 CF 60.4243(b)(2)(ii)	N/A	No
		Equipment/operational data recordkeeping by electronic or hard copy continuously. Keep records of the information in 40 CFR 60.4245(a)(1) through (a)(4).	40 CFR 60.4245(a)	N/A	No
		Requirements that specify reports to be submitted			
		Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in 40 CFR 60.4231 must submit an initial notification as required in 40 CFR 60.7(a)(1). The notification must include the information in 40 CFR 60.4245(c)(1)-(5).	40 CFR 60.4245(c)	N/A	No
		Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in 40 CFR 60.4244 within 60 days after the test has been completed.	40 CFR 60.4245(d)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
NGGEN1 - Natural Gas Generator #1 (2,328 hp) NGGEN2 - Natural Gas Generator #2 (2,328 hp) (continued)	40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	**Requirements that specify performance testing -**			
		If the certified stationary SI internal combustion engine and control device is operated and maintained according to the manufacturer's emission-related written instructions, keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. Meet the requirements as specified in 40 CFR part 1068, subparts A through D, as they apply.	40 CFR 60.4243(a)(1)	N/A	No
		If the certified stationary SI internal combustion engine and control device are not maintained according to the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine, and you must demonstrate compliance according to (a)(2)(i) through (iii) of this section, as appropriate.	40 CFR 60.4243(a)(2)	N/A	No
		Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.	41 CFR 60.4243(b)(2)	N/A	No
		If purchasing a non-certified engine, conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. Conduct performance tests by following the procedures in 40 CFR 60.4244(a) through (g).	40 CFR 60.4243(b)(2)(ii); 40 CFR 60.4244	Every 8,760 hours or 3 years	No
	40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		A new stationary RICE located at an area source meets the requirements of this part (i.e., 40 CFR Part 63 Subpart ZZZZ) by meeting the requirements of 40 CFR Part 60, Subpart JJJJ. No further requirements apply under 40 CFR Part 63 Subpart ZZZZ.	40 CFR 63.6590(c)(1)	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III.Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent; except emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes. (Complies by using sweet natural gas as fuel)	LAC 33:III.1311.C	Six-minute	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel)	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		Shall comply with the emission standards for new CI engines in 40 CFR 60.4201 for their 2007 model year and later stationary CI ICE, as applicable.	40 CFR 60.4204(b)	N/A	No
		Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.	40 CFR 60.4201(a)	N/A	No
		Shall operate and maintain stationary CI ICE that achieve the emission standards as required in 40 CFR 60.4204 over the entire life of this engine.	40 CFR 60.4206	Entire life of the engine	No
		Beginning October 1, 2010, shall use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.	40 CFR 60.4207(b)	N/A	No
		May not import or install stationary CI ICE that do not meet the applicable requirements in 40 CFR 60.4208.	40 CFR 60.4208	N/A	No
		In addition to the requirements specified in 40 CFR 60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.	40 CFR 60.4208(h)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Owner or operator that must comply with the emission standards in this subpart shall do the following: - Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions; - Change only those emission-related settings that are permitted by the manufacturer; and - Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply.	40 CFR 60.4211(a)(1) through (a)(3)	N/A	No
		As stated in 40 CFR 60.4218, comply with the applicable general provisions listed in Table 8.	40 CFR 60.4218; Table 8	N/A	No
		Shall comply by purchasing an engine certified to the emission standards in 40 CFR 60.4204(b) for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph 60.4211(g).	40 CFR 60.4211(c)	N/A	No
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	40 CFR 60.4211(g)	N/A	No
		Requirements that specify monitoring-			
		If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in 40 CFR 60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.	40 CFR 60.4209(b)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	**Requirements that specify records to be kept and requirements that specify record retention time-**			
		If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.	40 CFR 60.4214(c)	N/A	No
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must keep a maintenance plan and records of conducted maintenance.	40 CFR 60.4211(g)	N/A	No
		Requirements that specify reports to be submitted-			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing-			
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.	40 CFR 60.4211(g)(2)	N/A	No
		If performance test is required: conduct performance tests by following the procedures in 40 CFR 60.4212(a) through (e).	40 CFR 60.4212	N/A	No
	40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations -**			
		Meet the requirements of 40 CFR 63 by meeting the requirements of 40 CFR 60 Subpart IIII. No further requirements apply to such engines under 40 CFR 63.	40 CFR 63.6590(c)(7)	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	LAC 33:III.Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations -**			
		Shall control the emission of smoke generated by the burning of fuel or combustion of waste material in a combustion unit, including the incineration of industrial, commercial, institutional and municipal wastes so that the shade or appearance of the emission is not darker than 20 percent average opacity, except that such emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1101.B	One six-minute period in any 60 consecutive minutes.	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III.Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations -**			
		Emissions of particulate matter shall be controlled so that the shade or appearance of the emission is not denser than 20 percent average opacity, except the emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1311.C	6 minutes in any 60 consecutive minutes	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel)	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		For the emergency generators: comply with the NMHC + NO_X, CO, and PM emission limitations set forth in Table 1 for the highest tier of the appropriate sized engine. All emergency generators are subject to the following standards: • CO limit of 3.5 g/kW-hr • PM limit of 0.20 g/kW-hr Engines greater than 560 kilowatts (kW) are subject to the following standard: • NMHC + NO_X limit of 6.4 g/kW-hr Engines with a rated power between 225-560 kW are subject to the following standard: • NMHC + NO_X limit of 4.0 g/kW-hr	40 C.F.R. § 60.4202(a)(2),40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.112(a) Table 1	Per underlying Test Method	No
		For the emergency generators: exhaust opacity from CI nonroad engines (excluding single-cylinder engines, propulsion marine diesel engines, and constant speed engines) may not exceed: • 20% during the acceleration mode; • 15% during the lugging mode; and • 50% during the peaks in either the acceleration or lugging modes.	40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.113	Per 40 C.F.R.§ 89.113	No
		For the fire pumps: comply with the NMHC + NO_X and PM emission limitations set forth in 40 C.F.R. Part 60 Subpart IIII Table 4 for 600-750 hp engines, 2009 model year and later.	40 C.F.R. § 60.4205(c), 40 C.F.R. Part 60 Subpart IIII Table 4	Per underlying Test Method	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Operate and maintain stationary CI ICE that achieve the emission standards as required in 40 C.F.R. 60.4204 and 40 C.F.R. 60.4205 over the entire life of the engine.	40 C.F.R. § 60.4206	N/A	No
		Use diesel fuel with a maximum sulfur content of 15 ppm. Use diesel fuel with a minimum cetane index of 40 or a maximum aromatic content of 35 volume %.	40 C.F.R. § 60.4207(b), 40 C.F.R. § 80.510(b)	Continuously	No
		If the emergency stationary CI internal combustion engine does not meet the standards applicable to non-emergency engines, install a non-resettable hour meter prior to startup of the engine.	40 C.F.R. § 60.4209(a)	N/A	No
		Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions, change only those emission related settings that are permitted by the manufacturer, and meet the requirements of 40 C.F.R. Part 89, 94, and/or 1068, as they apply.	40 C.F.R. § 60.4211(a)	N/A	No
		Purchase an engine certified to the emission standards in 40 C.F.R. § 60.4204(b), § 60.4205(b), or § 60.4205(c), as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in 40 C.F.R. § 60.4211(g).	40 C.F.R. § 60.4211(c)	N/A	No
		Operate according to the requirements in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3). In order for the engine to be considered an emergency stationary ICE under 40 C.F.R. 60 Subpart IIII, any operation other than as described in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3) is prohibited. If the engine is not operated according to these requirements, the engine will not be considered an emergency engine under 40 C.F.R. 60 Subpart IIII and must meet all requirements for non-emergency engines.	40 C.F.R. § 60.4211(f)	N/A	No
		There is no time limit on the use of emergency stationary ICE in emergency situations.	40 C.F.R. § 60.4211(f)(1)	N/A	No
		Operate for maintenance checks and readiness testing for a maximum of 100 hours per calendar year, provided that the tests are recommended by the federal, state or local government; the manufacturer; the vendor; the regional transmission organization or equivalent balancing authority and transmission operator; or the insurance company associated with the engine. LDEQ may be petitioned for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if records are maintained indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.	40 C.F.R. § 60.4211(f)(2)(i)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Operate for up to 50 hours per calendar year in non-emergency situations. Count the 50 hours of operation in non-emergency situations as part of the 100 hours per calendar year for maintenance and testing provided in 40 C.F.R. 60.4211(f)(2)(i). Do not use the 50 hours per calendar year for non-emergency situations for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity, except as provided in 40 C.F.R. 60.4211(f)(3)(i).	40 C.F.R. § 60.4211(f)(3)	N/A	No
		Comply with applicable requirements in Table 8 to Subpart IIII of Part 60.	40 C.F.R. § 60.4218, Table 8 to Subpart IIII of Part 60	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Operating time recordkeeping by electronic or hard copy upon occurrence of event. If the emergency engine meets the standards applicable to emergency engines in the applicable model year, keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. Record the time of operation of the engine and the reason the engine was in operation during that time.	40 C.F.R. § 60.4214(b)	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 63 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.6 and § 63.11 as per 63.6665	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.8 as per 63.6665	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.10 as per 63.6665	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.9 and § 63.10 as per 63.6665	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 63.7.	40 C.F.R. § 63.7 as per 63.6665	N/A	No
	40 C.F.R. Part 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		N/A	N/A	N/A	N/A
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		<u>RICE with Capacities Greater Than 500 Horsepower:</u> Per 40 C.F.R. § 63.6590(b)(1)(i), new emergency stationary RICE with a site rating of more than 500 brake horsepower located at a major HAP source that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in 40 C.F.R. § 63.6640(f)(2)(ii) and (iii) do not have to meet the requirements of Subpart ZZZZ and Subpart A except for the initial notification requirements of 40 C.F.R. § 63.6645(f).	40 C.F.R. § 63.6590(b)(1)(i), 40 C.F.R. § 63.6645(f)	N/A	No
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent, except for emissions that have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes. Determine opacity by using Method 9 of 40 C.F.R. Part 60, Appendix A or by using a continuous opacity monitoring system (COMS) meeting the requirements outlined in 40 C.F.R. 60.13(c) and (d).	LAC 33:III.1101.B	6 Minutes in any 60 Minute Consecutive Period	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	LAC 33:III Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent, except for emissions that have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1311.C	6 Minutes in any 60 Minute Consecutive Period	No
		Emissions of particulate matter from any fuel burning equipment cannot exceed 0.6 lbs/MMBTU of heat input.	LAC 33:III.1313.C	3-hour Average	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
FUG - Facility Wide Fugitives	LAC 33:III Chapter 2111 - Pumps And Compressors	**Requirements that limit emissions or operations-**			
		Equip all rotary pumps and compressors handling volatile organic compounds having a true vapor pressure of 1.5 psia or greater at handling conditions with mechanical seals or other equivalent equipment.	LAC 33:III.2111	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program	**Requirements that limit emissions or operations-**			
		N/A	N/A	N/A	N/A
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		Emissions to be reported in facility-wide report.	LAC 33:III.5107.A	N/A	Yes
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 3. EXPLANATION FOR EXEMPTION STATUS OR NON-APPLICABILITY OF A SOURCE

Emission Point ID No:	Requirement	Exempt or Does Not Apply	Explanation	Citation Providing for Exemption or Non-applicability
BMOP DWP Facility	NSPS Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution [40 C.F.R. Part 60 Subpart OOOOa]	Does Not Apply	The facility is an offshore platform.	40 C.F.R. § 60.5365a
	NESHAP Subpart V - National Emission Standards for Hazardous Air Pollutants for Equipment Leaks (Fugitive Emission Sources) [40 C.F.R. Part 61 Subpart V]	Does Not Apply	Project components will not operate in volatile hazardous air pollutant (VHAP) service.	40 C.F.R. § 61.240(a)
	NESHAP Subpart H - National Emission Standards for Hazardous Air Pollutants for Equipment Leaks [40 C.F.R. Part 63 Subpart H]	Does Not Apply	No Part 63 subpart that applies to the Project references Subpart H.	40 C.F.R. § 63.160(a)
	NESHAP Subpart HH - National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities [40 C.F.R. Part 63 Subpart HH]	Does Not Apply	The facility is not a production facility of oil and natural gas.	40 C.F.R. § 63.760
	NESHAP Subpart VV - National Emission Standards for Hazardous Air Pollutants for Oil-Water Separators and Organic-Water Separators [40 C.F.R. Part 63 Subpart VV]	Does Not Apply	No Part 63 subpart that applies to the Project references Subpart VV.	40 C.F.R. § 63.1040
	NESHAP Subpart EEEE - National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline) [40 C.F.R. Part 63 Subpart EEEE]	Does Not Apply	The definition storage vessel specifically excludes surge control vessels. The other storage tanks proposed do not store an organic liquid as defined in the rule (excludes diesel, and fuels used for refueling). The project will not include a transfer rack, as the delivery of crude is to marine vessel, not to a cargo tank or tank car. Thus this subpart does not apply.	40 C.F.R. 63.2406
	Chemical Accident Prevention Provisions [40 C.F.R. Part 68]	Does Not Apply	Facility does not produce, process, handle, or store any substance listed greater than the threshold amounts.	40 C.F.R. § 68
	Acid Rain Program General Provisions [40 C.F.R. Part 72]	Does Not Apply	The units at the facility are non-utility units, and non-utility units are not subject to the Acid Rain Program.	40 C.F.R. § 72.6(b)(8)
	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does Not Apply	No single point source emits or has the potential to emit 5 tons per year or more of SO_2.	LAC 33:III.1502.A.3
	Fugitive Emission Control [LAC 33:III.Chapter 2121]	Exempt	Facility is not one of the facility types subject to this regulation; the definition of natural gas processing plant excludes compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units, and field gas gathering systems.	LAC 33:III.2121.A
	Chemical Accident Prevention and Minimization of Consequences [LAC 33:III.Chapter 59]	Does Not Apply	Facility does not produce, process, handle, or store any substance listed greater than the threshold amounts.	LAC 33:III.5907

TABLE 3. EXPLANATION FOR EXEMPTION STATUS OR NON-APPLICABILITY OF A SOURCE

Emission Point ID No:	Requirement	Exempt or Does Not Apply	Explanation	Citation Providing for Exemption or Non-applicability
NGGEN1 NGGEN2	Control of Emissions of Smoke [LAC 33:III.Chapter 11]	Exempt	The units will burn only natural gas and are exempt from the requirements of LAC 33:III.1101.	LAC 33:III.1107.B.1
	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does not apply	The units will not emit 5 tons per year or more of SO_2 to the atmosphere.	LAC 33:III.1502.A.3
	Control of Emissions of Nitrogen Oxides (NO_X) [LAC 33:III. Chapter 22]	Does not apply	The facility is not located in a non-attainment area or the region of influence.	LAC 33:III.2201.A
BCRANE1 BCRANE2 DGEN BFWP CFWP	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does Not Apply	Each unit emits less than 5 tons per year of sulfur dioxide. Shall record and retain data to show annual potential emissions from each unit.	LAC 33:III.1502.A.3 and 1513.C
	LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program [LAC 33:III.Chapter 51]	Exempt	TAP emissions are from the combustion of Group 1 virgin fossil fuels.	LAC 33:III.5105.B.3.a
PDST SRGT	NSPS Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978 [40 C.F.R. Part 63 Subpart K]	Does Not Apply	Storage Tank constructed after May 19, 1978.	40 C.F.R. § 60.110(c)(1).
	NSPS Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984 [40 C.F.R. Part 63 Subpart Ka]	Does Not Apply	Storage Tank constructed after July 23, 1984.	40 C.F.R. § 60.110a
PDST	NSPS Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 [40 C.F.R. Part 63 Subpart Kb]	Does Not Apply	The storage capacity for each of the tank is less than 75 $m.^3$	40 C.F.R. § 60.110b(a).
	Control of Emissions of Organic Compounds - Storage of Volatile Organic Compounds [LAC 33:III:2103]	Does Not Apply	Tank will store diesel which has a vapor pressure of lower than 1.5 psia; therefore, the requirements of LAC 33:III.2103 are not applicable.	LAC 33:III 2103.B
SRGT	NSPS Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 [40 C.F.R. Part 63 Subpart Kb]	Does Not Apply	The surge tank is potentially subject to NSPS Subpart Kb. However, the surge tank is considered a process tanks. The definition storage vessel specifically excludes process tanks. Thus subpart Kb does not apply.	40 C.F.R. § 60.111b
	LAC 33:III Chapter 2103 - Storage of Volatile Organic Compounds	Exempt	Storage tank is used for crude oil or condensate and having a nominal storage capacity of less than 420,000 gallons and storage tank is NOT subject to New Source Performance Standards;	LAC 33:III 2103.G.1
FUG	Fugitive Emission Control [LAC 33:III.Chapter 2121]	Exempt	Facility is not one of the facility types subject to this regulation; the definition of natural gas processing plant excludes compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units, and field gas gathering systems.	LAC 33:III.2121.A

TABLE 4. EQUIPMENT LIST

Emission Point ID No:	Description	Construction Date	Routes to:	Operating Rate/Volume	Applicable Requirement(s)?
NGGEN1	Natural Gas Generator #1	Proposed	NGGEN CAP	158,316 scf/hr	Yes
NGGEN2	Natural Gas Generator #2	Proposed	NGGEN CAP	158,316 scf/hr	Yes
UNLD1	Uncontrolled Loading at Buoy #1	Proposed	UNLD CAP	80,000 bbl/hr	No
UNLD2	Uncontrolled Loading at Buoy #2	Proposed	UNLD CAP	80,000 bbl/hr	No

23. Emissions Inventory Questionnaire (EIQ) Forms [LAC 33:III.517.D.3; 517.D.6]

Complete one (1) EIQ for:

- Each emission source. If two emission sources have a common stack, the applicant may submit one EIQ sheet for the common emissions point. Note any emissions sources that route to this common point in Table 4 of the application.
- Each emissions CAP that is proposed, including each source that is part of the CAP.
- Each alternate operating scenario that a source may operate under. Some common scenarios are:
    1. Sources that combust multiple fuels
    2. Sources that have startup/shutdown max lb/hr emission rates higher than the max lb/hr for normal operating conditions would need a separate EIQ addressing the startup/shutdown emission rates
- Fugitive emissions releases. One (1) EIQ should be completed for each of the following types of fugitive emissions sources or emissions points:
    1. Equipment leaks.
    2. Non-equipment leaks (i.e., road dust, settling ponds, etc).

For each EIQ:

- Fill in all requested information.
- Speciate all Toxic Air Pollutants and Hazardous Air Pollutants emitted by the source.
- Use appropriate significant figures.
- Consult instructions.

The EIQ is in Microsoft Word Excel. Visit the following website to get to the EIQ form.
http://deq.louisiana.gov/page/air-permit-applications

State of Louisiana

Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation) UNLD CAP	**Descriptive Name of the Emissions Source (Alt. Name)** Uncontrolled Loading CAP	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method ____ Datum ____
UTM Zone ____ Horizontal ____ mE Vertical ____ mN
Latitude ____ ° ____ ' ____ " ____ hundredths
Longitude ____ ° ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (^oF)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	N/A ft N/A ft^2	N/A ft	N/A ft/sec	N/A ft^3/min	N/A °F	8,760 hr/yr	| | proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	700,800,000	bbl/yr
Maximum Operating Rate/Throughput	700,800,000	bbl/yr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☑ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Notes

This emissions CAP includes emissions from Uncontrolled Loading Buoy 1 (UNLD1) and Uncontrolled Loading Buoy 2 (UNLD2). See individual EIQs for max hourly emissions and stack information.

Emission Point ID No. (Designation) UNLD CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				5422.48	--	21840.28	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	70.15	--	9.49	--	A		ppm by vol
n-Hexane			00110-54-3	221.77	--	893.22	--	A		ppm by vol
Benzene			00071-43-2	43.40	--	174.81	--	A		ppm by vol
Toluene			00108-88-3	19.27	--	77.61	--	A		ppm by vol
Ethyl benzene			00100-41-4	2.69	--	10.85	--	A		ppm by vol
1,2,4 - Trimethylbenzene				0.58	--	2.33	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				2.58	--	10.41	--	A		ppm by vol
1,4-dimethylbenzene				1.80	--	7.25	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	11.26	--	45.36	--	A		ppm by vol
Cumene			00098-82-8	0.32	--	1.28	--	A		ppm by vol
Biphenyl			00092-52-4	0.001	--	<0.01	--	A		ppm by vol
Cresol			01319-77-3	0.04	--	0.16	--	A		ppm by vol
Naphthalene			00091-20-3	0.03	--	0.14	--	A		ppm by vol
Phenol			00108-95-2	0.08	--	0.33	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation)	**Descriptive Name of the Emissions Source (Alt. Name)**	**Approximate Location of Stack or Vent (see instructions)**
UNLD1	Uncontrolled Loading at Buoy #1	Method 18,"Interpolation - Map" Datum WGS84
Tempo Subject Item ID No.		UTM Zone 15 Horizontal 499627.30 mE Vertical 3147270.30 mN
		Latitude ° ' " hundredths
		Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	2.17 ft ft^2	36.09 ft	33.74 ft/sec	7,486.11 ft^3/min	90 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a		
	b		
	c		

Notes

Average hourly and annual emissions permitted under Uncontrolled Loading CAP.

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	80,000	bbl/hr
Maximum Operating Rate/Throughput	80,000	bbl/hr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) UNLD1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				--	5422.48	--	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	--	70.15	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	221.77	--	--	A		ppm by vol
Benzene			00071-43-2	--	43.40	--	--	A		ppm by vol
Toluene			00108-88-3	--	19.27	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	2.69	--	--	A		ppm by vol
1,2,4 - Trimethylbenzene				--	0.58	--	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				--	2.58	--	--	A		ppm by vol
1,4-dimethylbenzene				--	1.80	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	11.26	--	--	A		ppm by vol
Cumene			00098-82-8	--	0.32	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.001	--	--	A		ppm by vol
Cresol			01319-77-3	--	0.04	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.03	--	--	A		ppm by vol
Phenol			00108-95-2	--	0.08	--	--	A		ppm by vol

State of Louisiana

Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug 2020

Emission Point ID No. (Designation) UNLD2	**Descriptive Name of the Emissions Source (Alt. Name)** Uncontrolled Loading at Buoy #2	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 501099.00 mE Vertical 3146871.60 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	2.17 ft ft^2	36.09 ft	33.74 ft/sec	7,486.11 ft^3/min	90 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Notes

Average hourly and annual emissions permitted under Uncontrolled Loading CAP.

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	80,000	bbl/hr
Maximum Operating Rate/Throughput	80,000	bbl/hr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) UNLD2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				--	5422.48	--	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	--	70.15	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	221.77	--	--	A		ppm by vol
Benzene			00071-43-2	--	43.40	--	--	A		ppm by vol
Toluene			00108-88-3	--	19.27	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	2.69	--	--	A		ppm by vol
1,2,4 - Trimethylbenzene				--	0.58	--	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				--	2.58	--	--	A		ppm by vol
1,4-dimethylbenzene				--	1.80	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	11.26	--	--	A		ppm by vol
Cumene			00098-82-8	--	0.32	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.001	--	--	A		ppm by vol
Cresol			01319-77-3	--	0.04	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.03	--	--	A		ppm by vol
Phenol			00108-95-2	--	0.08	--	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug 2020

Emission Point ID No. (Designation)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
NGGEN CAP	**Natural Gas Generator CAP**	Method ____ Datum ____ UTM Zone ____ Horizontal ____ mE Vertical ____ mN Latitude ____ ° ____ ' ____ " ____ hundredths Longitude ____ ° ____ ' ____ " ____ hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	N/A ft N/A ft^2	N/A ft	N/A ft/sec	N/A ft^3/min	N/A °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Notes

This emissions CAP includes emissions from NG Generator No1 (NGGEN1) and NG Generator No2 (NGGEN2). See individual EIQs for max hourly emissions and stack information.

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	156	MMscf/yr
Maximum Operating Rate/Throughput	156	MMscf/yr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) NGGEN CAP	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Particulate matter (PM$_{10}$)				0.18	--	0.80	--	A		gr/std ft^3
Particulate matter (PM$_{2.5}$)				0.18	--	0.80	--	A		gr/std ft^3
Sulfur dioxide				0.01	--	0.05	--	A		ppm by vol
Nitrogen oxides				5.13	--	22.48	--	A		ppm by vol
Carbon monoxide				10.26	--	44.96	--	A		ppm by vol
Total VOC (including those listed below)				3.59	--	15.74	--	A		ppm by vol
Sulfuric Acid			07664-93-9	0.001	--	<0.01	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	0.15	--	0.67	--	A		ppm by vol
Acrolein			00107-02-8	0.093	--	0.409	--	A		ppm by vol
Benzene			00071-43-2	0.01	--	0.04	--	A		ppm by vol
Biphenyl			00092-52-4	0.004	--	0.02	--	A		ppm by vol
1,3-Butadiene			00106-99-0	0.005	--	0.021	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	<0.001	--	<0.01	--	A		ppm by vol
Chlorobenzene			00108-90-7	<0.001	--	0.002	--	A		ppm by vol
Chloroform			00067-66-3	<0.001	--	<0.01	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	<0.001	--	<0.01	--	A		ppm by vol
Ethyl benzene			00100-41-4	<0.001	--	<0.01	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	<0.001	--	0.004	--	A		ppm by vol
Formaldehyde			00050-00-0	0.61	--	2.67	--	A		ppm by vol
Methanol			00067-56-1	0.05	--	0.20	--	A		ppm by vol
Dichloromethane			00075-09-2	<0.001	--	<0.01	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	<0.001	--	<0.01	--	A		ppm by vol
n-Hexane			00110-54-3	0.02	--	0.09	--	A		ppm by vol
Naphthalene			00091-20-3	0.001	--	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	--	<0.01	--	A		ppm by vol
Phenanthrene				<0.001	--	<0.01	--	A		ppm by vol
Phenol			00108-95-2	<0.001	--	<0.01	--	A		ppm by vol
Styrene			00100-42-5	<0.001	--	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.01	--	0.03	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	<0.001	--	<0.01	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	<0.001	--	<0.01	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	0.00	--	0.02	--	A		ppm by vol
Vinyl chloride			00075-01-4	<0.001	--	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.003	--	0.01	--	A		ppm by vol
CO2e				2,940	--	12,878	--	A		ppm by vol

State of Louisiana

Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal: Aug 2020

Emission Point ID No. (Designation)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
NGGEN1	**Natural Gas Generator #1**	Method 18,"Interpolation - Map" Datum WGS84
Tempo Subject Item ID No.		UTM Zone 15 Horizontal 499558.50 mE Vertical 3145263.24 mN
		Latitude ° ' " hundredths
		Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ft^2	104.40 ft	125.98 ft/sec	2,638.61 ft^3/min	924 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	18.18
b		
c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	158,316	scf/hr
Maximum Operating Rate/Throughput	158,316	scf/hr
Design Capacity/Volume/Cylinder Displacement	2,328	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☑ **Lean Burn** ☐ **2 Stroke** ☑ **4 Stroke**

Emission Point ID No. (Designation): NGGEN1	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Particulate matter (PM_{10})				--	0.18	--	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				--	0.18	--	--	A		gr/std ft^3
Sulfur dioxide				--	0.01	--	--	A		ppm by vol
Nitrogen oxides				--	5.13	--	--	A		ppm by vol
Carbon monoxide				--	10.26	--	--	A		ppm by vol
Total VOC (including those listed below)				--	3.59	--	--	A		ppm by vol
Sulfuric Acid			07664-93-9	--	0.001	--	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	--	0.15	--	--	A		ppm by vol
Acrolein			00107-02-8	--	0.09	--	--	A		ppm by vol
Benzene			00071-43-2	--	0.01	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.004	--	--	A		ppm by vol
1,3-Butadiene			00106-99-0	--	0.005	--	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	--	<0.001	--	--	A		ppm by vol
Chlorobenzene			00108-90-7	--	<0.001	--	--	A		ppm by vol
Chloroform			00067-66-3	--	<0.001	--	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	--	<0.001	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	<0.001	--	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	--	<0.001	--	--	A		ppm by vol
Formaldehyde			00050-00-0	--	0.61	--	--	A		ppm by vol
Methanol			00067-56-1	--	0.05	--	--	A		ppm by vol
Dichloromethane			00075-09-2	--	<0.001	--	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	--	<0.001	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	0.02	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.001	--	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				--	<0.001	--	--	A		ppm by vol
Phenanthrene				--	<0.001	--	--	A		ppm by vol
Phenol			00108-95-2	--	<0.001	--	--	A		ppm by vol
Styrene			00100-42-5	--	<0.001	--	--	A		ppm by vol
Toluene			00108-88-3	--	0.01	--	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	--	<0.001	--	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	--	<0.001	--	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	--	0.005	--	--	A		ppm by vol
Vinyl chloride			00075-01-4	--	<0.001	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	0.003	--	--	A		ppm by vol
CO2e				--	2,940	--	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation) NGGEN2	**Descriptive Name of the Emissions Source (Alt. Name)** **Natural Gas Generator #2**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499563.03 mE Vertical 3145259.16 mN Latitude ____ ° ____ ' ____ " ____ hundredths Longitude ____ ° ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ____ ft^2	104.40 ft	125.98 ft/sec	2,638.61 ft^3/min	924 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Natural Gas	18.18
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	158,316	scf/hr
Maximum Operating Rate/Throughput	158,316	scf/hr
Design Capacity/Volume/Cylinder Displacement	2,328	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☑ **Lean Burn** ☐ **2 Stroke** ☑ **4 Stroke**

Emission Point ID No. (Designation) NGGEN2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				--	0.18	--	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				--	0.18	--	--	A		gr/std ft^3
Sulfur dioxide				--	0.01	--	--	A		ppm by vol
Nitrogen oxides				--	5.13	--	--	A		ppm by vol
Carbon monoxide				--	10.26	--	--	A		ppm by vol
Total VOC (including those listed below)				--	3.59	--	--	A		ppm by vol
Sulfuric Acid			07664-93-9	--	0.001	--	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	--	0.15	--	--	A		ppm by vol
Acrolein			00107-02-8	--	0.09	--	--	A		ppm by vol
Benzene			00071-43-2	--	0.01	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.004	--	--	A		ppm by vol
1,3-Butadiene			00106-99-0	--	0.005	--	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	--	<0.001	--	--	A		ppm by vol
Chlorobenzene			00108-90-7	--	<0.001	--	--	A		ppm by vol
Chloroform			00067-66-3	--	<0.001	--	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	--	<0.001	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	<0.001	--	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	--	<0.001	--	--	A		ppm by vol
Formaldehyde			00050-00-0	--	0.61	--	--	A		ppm by vol
Methanol			00067-56-1	--	0.05	--	--	A		ppm by vol
Dichloromethane			00075-09-2	--	<0.001	--	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	--	<0.001	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	0.02	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.001	--	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				--	<0.001	--	--	A		ppm by vol
Phenanthrene				--	<0.001	--	--	A		ppm by vol
Phenol			00108-95-2	--	<0.001	--	--	A		ppm by vol
Styrene			00100-42-5	--	<0.001	--	--	A		ppm by vol
Toluene			00108-88-3	--	0.01	--	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	--	<0.001	--	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	--	<0.001	--	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	--	0.005	--	--	A		ppm by vol
Vinyl chloride			00075-01-4	--	<0.001	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	0.003	--	--	A		ppm by vol
CO2e				--	2,940	--	--	A		ppm by vol

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Aug | 2020

Emission Point ID No. (Designation) DGEN	**Descriptive Name of the Emissions Source (Alt. Name)** **Emergency Diesel Generator**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499567.56 mE Vertical 3145255.08 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ft^2	104.40 ft	103.00 ft/sec	2,157.20 ft^3/min	757 °F	100 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Diesel	14.08
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	1,408	MMBtu/yr
Maximum Operating Rate/Throughput	14.08	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	2,012	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) DGEN	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.77	0.77	0.04	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.77	0.77	0.04	--	A		gr/std ft^3
Sulfur dioxide				1.43	1.43	0.07	--	A		ppm by vol
Nitrogen oxides				21.17	21.17	1.06	--	A		ppm by vol
Carbon monoxide				11.58	11.58	0.58	--	A		ppm by vol
Total VOC (including those listed below)				21.17	21.17	1.06	--	A		ppm by vol

Emission Point ID No. (Designation) DGEN	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.04	0.04	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	<0.001	<0.001	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.01	0.01	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.001	0.001	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.004	0.004	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.003	0.003	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				0.003	0.003	<0.01	--	A		ppm by vol
CO2e				2,304	-	115	--	A		ppm by vol

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Date of submittal: Aug | 2020

Emission Point ID No. (Designation) BCRANE1	**Descriptive Name of the Emissions Source (Alt. Name)** **Platform B Crane #1**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499573.09 mE Vertical 3145256.67 mN Latitude ° ' " hundredths Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, <u>not</u> at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	154.67 ft	97.27 ft/sec	509.28 ft^3/min	980 °F	4,380 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Diesel	3.33
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	14,564	MMBtu/yr
Maximum Operating Rate/Throughput	3.33	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	475	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year |

Date Engine Was Built by Manufacturer |

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BCRANE1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.05	0.05	0.11	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.05	0.05	0.11	--	A		gr/std ft^3
Sulfur dioxide				0.34	0.34	0.74	--	A		ppm by vol
Nitrogen oxides				0.47	0.47	1.03	--	A		ppm by vol
Carbon monoxide				2.73	2.73	5.99	--	A		ppm by vol
Total VOC (including those listed below)				0.22	0.22	0.49	--	A		ppm by vol

Emission Point ID No. (Designation) BCRANE1	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	0.02	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.003	0.003	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.004	0.004	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.001	0.001	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	<0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				544	--	1,191	--	A		ppm by vol

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Date of submittal: Aug 2020

Emission Point ID No. (Designation) BCRANE2	**Descriptive Name of the Emissions Source (Alt. Name)** **Platform B Crane #2**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499528.13 mE Vertical 3145242.60 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point** Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	154.67 ft	97.27 ft/sec	509.28 ft^3/min	980 °F	4,380 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	**Type of Fuel**	**Heat Input (MMBTU/hr)**
a	Diesel	3.33
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	14,564	MMBtu/yr
Maximum Operating Rate/Throughput	3.33	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	475	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year |

Date Engine Was Built by Manufacturer |

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BCRANE2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.05	0.05	0.11	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.05	0.05	0.11	--	A		gr/std ft^3
Sulfur dioxide				0.34	0.34	0.74	--	A		ppm by vol
Nitrogen oxides				0.47	0.47	1.03	--	A		ppm by vol
Carbon monoxide				2.73	2.73	5.99	--	A		ppm by vol
Total VOC (including those listed below)				0.22	0.22	0.49	--	A		ppm by vol

Emission Point ID No. (Designation) BCRANE2	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	0.02	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.003	0.003	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.004	0.004	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.001	0.001	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	<0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				544	--	1,191	--	A		ppm by vol

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Aug	2020

Emission Point ID No. (Designation)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
BFWP	**Platform B Firewater Pump**	Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499552.80 mE Vertical 3145247.80 mN Latitude ° ' " hundredths Longitude ° ' " hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	56.16 ft	133.10 ft/sec	696.91 ft^3/min	980 °F	100 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Diesel	4.55
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	455	MMBtu/yr
Maximum Operating Rate/Throughput	4.55	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	650	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BFWP	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Particulate matter (PM$_{10}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Particulate matter (PM$_{2.5}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Sulfur dioxide				0.46	0.46	0.02	--	A		ppm by vol
Nitrogen oxides				4.30	4.30	0.21	--	A		ppm by vol
Carbon monoxide				3.73	3.73	0.19	--	A		ppm by vol
Total VOC (including those listed below)				4.30	4.30	0.21	--	A		ppm by vol

Emission Point ID No. (Designation) BFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.004	0.004	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.01	0.01	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.002	0.002	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.001	0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				744	--	37	--	A		ppm by vol

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Emission Point ID No. (Designation)	CFWP
Tempo Subject Item ID No.	
Descriptive Name of the Emissions Source (Alt. Name)	**Platform C Firewater Pump**

Approximate Location of Stack or Vent (see instructions)

Method 18,"Interpolation - Map" Datum WGS84

UTM Zone 15 Horizontal 499507.67 mE Vertical 3145358.27 mN

Latitude ° ' " hundredths

Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point: Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	56.06 ft	133.10 ft/sec	696.91 ft^3/min	980 °F	100 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Diesel	4.55
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	455	MMBtu/yr
Maximum Operating Rate/Throughput	4.55	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	650	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year |

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) CFWP Pollutant	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates: Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Permitted Emission Rate (Current) Annual (tons/yr)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Particulate matter (PM$_{10}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Particulate matter (PM$_{2.5}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Sulfur dioxide				0.46	0.46	0.02	--	A		ppm by vol
Nitrogen oxides				4.30	4.30	0.21	--	A		ppm by vol
Carbon monoxide				3.73	3.73	0.19	--	A		ppm by vol
Total VOC (including those listed below)				4.30	4.30	0.21	--	A		ppm by vol

Emission Point ID No. (Designation) CFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.00	0.00	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.004	0.004	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.01	0.01	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.002	0.002	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.001	0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				744	--	37	--	A		ppm by vol

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Emission Point ID No. (Designation)	PDST
Tempo Subject Item ID No.	
Descriptive Name of the Emissions Source (Alt. Name)	**Primary Diesel Storage Tank**

Approximate Location of Stack or Vent (see instructions)

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499557.40 mE Vertical 3145253.30 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.50 ft ft²	102.40 ft	3.28 ft/sec	38.65 ft^3/min	77 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	**Type of Fuel**	**Heat Input (MMBTU/hr)**
a		
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	468,000	gal/yr
Maximum Operating Rate/Throughput	400	gal/hr
Design Capacity/Volume/Cylinder Displacement	18,000	gal
Shell Height (ft)	10.00	ft
Tank Diameter (ft)	17.76	ft

Tanks: ☑ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered
Engine Model Year
Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) PDST	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				0.002	--	0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	--	<0.01	--	A		ppm by vol

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Date of submittal
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Emission Point ID No. (Designation) ST	**Descriptive Name of the Emissions Source (Alt. Name)** **Surge Tank**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499536.88 mE Vertical 3145247.78 mN
Latitude ____ ° ____ ' ____ " ____ hundredths
Longitude ____ ° ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.50 ft ____ ft^2	105.06 ft	3.28 ft/sec	38.65 ft^3/min	150 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a		
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	42,000	gal/yr
Maximum Operating Rate/Throughput	80,000	gal/hr
Design Capacity/Volume/Cylinder Displacement	42,000	gal
Shell Height (ft)	47.50	ft
Tank Diameter (ft)	12.67	ft

Tanks: ☑ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) ST	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				0.85	--	3.73	--	A		ppm by vol
Benzo(g,h,i)perylene				0.004	--	0.02	--	A		ppm by vol
Cyclohexane				0.005	--	0.02	--	A		ppm by vol
Ethylcyclohexane				0.001	--	<0.01	--	A		ppm by vol

Emission Point ID No. (Designation) ST	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Hexanol				0.004	--	0.02	--	A		ppm by vol
Toluene diisocyanate				0.002	--	0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	--	<0.01	--	A		ppm by vol

State of Louisiana

Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug 2020

Emission Point ID No. (Designation) FUG0001	**Descriptive Name of the Emissions Source (Alt. Name)** **Facility Wide Fugitives**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499554.70 mE Vertical 3145251.00 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	N/A ft ft^2	N/A ft	N/A ft/sec	ft^3/min	N/A °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	**Type of Fuel**	**Heat Input (MMBTU/hr)**
a		
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) FUG0001	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				4.26	4.26	18.65	--	A		ppm by vol
Benzene			00071-43-2	0.03	0.03	0.12	--	A		ppm by vol
Cumene			00098-82-8	<0.001	<0.001	<0.01	--	A		ppm by vol
Ethyl benzene			00100-41-4	0.02	0.02	0.08	--	A		ppm by vol
n-Hexane			00110-54-3	0.21	0.21	0.91	--	A		ppm by vol
Naphthalene			00091-20-3	<0.001	<0.001	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.07	0.07	0.32	--	A		ppm by vol

Emission Point ID No. (Designation) FUG0001	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Trimethylbenzene (1,2,4)				0.03	0.03	0.14	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.08	0.08	0.33	--	A		ppm by vol
1,3-dimethylbenzene				0.001	0.001	0.01	--	A		ppm by vol
1,4-dimethylbenzene				0.001	0.001	<0.01	--	A		ppm by vol
CO2e				242	242	1,060		A		ppm by vol

24. NSR Applicability Summary [LAC 33:III.504 and LAC 33:III.509] ☐ N/A

Refer to Sections 4 the Prevention of Significant Deterioration Air Construction Permit Application Volume 1 for the NSR Applicability Summary.

This section consists of seven subsections, A-G, and is applicable only to new and existing major stationary sources (as defined in LAC 33:III.504 or in LAC 33:III.509) proposing to permit a physical change or change in the method of operation. It would also apply to existing minor stationary sources proposing a physical change or change in the method of operation where the change would be a major source in and of itself. Add rows to each table as necessary. Provide a written explanation of the information summarized in these tables. Consult instructions.

24.A. Project Summary

		A	B	C	D	E	F
Emission Point ID	**Description**	**New, Modified, Affected, or Unaffected***	**Pre-Project Allowables (TPY)**	**Baseline Actual Emissions (over 24-month period)**	**Projected Actual Emissions (TPY)**	**Post-Project Potential to Emit (TPY)**	**Change**

$PM_{2.5}$	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						$PM_{2.5}$ Change:	

PM_{10}	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						PM_{10} Change:	

SO_2	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						SO_2 Change:	

NO_X	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						NO_X Change:	

CO	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						CO Change:	

VOC	**24-Month Period:** N/A – NEW FACILTY						
	Marine Uncontrolled Loading	NEW	N/A	N/A	N/A	21,840.28	21,840.28
	Natural Gas Generators (x2)	NEW	N/A	N/A	N/A	15.74	15.74
	Emergency Diesel Generator	NEW	N/A	N/A	N/A	1.06	1.06
	Platform B Cranes (x2)	NEW	N/A	N/A	N/A	0.97	0.97
	Firewater Pump Engine (Platform B)	NEW	N/A	N/A	N/A	0.21	0.21
	Primary Diesel Tank	NEW	N/A	N/A	N/A	0.01	0.01
	Surge Tank #1	NEW	N/A	N/A	N/A	3.73	3.73
	Firewater Pump Engine (Platform C)	NEW	N/A	N/A	N/A	0.21	0.21
	Total Fugitive Emissions	NEW	N/A	N/A	N/A	18.65	18.65
						21,880.87	**21,880.87**
						VOC Change:	**21,880.87**

CO_2e	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						CO_2e Change:	

* Unaffected emissions units are not required to be listed individually. By choosing not to list unaffected emissions units, the applicant asserts that all emissions units not listed in Table 24.A will <u>not</u> be modified or experience an increase in actual annual emissions as part of the proposed project.

24.B. Creditable Contemporaneous Changes

Contemporaneous Period: MM/DD/YYYY – MM/DD/YYYY

		A	B	C	D	E	F
Emission Point ID	**Description**	**Date of Modification**	**Pre-Project Allowables (TPY)**	**Baseline Actual Emissions (over 24-month period)**	**24-Month Period**	**Post-Project Potential to Emit (TPY)**	**Change**
$PM_{2.5}$							
						$PM_{2.5}$ Change:	
PM_{10}							
						PM_{10} Change:	
SO_2							
						SO_2 Change:	
NO_X							
						NO_X Change:	

24.B. Creditable Contemporaneous Changes

CO							
						CO Change:	

VOC							
						VOC Change:	

CO$_2$e							
						CO$_2$e Change:	

For each source identified as “New” or “Modified” in Section 24.A, complete the following table for each pollutant that will trigger NSR. If LAER is not required per LAC 33:III.504.D.3, indicate such.

24.C. BACT/LAER Summary

Refer to Section 5 of the Prevention of Significant Deterioration Air Construction Permit Application Volume 1 for the BACT analysis.

Emission Point ID	Pollutant	BACT/LAER	Limitation	Averaging Period	Description of Control Technology/Work Practice Standard(s)

24.D. PSD Air Quality Analyses Summary

		A	B	C	D	E	F	G	H	I
Pollutant	Averaging Period	Preliminary Screening Concentration (μg/m^3)	Level of Significant Impact (μg/m^3)	Significant Monitoring Concentration (μg/m^3)	Background (μg/m^3)	Maximum Modeled Concentration (μg/m^3)	Modeled + Background Concentration (μg/m^3)	NAAQS (μg/m^3)	Modeled PSD Increment Consumption (μg/m^3)	Allowable Class II PSD Increment (μg/m^3)
$PM_{2.5}$	24-hour		-	-				35		9
	Annual		-	-				12		4
PM_{10}	24-hour		5	10				150		30
	Annual		1	-				-		17
SO_2	1-hour		7.8	-				195		-
	3-hour		25	-				1300		512
	24-hour		5	13				365		91
	Annual		1	-				80		20
NO_X	1-hour		7.5	-				189		-
	Annual		1	14				100		25
CO	1-hour		2000	-				40,000	-	-
	8-hour		500	575				10,000	-	-
Lead	3-month		-	0.1				1.5	-	-

24.E Nonattainment New Source Review Offsets **[LAC 33:III.517.D.16, LAC 33:III.504.D.4 & 5]** ☒ **N/A**

Complete this section only if the proposed project triggers Nonattainment New Source Review (NNSR).
This project triggers NNSR review for: ☐ **NO_X** ☐ **VOC** ☐ **SO_2**

NO_X:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

VOC:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

SO_2:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

In order to expedite processing, please be sure the ERC Bank Application is completed properly. In the case of NO_X, the document should clearly differentiate between ozone season and non-ozone season actual emissions during the baseline period. Be sure to indicate if a portion of the reductions are no longer surplus (e.g., due to new or revised federal or state regulations, use in a netting analysis, etc.).

24.F. Economic Impact

Answer the following questions.

How many temporary jobs will be added as a result of this project? 1393

How many permanent jobs will be added as a result of this project? 28

24.G Notification of Federal Land Manager [LAC 33:III.504.E.1, LAC 33:III.509.P.1]

Complete this section only if the proposed project triggers NNSR or PSD.

a. Is the proposed facility or modification located within 100 kilometers of a Class I Area? ☐ **Yes** ☒ **No**

If Yes, determination of Q/d is not required; skip to the next question. If No, complete the Q/d equation below:

$$Q/d = \frac{PM_{10\,(NEI)} + SO_{2\,(NEI)} + NO_{X\,(NEI)} + H_2SO_{4\,(NEI)}}{\text{Class I km}}$$

where:

$PM_{10\,(NEI)}$ = net emissions increase of PM_{10}[1,2]

$SO_{2\,(NEI)}$ = net emissions increase of SO_2[1,2]

$NO_{X\,(NEI)}$ = net emissions increase of NO_X[1,2]

$H_2SO_{4\,(NEI)}$ = net emissions increase of H_2SO_4[1,2]

Class I km = distance to nearest Class I Area[3]

$$Q/d = \frac{\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_}{\_\_\_\_\_} = \_\_\_\_\_$$

Per Federal Land Manager guidance, Q values should reflect annual emissions (in tons per year, based on 24-hour maximum allowable emissions). If Q/d < 10, proceed to Section 25. If Q/d ≥ 10, complete the remainder of this Section.

b. Has the applicant provided a copy of the application to the Federal Land Manager? ☐ **Yes** ☒ **No**

c. Does the application contain modeling that demonstrates no adverse impact on Air Quality Related Values (AQRVs) in the Class I Area? ☐ **Yes** ☒ **No**

d. If Yes, indicate the model used: ☐ **VISCREEN** ☐ **PLUVUE II** ☐ **CALPUFF** ☐ **Other:**[4] ________

e. Has the Federal Land Manager concurred that the proposed project will not adversely impact any AQRVs?

☐ **Yes** ☒ **No** If Yes, please attach correspondence.

---

[1] If the net emissions increase of any pollutant is negative, enter "0."

[2] If the project did not trigger a netting analysis, use the project increase. In this case, the value will be less than the pollutant's significance level.

[3] In kilometers.

[4] Model must be approved by LDEQ and the Federal Land Manager.

25. Environmental Assessment Statement (EAS or "IT" Question Responses)

[La. R.S. 30:2018] ☒ **Yes** ☐ **No**

*** This section is required when applying for new Part 70 operating permits and/or major modifications. Any applications for these permit types that do not include answers to these questions will not be considered to be administratively complete. ***

For new Part 70 operating permits and/or major modifications, answers to these questions must be provided by the applicant to the local governmental authority and the designated public library at no additional costs to these entities. Consult instructions to determine what is considered to be a "local governmental authority" and a "designated public library." Indicate the name and address of the local governmental authority and the designated public library to which the answers to these questions were sent:

Name of Local Governing Authority			**Name of Designated Public Library**		
Street or P.O. Box			**Street or P.O. Box**		
City	**State**	**ZIP**	**City**	**State**	**ZIP**

Answer the following five questions on separate pages using full and complete answers. Include as many pages as necessary in order to provide full and complete answers. This information is required per Louisiana Revised Statutes 30:2018 (La. R.S. 30:2018).

Question 1: **Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?**

Yes, Blue Marlin Offshore Port, LLC (BMOP) will avoid adverse environmental effects to the maximum extent possible as described below.

As described in the Title V Application for this facility, all new source emissions of air pollutants will be in compliance with applicable Federal and State regulations. A detailed Best Available Control Technology (BACT) analysis has been conducted, and control technologies will be implemented for Facility operation. Details (including Potential to Emit [PTE] calculations, Prevention of Significant Deterioration [PSD] analysis, and air dispersion modeling) for air emission sources can be found within this application.

Question 2: **Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?**

The proposed project will provide the United States (U.S.) essential crude oil transportation and loading services for crude oil produced in the continental U.S. The proposed Project will enhance the country's global competitiveness, operational efficiency, and long-term economic viability.

Significant impacts to the environment are not expected due to the proposed Project. Additionally, as the part of the proposed project PSD permit application, BMOP has evaluated and proposed BACT (40 CFR 52 and LAC 33:III.509.J) limits for applicable emission units; thereby, further reducing any impacts to the environment.

Question 3: **Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits?**

There are no viable alternative projects identified that would offer more environmental protection. With the appropriate BACT implemented, this facility and project will be protective of the environment.

Question 4: **Are there alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?**

The DWP will be located approximately eighty two (82) statute miles from the nearest point on the Louisiana coastline (99 statute miles of offshore pipe). This location was specifically chosen to meet the purpose of the project and have the capability to fully load Very Large Crude Carriers (VLCCs) with minimal total impacts, as both the offshore pipeline and the offshore facility at WC 509 are existing. There are no identified alternative sites which would offer more protection to the environment.

Question 5: **Are there mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits?**

For the proposed Project, BACT controls will be implemented. The BACT control level cannot be less stringent than the controls required under any applicable federal New Source Performance Standard (NSPS) or National Emission Standard for Hazardous Air Pollutants (NESHAP). Furthermore, BMOP has completed a detailed evaluation of additional control technologies, and have selected the top performing feasible control as BACT. No other feasible control option offer more protection to the environment.

PART 70 OPERATING PERMIT APPLICATION COMPLETENESS CHECKLIST

Instructions: Complete this checklist and submit with the completed air permit application.

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
517.A Timely Submittal	Was a Copy of the Application Also Submitted to EPA?	X			
517.B.1,2 Certification	Does the Application include a Certification by a Responsible Official?	X			AAE – Section 10
517.B.3 Certification	Does the Application Include Certification by a Professional Engineer or their Designee:	X			AAE – Section 10
517.D.1 Identifying Information	Does the Application Include:				
	1. Company Name, Physical and Mailing Address of Facility?	X			AAE – Section 1, 2
	2. Map showing Location of the Facility?	X			Appendix A
	3. Owner and Operator Names and Agent?	X			AAE – Section 1
	4. Name and Telephone Number of Plant Manager or Contact?	X			AAE – Section 11
517.D.2 SIC Codes, Source Categories	Does the Application Include a Description of the Source's Processes and Products?	X			Introduction
	Does the Application Include the Source's SIC Code?	X			AAE – Section 5
	Does the Application Include EPA Source Category of HAPs if applicable?			X	
517.D.3,6 EIQ Sheets	Has an EIQ Sheet been Completed for each Emission Point whether an Area or Point Source?	X			AAE – Section 23
517.D.4 Monitoring Devices	Does the Application Include Identification and Description of Compliance Monitoring Devices or Activities?	X			AAE – Section 22
517.D.5 Revisions and Modifications Only	For Revisions or Modifications, Does the Application include a Description of the Proposed Change and any Resulting Change in Emissions?			X	
517.D.7 General Information	Does the Application Include Information Regarding Fuels, Fuel Use, Raw Materials, Production Rates, and Operating Schedules as necessary to substantiate emission rates?	X			AAE Section 23 & Appendix B
517 D.8 Operating Limitations	Has Information Regarding any Limitations on Source Operation or any Applicable Work Practice Standards been Identified?	X			AAE Section 23
517.D.9 Calculations	Are Emission Calculations Provided?	X			Appendix B
517.D.10 Regulatory Review	Does the Application Include a Citation and Description of Applicable Louisiana and Federal Air Quality Requirements and Standards?	X			AAE – Section 22

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
517.D.11 Test Methods	Has a Description of or a Reference to Applicable Test Methods Used to Determine Compliance with Standards been Provided?			X	
517.D.12 Major Sources of TAPs	Does the Application include Information Regarding the Compliance History of Sources Owned or Operated by the Applicant (per LAC 33.III.5111)?			X	
517.D.13 Major Sources of TAPs	Does the Application include a Demonstration to show that the Source Meets all Applicable MACT and Ambient Air Standard Requirements?	X			See PSD Air Construction Permit Application Volume 2
517.D.14 PSD Sources Only	If Required by DEQ, Does the Application Include Information Regarding the Ambient Air Impact for Criteria Pollutants as Required for the Source Impact Analysis per LAC 33:III.509.K, L, and M?	X			See PSD Air Construction Permit Application Volume 2
517 D.15 PSD Sources Only	If Required by DEQ, Does the Application Include a Detailed Ambient Air Analysis?	X			See PSD Air Construction Permit Application Volume 2
517.D.16, 18	Has any Additional Information been Provided?	X			Introduction
517.D.17 Fees	Has the Fee Code been Identified?	X			AAE – Section 5
	Is the Applicable Fee Included with the Application?	X			See Cover Letter
517.E.1 Additional Part 70 Requirements	Does the Certification Statement Include a Description of the Compliance Status of Each Emission Point in the Source with All Applicable Requirements?	X			AAE – Section 10
517E.2 Additional Part 70 Requirements	Does the Certification Statement Include a Statement that the Source will continue to Comply with All Applicable Requirements with which the Source is in Compliance?	X			AAE – Section 10
517.E.3 Additional Part 70 Requirements	Does the Certification Statement Include a Statement that the Source will, on a timely basis, meet All Applicable Requirements that will Become Effective During the Permit Term?	X			AAE – Section 10
517.E.4 Additional Part 70 Requirements	Are there Applicable Requirements for which the Source is not in Compliance at the Time of Submittal?		X		
	Does the Application include a Compliance Plan Schedule?			X	
	Does the Schedule Include Milestone Dates for which Significant Actions will occur?			X	
	Does the Schedule Include Submittal Dates for Certified Progress Reports?			X	
517.E.5 Additional Part 70 Requirements Acid Rain	Is this Source Covered by the Federal Acid Rain Program?		X		

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
	Are the Requirements of LAC 33.III.517.E 1-4 included in the Acid Rain Portion of the Compliance Plan?			X	
517.E.6 Additional Part 70 Requirements	Have any Exemptions from any Applicable Requirements been Requested?	X			AAE – Section 22
	Is the List and explanations Provided?	X			AAE – Section 22
517.E.7 Additional Part 70 Requirements	Does the Application Include a Request for a Permit Shield?		X		
	Does the Request List those Federally Applicable Requirements for which the Shield is Requested along with the Corresponding Draft Permit Terms and conditions which are Proposed to Maintain Compliance?			X	
517.E.8 Additional Part 70 Requirements	Does the Application Identify and Reasonably Anticipated Alternative Operating Scenarios?			X	
	Does the Application include Sufficient Information to Develop permit Terms and Conditions for Each Scenario, Including Source Process and Emissions Data?			X	
517.F Confidentiality	Does the Application Include a Request for Non-Disclosure (Confidentiality)?	X			AAE – Section 3
525.B. Minor Permit Modifications	Does the Application Include a Listing of New Requirements Resulting for the Change?			X	
	Does the Application Include Certification by the Responsible Official that the Proposed Action Fits the Definition of a Minor Modification as per LAC 33:III.525.A.			X	
	Does the Certification also Request that Minor Modification Procedures be Used?			X	
	Does the Application, for Part 70 Sources, Include the Owner's Suggested Draft Permit and Completed Forms for the Permitting Authority to Use to Notify Affected States?			X	
La. R.S. 30:2018 – PSD/NNSR only	Has a copy of the answers to the questions posed in the Environmental Assessment Statement (Section 25) been sent to the local governing authority at no cost to the local governing authority?	X			
	Has a copy of the answers to the questions posed in the Environmental Assessment Statement (Section 25) been sent to the designated public library at no cost to the designated public library?	X			

APPENDIX C. DETAILED EMISSIONS CALCULATIONS

WC509 Potential Emissions Calculations

- WC509 Platform Summary
- Platform Natural Gas Generators
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform Diesel Generators
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform B Cranes
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform Firewater Pumps
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Stationary Tank Emissions
  - Total VOC and Total HAP Losses
  - Individual HAP Losses
- Fugitive Emissions
- Loading Operations
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions

BMOP - Deepwater Port WC509 platform

WC509 Platform Summary

	NO_X (tpy)	CO (tpy)	VOC (tpy)	SO_2 (tpy)	PM Filterable (tpy)	PM_{10}[1] (tpy)	$PM_{2.5}$[1] (tpy)	H_2S (tpy)	H_2SO_4 (tpy)	HAPs (tpy)	CO_2e (tpy)
Marine Loading											
Crude Oil Loading	--	--	21,840	--	--	--	--	9.49	--	1,224	--
Platform A Sources											
Aviation Fuel Tank	--	--	5.12E-04	--	--	--	--	--	--	7.65E-05	--
Platform B Sources											
Natural Gas Generators (x2)	22.48	44.96	15.74	0.05	6.14E-03	0.80	0.80	--	2.34E-03	4.22	12,871
Emergency Diesel Generator	1.06	0.58	1.06	0.07	0.03	0.04	0.04	--	2.23E-03	1.11E-03	115.2
Platform B Cranes (x2)	2.05	11.97	0.97	1.48	0.10	0.21	0.21	--	0.05	0.06	2,383
Platform B Cranes Diesel Tank #1	--	--	1.93E-03	--	--	--	--	--	--	2.65E-04	--
Platform B Cranes Diesel Tank #2	--	--	1.93E-03	--	--	--	--	--	--	2.65E-04	--
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	0.01	--	7.22E-04	3.58E-04	37.22
Primary Diesel Tank	--	--	8.51E-03	--	--	--	--	--	--	1.17E-03	--
Surge Tank #1	--	--	3.73	--	--	--	--	--	--	0.07	--
Platform C Sources											
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	0.01	--	7.22E-04	3.58E-04	37.22
Fugitive Sources											
Total Fugitive Emissions	--	--	18.65	--	--	--	--	4.89E-03	--	1.91	1,060
Total	26.02	57.88	21,881	1.64	0.16	1.07	1.07	9.50	0.05	1,230	16,503

[1] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emission

BMOP - Deepwater Port WC509 platform

Platform Natural Gas Generators

Engine Rating [1]	=	1,736	kW
	=	2,328	HP
Total Operating Time [1]	=	8,760	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1 engine at any one time	
Fuel Type [1]	=	Natural Gas, 4-Stroke Lean Burn	
Average Brake-Specific Fuel Consumption [2]	=	17,820	scf/hr
Average Higher Heating Value (HHV) [4]	=	1,020	Btu/scf
Average Heat Input Rate	=	18.18	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
$PM_{10,\text{ Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
$PM_{2.5,\text{ Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
PM $_{\text{Condensable}}$	AP-42	[4]	9.91E-03	lb/MMBtu	0.18	0.79
NO_x	EPA	[3]	1.00	g/HP-hr	5.13	22.48
SO_2	AP-42	[4]	5.88E-04	lb/MMBtu	0.01	0.05
CO	EPA	[3]	2.00	g/HP-hr	10.26	44.96
VOC	EPA	[3]	0.70	g/HP-hr	3.59	15.74
H_2SO_4	Conversion	[5]	5.00	% of SO_2	5.34E-04	2.34E-03

[1] Based on current project design specifications, provided by BMOP. The BMOP Platform complex will operate 2 engines, however, only one will be operating at any given time.

[2] Per Manufacturer Specification sheet for a Caterpillar G3516C (based on 100% load).

[3] Per Table 1 of NSPS Subpart JJJJ

[4] Emission factors are based on AP-42 Chapter 3, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines (July 2000). Assume filterable PM = PM_{10} = $PM_{2.5}$.

[5] Assumes 5% of SO_2 emissions are converted to H_2SO_4.

BMOP - Deepwater Port WC509 platform

Platform Natural Gas Generators

Hazardous Air Pollutants

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions	Annual Emissions
		Value	Units	(lb/hr)	(tons/yr)
Acenaphthene	AP-42 [6]	1.25E-06	lb/MMBtu	2.27E-05	9.95E-05
Acenaphthylene	AP-42 [6]	5.53E-06	lb/MMBtu	1.01E-04	4.40E-04
Acetaldehyde	AP-42 [6]	8.36E-03	lb/MMBtu	0.15	0.67
Acrolein	AP-42 [6]	5.14E-03	lb/MMBtu	0.09	0.41
Benzene	AP-42 [6]	4.40E-04	lb/MMBtu	8.00E-03	0.04
Benzo(b)fluoranthene	AP-42 [6]	1.66E-07	lb/MMBtu	3.02E-06	1.32E-05
Benzo(e)pyrene	AP-42 [6]	4.15E-07	lb/MMBtu	7.54E-06	3.30E-05
Beno(g,h,i)perylene	AP-42 [6]	4.14E-07	lb/MMBtu	7.53E-06	3.30E-05
Biphenyl	AP-42 [6]	2.12E-04	lb/MMBtu	3.85E-03	0.02
Butadiene (1,3-)	AP-42 [6]	2.67E-04	lb/MMBtu	4.85E-03	0.02
Carbon Tetrachloride	AP-42 [6]	3.67E-05	lb/MMBtu	6.67E-04	2.92E-03
Chlorobenzene	AP-42 [6]	3.04E-05	lb/MMBtu	5.53E-04	2.42E-03
Chloroform	AP-42 [6]	2.85E-05	lb/MMBtu	5.18E-04	2.27E-03
Chrysene	AP-42 [6]	6.93E-07	lb/MMBtu	1.26E-05	5.52E-05
Dichloropropene (1,3-)	AP-42 [6]	2.64E-05	lb/MMBtu	4.80E-04	2.10E-03
Ethylbenzene	AP-42 [6]	3.97E-05	lb/MMBtu	7.22E-04	3.16E-03
Ethylene Dibromide	AP-42 [6]	4.43E-05	lb/MMBtu	8.05E-04	3.53E-03
Fluoranthene	AP-42 [6]	1.11E-06	lb/MMBtu	2.02E-05	8.84E-05
Fluorene	AP-42 [6]	5.67E-06	lb/MMBtu	1.03E-04	4.51E-04
Formaldehyde	ZZZZ [7]	14	ppmvd	0.61	2.67
Methanol	AP-42 [6]	2.50E-03	lb/MMBtu	0.05	0.20
Methylene Chloride	AP-42 [6]	2.00E-05	lb/MMBtu	3.64E-04	1.59E-03
Methylnaphthalene (2-)	AP-42 [6]	3.32E-05	lb/MMBtu	6.03E-04	2.64E-03
n-Hexane	AP-42 [6]	1.11E-03	lb/MMBtu	0.02	0.09
Naphthalene	AP-42 [6]	7.44E-05	lb/MMBtu	1.35E-03	5.92E-03
PAH	AP-42 [6]	2.69E-05	lb/MMBtu	4.89E-04	2.14E-03
Phenanthrene	AP-42 [6]	1.04E-05	lb/MMBtu	1.89E-04	8.28E-04
Phenol	AP-42 [6]	2.40E-05	lb/MMBtu	4.36E-04	1.91E-03
Pyrene	AP-42 [6]	1.36E-06	lb/MMBtu	2.47E-05	1.08E-04
Styrene	AP-42 [6]	2.36E-05	lb/MMBtu	4.29E-04	1.88E-03
Tetrachloroethane	AP-42 [6]	2.48E-06	lb/MMBtu	4.51E-05	1.97E-04
Toluene	AP-42 [6]	4.08E-04	lb/MMBtu	7.42E-03	0.03
Tetrachloroethane (1,1,2,2-)	AP-42 [6]	4.00E-05	lb/MMBtu	7.27E-04	3.18E-03
Trichloroethane (1,1,2-)	AP-42 [6]	3.18E-05	lb/MMBtu	5.78E-04	2.53E-03
Trimethylpentane (2,2,4-)	AP-42 [6]	2.50E-04	lb/MMBtu	4.54E-03	0.02
Vinyl Chloride	AP-42 [6]	1.49E-05	lb/MMBtu	2.71E-04	1.19E-03
Xylene	AP-42 [6]	1.84E-04	lb/MMBtu	3.34E-03	0.01
Total VOC HAPs				**0.96**	**4.22**

[6] Emission factors are based on AP-42 Chapter 3, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines (July 2000).

[7] Per Table 2a of 40 CFR 63 Subpart ZZZZ, subject 4SLB engines may comply with 14 ppmvd HCHO at 15% O2.

Greenhouse Gases

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions	Annual Emissions
		Value	Units	(lb/hr)	(tons/yr)
CO_2	Manuf. Spec. [8]	617	g/kW-hr	2,361	10,343
CH_4	Manuf. Spec. [8]	6.02	g/kW-hr	23.04	100.9
N_2O	EPA [9]	1.00E-04	kg/MMBtu	4.01E-03	0.02
CO_2e	EPA [10]	--	--	**2,939**	**12,871**

[8] Per Manufacturer Specification sheet for a Caterpillar G3516C (based on 100% load).

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for natural gas was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

BMOP - Deepwater Port WC509 platform

Platform Diesel Generators

Engine Rating [1]	=	1,500	kW
	=	2,012	HP
Total Operating Time [1]	=	100	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	14.08	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
$PM_{10,\ \text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
$PM_{2.5,\ \text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
PM $_{\text{Condensable}}$	AP-42	[2]	5.39E-05	lb/HP-hr	0.11	5.42E-03
NO_x	EPA	[3]	6.40	g/kW-hr	21.17	1.06
SO_2	Fuel S Content	[4]	7.11E-04	lb/HP-hr	1.43	0.07
CO	EPA	[3]	3.50	g/kW-hr	11.58	0.58
VOC	EPA	[3]	6.40	g/kW-hr	21.17	1.06
H_2SO_4	Fuel S Content	[4]	2.22E-05	lb/HP-hr	0.04	2.23E-03

[1] Based on current project design specifications, provided by BMOP.

[2] Emission factors are based on AP-42 Chapter 3, Tables 3.4-1 and 2, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996). An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr.

[3] Per 40 CFR 60.4205(b) and Table 1 of 40 CFR 89.112. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit. Conservatively assume that filterable $PM=PM_{10}=PM_{2.5}$.

[4] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

[5] Per footnote f of AP-42 Chapter 3, Table 3.4-1, non methane VOC emission factor has calculated as 91% of TOC emission factor.

BMOP - Deepwater Port WC509 platform

Platform Diesel Generators

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42	[6], [7]	2.52E-05	lb/MMBtu	3.55E-04	1.77E-05
Acrolein	AP-42	[6], [7]	7.88E-06	lb/MMBtu	1.11E-04	5.55E-06
Benzene	AP-42	[6], [7]	7.76E-04	lb/MMBtu	1.09E-02	5.46E-04
Formaldehyde	AP-42	[6], [7]	7.89E-05	lb/MMBtu	1.11E-03	5.56E-05
Toluene	AP-42	[6], [7]	2.81E-04	lb/MMBtu	3.96E-03	1.98E-04
Xylenes	AP-42	[6], [7]	1.93E-04	lb/MMBtu	2.72E-03	1.36E-04
Total PAH	AP-42	[6], [7]	2.12E-04	lb/MMBtu	2.99E-03	1.49E-04
Total VOC HAPs					**2.22E-02**	**1.11E-03**

[6] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[7] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
CO_2	EPA	[8], [11]	73.96	kg/MMBtu	2,296	114.8
CH_4	EPA	[9], [11]	3.00E-03	kg/MMBtu	9.31E-02	0.00
N_2O	EPA	[9], [11]	6.00E-04	kg/MMBtu	1.86E-02	0.00
CO_2e	EPA	[10]	--	--	**2,304**	**115.2**

[8] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[11] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform

Platform B Cranes

Engine Rating [1]	=	354	kW
	=	475	HP
Total Operating Time [1]	=	4,380	hrs/yr
Operating load [1]	=	100%	
Total number Gen Sets [1]	=	2	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	3.33	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
			Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
$PM_{10, \text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
$PM_{2.5, \text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
PM $_{\text{Condensable}}$	AP-42	[5]	5.39E-05	lb/HP-hr	2.56E-02	5.61E-02	0.05	0.11
NO_x	EPA	[3]	0.60	g/kW-hr	0.47	1.03	0.94	2.05
SO_2	Fuel S Content	[6]	7.11E-04	lb/HP-hr	0.34	0.74	0.68	1.48
CO	EPA	[3]	3.5	g/kW-hr	2.73	5.99	5.47	11.97
VOC	EPA	[3]	0.285	g/kW-hr	0.22	0.49	0.45	0.97
H_2SO_4	Fuel S Content	[6]	2.22E-05	lb/HP-hr	1.06E-02	2.31E-02	2.11E-02	4.62E-02

[1] Based on current project design specifications, provided by BMOP.

[2] Based on AP-42 Chapter 3, Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines (October 1996).

[3] Per 40 CFR 60.4204(b) and Table 1 of 40 CFR 1039.101. Per 40 CFR 1039.101(e), emissions of PM, NO_X, and VOC are multiplied by the appropriate NTE multiplier.

[4] Conservatively assumed PM_{10}=$PM_{2.5}$.

[5] Conservatively based on AP-42 Chapter 3, Table 3.4-1, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996).

[6] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

BMOP - Deepwater Port WC509 platform

Platform B Cranes

Hazardous Air Pollutants

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions from 1 Engine (lb/hr)	Annual Emissions from 1 Engine (tons/yr)	Hourly Emissions from All Engines (lb/hr)	Annual Emissions from All Engines (tons/yr)
		Value	Units				
Acetaldehyde	AP-42 [7], [8]	7.67E-04	lb/MMBtu	2.55E-03	5.59E-03	5.10E-03	1.12E-02
Acrolein	AP-42 [7], [8]	9.25E-05	lb/MMBtu	3.08E-04	6.74E-04	6.15E-04	1.35E-03
Benzene	AP-42 [7], [8]	9.33E-04	lb/MMBtu	3.10E-03	6.79E-03	6.20E-03	1.36E-02
1,3-Butadiene	AP-42 [7], [8]	3.91E-05	lb/MMBtu	1.30E-04	2.85E-04	2.60E-04	5.69E-04
Formaldehyde	AP-42 [7], [8]	1.18E-03	lb/MMBtu	3.92E-03	8.59E-03	7.85E-03	1.72E-02
Toluene	AP-42 [7], [8]	4.09E-04	lb/MMBtu	1.36E-03	2.98E-03	2.72E-03	5.96E-03
Xylenes	AP-42 [7], [8]	2.85E-04	lb/MMBtu	9.48E-04	2.08E-03	1.90E-03	4.15E-03
Total PAH	AP-42 [7], [8]	1.68E-04	lb/MMBtu	5.59E-04	1.22E-03	1.12E-03	2.45E-03
Total VOC HAPs				**1.29E-02**	**2.82E-02**	**2.58E-02**	**5.64E-02**

[7] Emission factors based on AP-42, Chapter 3, Table 3.3-2, Speciated Organic Compound Emission Factors for Uncontrolled Stationary Diesel Engines (October 1996).

[8] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions from 1 Engine (lb/hr)	Annual Emissions from 1 Engine (tons/yr)	Hourly Emissions from All Engines (lb/hr)	Annual Emissions from All Engines (tons/yr)
		Value	Units				
CO_2	EPA [9], [12]	73.96	kg/MMBtu	542.2	1,187.3	1,084.3	2,375
CH_4	EPA [10], [12]	3.00E-03	kg/MMBtu	2.20E-02	4.82E-02	4.40E-02	9.63E-02
N_2O	EPA [10], [12]	6.00E-04	kg/MMBtu	4.40E-03	9.63E-03	8.80E-03	1.93E-02
CO_2e	EPA [11]	--	--	**544.0**	**1,191.4**	**1,088.0**	**2,383**

[9] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[10] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[11] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[12] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform

Platform Firewater Pumps

Engine Rating [1]	=	485	kW
	=	650	HP
Total Operating Time [1]	=	100	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	2	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	4.55	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
			Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
PM_{10}, $_{\text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
$PM_{2.5, \text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
PM $_{\text{Condensable}}$	AP-42	[5]	5.39E-05	lb/HP-hr	3.50E-02	1.75E-03	0.07	3.50E-03
NO_x	EPA	[3]	3.00	g/HP-hr	4.30	0.21	8.60	0.43
SO_2	Fuel S Content	[6]	7.11E-04	lb/HP-hr	0.46	0.02	0.92	0.05
CO	EPA	[3]	2.60	g/HP-hr	3.73	0.19	7.45	0.37
VOC	EPA	[3]	3.00	g/HP-hr	4.30	0.21	8.60	0.43
H_2SO_4	Fuel S Content	[6]	2.22E-05	lb/HP-hr	1.44E-02	7.22E-04	2.89E-02	1.44E-03

[1] Based on current project design specifications, provided by BMOP.

[2] Based on AP-42 Chapter 3, Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines (October 1996).

[3] Per 40 CFR 60.4205(c) and Table 4 of NSPS Subpart IIII. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit.

[4] Conservatively assumed PM_{10}=$PM_{2.5}$.

[5] Conservatively based on AP-42 Chapter 3, Table 3.4-1, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996).

[6] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

BMOP - Deepwater Port WC509 platform
Platform Firewater Pumps

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine (lb/hr)	Annual Emissions from 1 Engine (tons/yr)	Hourly Emissions from All Engines (lb/hr)	Annual Emissions from All Engines (tons/yr)
			Value	Units				
Acetaldehyde	AP-42	[7], [8]	2.52E-05	lb/MMBtu	1.15E-04	5.73E-06	2.29E-04	1.15E-05
Acrolein	AP-42	[7], [8]	7.88E-06	lb/MMBtu	3.59E-05	1.79E-06	7.17E-05	3.59E-06
Benzene	AP-42	[7], [8]	7.76E-04	lb/MMBtu	3.53E-03	1.77E-04	7.06E-03	3.53E-04
Formaldehyde	AP-42	[7], [8]	7.89E-05	lb/MMBtu	3.59E-04	1.79E-05	7.18E-04	3.59E-05
Toluene	AP-42	[7], [8]	2.81E-04	lb/MMBtu	1.28E-03	6.39E-05	2.56E-03	1.28E-04
Xylenes	AP-42	[7], [8]	1.93E-04	lb/MMBtu	8.78E-04	4.39E-05	1.76E-03	8.78E-05
Total PAH	AP-42	[7], [8]	2.12E-04	lb/MMBtu	9.65E-04	4.82E-05	1.93E-03	9.65E-05
Total VOC HAPs					**7.16E-03**	**3.58E-04**	**1.43E-02**	**7.16E-04**

[7] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[8] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine (lb/hr)	Annual Emissions from 1 Engine (tons/yr)	Hourly Emissions from All Engines (lb/hr)	Annual Emissions from All Engines (tons/yr)
			Value	Units				
CO_2	EPA	[9], [12]	73.96	kg/MMBtu	741.9	37.09	1,483.8	74.19
CH_4	EPA	[10], [12]	3.00E-03	kg/MMBtu	3.01E-02	1.50E-03	6.02E-02	3.01E-03
N_2O	EPA	[10], [12]	6.00E-04	kg/MMBtu	6.02E-03	3.01E-04	1.20E-02	6.02E-04
CO_2e	EPA	[11]	--	--	**744.4**	**37.22**	**1,488.88**	**74.44**

[9] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[10] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[11] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[12] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform
Stationary Tank Emissions - Total VOC and Total HAP Losses

Platform	Tank ID	Roof Type	Standing Losses (tpy)	Working Losses (tpy)	Total VOC Losses (tpy)	Total HAP Losses (tpy)
WC509	Aviation Fuel Storage[1]	Horizontal Tank	2.90E-04	2.22E-04	5.12E-04	7.65E-05
	Crane Diesel Tank No. 1[2]	FRT (no floating roof)	4.14E-04	1.52E-03	1.93E-03	2.65E-04
	Crane Diesel Tank No. 2[2]	FRT (no floating roof)	4.14E-04	1.52E-03	1.93E-03	2.65E-04
	Primary Diesel Storage Tank[2]	Horizontal Tank	2.23E-03	6.28E-03	0.01	1.17E-03
	Surge Tank	Horizontal Tank	3.57	0.17	3.73	0.07
				Totals:	**3.74**	**0.07**

[1] TankESP default Jet Kerosene is used as a product for this tank.

[2] TankESP default Diesel stock is used as product for this tank.

BMOP - Deepwater Port WC509 platform
Stationary Tank Emissions - Individual HAP Losses

Platform	Tank ID	HAP Emissions (lb/yr)										
		Benzo(g,h,i)perylene	Biphenyl	Cumene	Cyclohexane	Ethylcyclohexane	Hexanol (1)	Neopentane {dimethylpropane (2,2)}	Pentane (n-)	Toluene diisocyanate	Trimethylbenzene (1,3,5)	Xylene (m-)
WC509	Aviation Fuel Storage[1]	0.0069	2.41E-16	-	-	0.0207	0.0139	3.31E-04	3.58E-14	0.0670	-	0.0442
	Crane Diesel Tank No. 1[2]	0.0077	2.95E-15	-	-	0.0118	0.0016	1.74E-03	6.41E-13	0.0898	0.1876	0.2303
	Crane Diesel Tank No. 2[2]	0.0077	2.95E-15	-	-	0.0118	0.0016	1.74E-03	6.41E-13	0.0898	0.1876	0.2303
	Primary Diesel Storage Tank[2]	0.0339	1.33E-14	-	-	0.0521	0.0068	7.69E-03	2.88E-12	0.3949	0.8273	1.0140
	Surge Tank	3.32E+01	9.34E-15	0.25	39.81	2.13	35.46	0.01	9.94E-12	16.28	0.37	6.53
		33.28	**2.87E-14**			**2.23**	**35.48**	**1.66E-02**	**1.41E-11**	**16.92**	**1.57**	**8.05**

[1] TankESP default Jet Kerosene is used as a product for this tank.

[2] TankESP default Diesel stock is used as product for this tank.

BMOP - Deepwater Port WC509 platform
Fugitive Emissions

					Equipment Counts															
Source	Contents	Representative Contents	Platform	Service	Valves	Flanges/Connectors	Pumps	Vapor/Gas Relief Valves	Compressors	Process Drains	Sampling Connections	Total VOC[1] (lb/hr)	Total VOC[2] (tpy)	Total HAP[3] (lb/hr)	Total HAP[2] (tpy)	Total H_2S[4] (lb/hr)	Total H_2S[2,4] (tpy)	Total CO_2e[5] (lb/hr)	Total CO_2e[2] (tpy)
Gas Inlet Scrubber No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 3	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 4	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Condensate Pump No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 3	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 4	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Pig Launcher (Gas Export)	Natural Gas	Natural Gas	509A	Gas/Vapor	63	126	0	0	0	8	8	0.13	0.58	0.01	0.06	0	0	33.84	148.21
Pig Receiver (Oil Import)	Crude Oil	Crude Oil	509B	Light Liquid	9	17	0	0	0	4	0	0.10	0.45	5.82E-03	0.03	1.34E-03	1.98E-04	0	0
Oil Meter Skid	Crude oil	Crude Oil	509B	Light Liquid	52	105	0	0	0	6	1	0.57	2.50	0.03	0.14	7.39E-03	1.09E-03	0	0
Meter Prover Skid	Crude Oil	Crude Oil	509B	Light Liquid	8	16	0	0	0	1	0	0.08	0.36	4.65E-03	0.02	1.07E-03	1.58E-04	0	0
Pig Launcher No. 1 (Export to VLCC)	Crude Oil	Crude Oil	509B	Light Liquid	18	34	0	0	0	8	0	0.21	0.91	0.01	0.05	2.69E-03	3.95E-04	0	0
Pig Launcher No. 2 (Export to VLCC)	Crude Oil	Crude Oil	509B	Light Liquid	18	34	0	0	0	8	0	0.21	0.91	0.01	0.05	2.69E-03	3.95E-04	0	0
CALM Buoy #1	Crude Oil	Crude Oil	--	Light Liquid	20	50	0	0	0	0	0	0.20	0.89	0.01	0.05	2.63E-03	3.87E-04	0	0
CALM Buoy #2	Crude Oil	Crude Oil	--	Light Liquid	20	50	0	0	0	0	0	0.20	0.89	0.01	0.05	2.63E-03	3.87E-04	0	0
Surge Relief Valve Skid	Crude Oil	Crude Oil	509B	Light Liquid	20	18	0	0	0	2	0	0.19	0.85	0.01	0.05	2.52E-03	3.71E-04	0	0
Surge Tank	Crude Oil	Crude Oil	509B	Light Liquid	12	22	2	0	0	1	0	0.21	0.92	0.01	0.05	2.71E-03	3.99E-04	0	0
Surge Tank Pump No. 1	Crude Oil	Crude Oil	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	2.43E-03	0.01	5.61E-04	8.26E-05	0	0
Surge Tank Pump No. 2	Crude Oil	Crude Oil	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	2.43E-03	0.01	5.61E-04	8.26E-05	0	0
Sump System No. 1	Crude Oil	Crude Oil	509B	Light Liquid	15	32	2	0	0	3	0	0.25	1.09	0.01	0.06	3.22E-03	4.74E-04	0	0
Sump System No. 2	Crude Oil	Crude Oil	509C	Light Liquid	15	32	2	0	0	3	0	0.25	1.09	0.01	0.06	3.22E-03	4.74E-04	0	0
Firewater Pump No. 1	Diesel Fuel	Diesel Fuel	509B	Light Liquid	5	6	0	0	0	1	0	0.05	0.22	7.04E-03	0.03	0	0	0	0
Firewater Pump No. 2	Diesel Fuel	Diesel Fuel	509C	Light Liquid	5	6	0	0	0	1	0	0.05	0.22	7.04E-03	0.03	0	0	0	0
Air Compressor No. 1	Lubricating Oil	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Air Compressor No. 2	Lubricating Oil	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Platform Crane No. 1	Diesel Fuel	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Platform Crane No. 2	Diesel Fuel	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Diesel Transfer Skid	Diesel Fuel	Diesel Fuel	509B	Light Liquid	18	30	2	0	0	1	0	0.27	1.17	0.04	0.16	0	0	0	0
Gas Generator No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	10	11	0	0	0	2	0	0.01	0.07	1.47E-03	6.44E-03	0	0	3.82	16.72
Gas Generator No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	10	11	0	0	0	2	0	0.01	0.07	1.47E-03	6.44E-03	0	0	3.82	16.72
Emergency Diesel Generator	Diesel Fuel	Diesel Fuel	509B	Gas/Vapor	5	6	0	0	0	1	0	0.09	0.41	0.01	0.06	0	0	0	0
Knockout System	Natural Gas	Natural Gas	509B	Gas/Vapor	30	40	0	2	0	2	0	0.08	0.36	8.20E-03	0.04	0	0	21.30	93.30
Fuel Gas Skid	Natural Gas	Natural Gas	509B	Gas/Vapor	68	81	0	6	0	13	5	0.23	1.00	0.02	0.10	0	0	58.66	256.92
Aviation Refueling	Aviation Fuel	Aviation Fuel	509A	Light Liquid	6	20	1	0	0	1	0	0.11	0.49	0.11	0.49	0	0	0	0
Total												4.26	18.65	0.44	1.91	0.03	4.89E-03	241.95	1059.75

[1] Emission factors based on EPA's Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017
https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf

[2] Based on continous operation (e.g. 8,760 hours per year).

[3] HAP emissions are based on the speciation of:
- Natural Gas Composition and Properties based on an April 13, 2020 sample at WC509.
- Diesel fuel HAP content consistent with tank emissions speciation.
- Crude Oil speciation per the maximum mass %, vapor values calculated for crude oil loading emissions.

[4] H2S emissions are calculated based on the mass balance and liquid H2S parition factors from the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93.
Short-term and annual H2S values are based on the values used to calculate crude oil loading emissions.

[5] CO2 and CH4 speciation of natural gas based on an April 13, 2020 sample at WC509.
CH4 and CO2 CO2e, weighted according to their global warming potential (GWP).
The GWP was obtained from table A-1 to Subpart A of Part 98.

BMOP - Deepwater Port WC509 platform

Loading Operations

Maximum Hourly Loading Rate [1] = 80,000 bbl/hr
= 3,360 1,000 gal/hr

Maximum Annual Loading Rate [1] = 700,800,000 bbl/yr
= 29,433,600 1,000 gal/yr

Crude Oil Loading Specifications		Maximum	Annual	
Arrival Emission Factor [2]	=	0.86	0.86	
Loading Temperature [1]	=	550	532	°R
Vapor Molecular Weight [1]	=	50	50	lb/lbmol
Crude Oil Liquid Molecular Weight [1]	=	207	207	lb/lbmol
True Vapor Pressure [1]	=	10.99	9.00	psia
Liquid H_2S Partition [3]	=	25	21	
H2S Molecular Weight	=	34.1	34.1	lb/lbmol

Criteria Pollutants

Pollutant	Emission Factor Basis	Hourly Emission Factor		Annual Emission Factor		Hourly Loading Emission	Annual Loading Emission
		Value	Units	Value	Units	(lb/hr)	(tons/yr)
VOC	AP-42 [2]	1.61	lb/1,000 gal	1.48	lb/1,000 gal	5,422	21,840
H_2S	Site Specific [3], [4]	125	ppmw	5	ppmw	70.15	9.49

[1] Based on current project design specifications, provided by BMOP. Molecular weight referenced from AP-42, Chapter 7, Table 7.1-2.

[2] Per AP-42, Table 5.2-3 for crude oil loading into ships (uncleaned). Total loading loss based on AP-42, Section 5.2 Equations 2 and 3 (06/08).

[3] Mass balance based and liquid H_2S partion factors from the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93. Short-term H2S concentration from Nederland permit basis.

[4] Annual mass H2S emissions calculated from a conservative assumption of 5 ppmw. The average of all samples from Nederland (>3000 samples) is 1.31 ppmw.

BMOP - Deepwater Port WC509 platform

Loading Operations

Hazardous Air Pollutants

Crude Oil HAP Speciation (%)[5]			99% UPL[6]	99% UPL[7]	Nederland Basis[8]	Maximum HAP[9]	Hourly Emissions[10]	Annual Emissions
HAP	**Mass %, liquid**	**Mass %, vapor**	**Mass %, liquid**	**Mass %, vapor**	**Mass %, vapor**	**Mass %, vapor**	**lb/hr**	**tpy**
Hexane	2.07%	3.11%	3.09%	4.09%	3.38%	4.09%	221.8	893.2
Benzene	0.25%	0.19%	0.46%	0.34%	0.80%	0.80%	43.40	174.8
Toluene	0.69%	0.20%	1.10%	0.29%	0.36%	0.36%	19.27	77.61
Ethylbenzene	0.16%	0.01%	0.29%	0.02%	0.05%	0.05%	2.69	10.85
1,2,4-Trimethylbenzene	0.44%	0.007%	0.76%	0.01%		0.01%	0.58	2.33
1,3-dimethylbenzene	0.43%	0.04%	0.79%	0.05%		0.05%	2.58	10.41
1,4-dimethylbenzene	0.31%	0.03%	0.57%	0.03%		0.03%	1.80	7.25
1,2-dimethylbenzene (Xylene)	0.21%	0.01%	0.37%	0.02%	0.21%	0.21%	11.26	45.36
i-propylbenzene (Cumene)	0.04%	0.002%	0.08%	0.003%	0.006%	0.01%	0.32	1.28
Biphenyl[6]					0.00002%	0.00002%	0.001	0.004
Cresols[6]					0.0007%	0.001%	0.04	0.16
Naphthalene[6]					0.0006%	0.001%	0.03	0.14
Phenol[6]					0.001%	0.001%	0.08	0.33
Total HAP	**4.59%**	**3.60%**	**7.50%**	**4.86%**	**4.80%**	**5.60%**	**303.8**	**1,224**

[5] Maximum mass % in liquid of individual HAP from 13 samples of various crude types taken at Nederland from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.
Vapor weight percent calculated assuming annual average temperature.

[6] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in liquid, based on the results of the 13 samples from Nederland, by individual HAP.

[7] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in vapor, based on the calculated vapor speciation using results of the 13 samples from Nederland, by individual HAP.

[8] Speciated VOC components, vapor weight %, from the permit basis for the Nederland Terminal, which references Table 3-1 of API Publication 1673 (May 1998), and factors obtained from Mr. James Durham, EPA Office of Air Quality Planning and Standards.

[9] The maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP.

[10] Calculated as a percent of VOC emissions, as the crude samples demonstrated >99.9% is VOC.
Note that the "Total HAP" is the sum of all max individual HAP from the 13 samples.

APPENDIX D. BACT SUPPORTING DOCUMENTATION

VCU Platform Drawings

- WC509 VCU Isometric
- WC509 VCU Platform Layout
- WC509 VCU Plot

REFERENCE DRAWINGS

REV	DESCRIPTION	BY	DATE	CHK'D	APP'D
1	ISSUED FOR PERMIT	BWC			
0	ISSUED FOR PERMIT	BWC			

FACILITY CODE OR ACCOUNT NO:
CONSTRUCTION YEAR: –

	BY	DATE
DRAWN	BWC	07–16–2020
CHECK	EZ	
APPROVED	EZ	–

SCALE: AS SHOWN

PROJECT CONSULTING SERVICES, INC.
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002–7406
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BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
FILED ISOMETRIC
WITH VAPOR CONTROL

WBS NO.

OLD DRAWING NO.

DRAWING NO. BMOP-WC509.006

REV. NO. 1

FILENAME: P:\Workspaces\BCook\18220_STINGRAY OFFSHORE\18220_ET WC509.006.dwg PLOTTED: 9/11/2020 8:43:12 AM PLOTTED BY: ––––

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REFERENCE DRAWINGS						
	0	ISSUED FOR PERMIT	BWC	07-01-20	EZ	
	REV	DESCRIPTION	BY	DATE	CHK'D	APP'D

FACILITY CODE OR ACCOUNT NO:
CONSTRUCTION YEAR: –

	BY	DATE
DRAWN	BWC	03-12-2020
CHECK	EZ	
APPROVED	EZ	–

SCALE: AS SHOWN

PROJECT CONSULTING SERVICES, INC.
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BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
COMPLEX ISOMETRIC
WITH VAPOR CONTROL

WBS NO.
OLD DRAWING NO.
DRAWING NO. BMOP-WC509.007
REV. NO. 0

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07-30-20 15:12 18220 05 BWC 18220_ET WC509.007.DWG

COORDINATE PROJECTION: UTM, NAD83, ZONE 15, US FOOT; CENTRAL MERIDIAN 93°W – LAT–LONG SHOWN IN NAD27

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	REVISE VCU PLATFORM, RISERS AND BRIDGE LOCATION, UPDATE VCU RISER'S #1				
			AND #2 LAT–LON'S AND 20" VAPOR RETURN ROUTE #1 AND #2 LENGTHS	GJD	8–4–20	JHE	TO
		B	REVISE PLEM #2 LOCATION, UPDATE LAT–LONGS	GJD	7–21–20	JHE	TO
		A	ISSUED FOR REVIEW	GJD	6–15–20	JHE	TO

DWG. STATUS	CHECKED		APPROVED			
	BY	DATE	BY	DATE	BY	DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE:					
	FILE NAME:					

P.L./STA. NO. ACCOUNT NO.		
CONSTRUCTION YEAR		
	BY	DATE
DESIGN	JHE	06–15–20
DRAWN	GJD	06–15–20
ASBUILT		
FILE NO.		
SCALE:		

ENERGY TRANSFER™

BLUE MARLIN OFFSHORE PORT
(BMOP)
CRUDE OIL PIPELINE
WC509 VCU PIPELINE ROUTES
WEST CAMERON BLOCK 509 SURVEY AREA

PROJECT NO.

PREVIOUS DWG. NO.
SHEET 1 OF 1

DWG. NO.
BMOP–WC509–VCU C
SHEET 1 OF 1

08–04–20 08:30 4 GJD 18220 18220_BMOP–WC509–VCU.DWG

Vapor Capture and Control Cost Analysis

- Cost Evaluation for Control of Vapors from Loading Crude Oil into VLCCs
- Estimated VCU-Related Downtime

[redacted]

[redacted]

[redacted]

Environmental Impacts of Vapor Capture and Control

- ► Vapor Combustion Unit Emissions
- ► VCU Platform Diesel Generator Emissions
- ► Fuel Supply Vessel Transport Emissions
  - Criteria and Greenhouse Gas Emissions
  - Hazardous Air Pollutant Emissions
- ► VCU Additional Air Emissions Summary

Blue Marlin Offshore Port, LLC
Vapor Combustion Unit Emissions

VCU Additional Emissions Summary

EPN	NO$_X$	CO	SO$_2$	PM/PM$_{10}$/PM$_{2.5}$	CO$_2$e
	tpy	tpy	tpy	tpy	tpy
VCU-1	27.43	125.9	3.03	3.41	75,382
VCU-2	27.43	125.9	3.03	3.41	75,382
VCU-3	27.43	125.9	3.03	3.41	75,382

Loading Losses

Annual Loading Loss[1]	Loading Loss w/ VCU Outages[2]
tpy	tpy
21,840	10,467

[1] The annual loading loss of VOC emissions from marine loading at the design Project capacity. Basis for John Zink VCU specifications.

[2] The annual loading loss of VOC emissions from marine loading at the reduced operating capacity of the Project due to reduced availability with vapor capture.

SO$_2$

Maximum Mass Ratio of H$_2$S in Crude Oil[3]	Maximum Mass Ratio of SO$_2$ in Crude Oil	SO$_2$ Annual Emissions
lb H$_2$S/lb VOC	lb SO$_2$/lb VOC	tpy
4.35E-04	8.69E-04	9.10

[3] Based on 5 ppmw H$_2$S in crude oil.

NO$_X$ & CO (per VCU)

NO$_X$ EF[1] lb/MMBtu	CO EF[4] lb/MMBtu	Max Hourly Firing Rate[1] MMBtu/hr	Annual Average Firing Rate[5] MMBtu/yr	NO$_X$ Annual Emissions tpy	CO Annual Emissions tpy	PM EF[6] lb/MMBtu	PM Annual Emissions tpy
0.06	0.28	218	914,315	27.43	125.9	0.01	3.41

[4] TCEQ publication RG-360A/11, Revised February 2012, page A-54.

[5] The maximum hourly firing rate based on VCU design specifications, based on the hours of operation in consideration of VCU outages.

[6] Total PM from AP-42, Section 1.4, *National Gas Combustion*, Table 1.4-2.

GHG per VCU

Heat Rate MMBtu/yr	CO$_2$ EF[7] kg/MMBtu	CH$_4$ EF[7] kg/MMBtu	N$_2$O EF[7] kg/MMBtu	GWP			CO$_2$ Annual Emissions	CH$_4$ Annual Emissions	N$_2$O EF Annual Emissions	CO$_2$e Annual Emissions
				CO2	CH4	N2O	tpy	tpy	tpy	tpy
914,315	74.54	0.003	0.0006	1	25	298	75,126	3.02	0.60	75,382

[7] Emission factors from 40 CFR 98 Subpart C

Blue Marlin Offshore Port, LLC
VCU Platform Diesel Generator

		Cat 3512C	
Engine Rating [1]	=	1,360	kW
	=	1,824	HP
Total Operating Time [1]	=	4,198	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
			Value	Units		
PM $_{\text{Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
$PM_{10,\text{ Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
$PM_{2.5,\text{ Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
PM $_{\text{Condensable}}$	AP-42	[2]	5.39E-05	lb/HP-hr	0.10	0.21
NO_x	EPA	[3]	5.46	g/HP-hr	21.95	46.08
SO_2	Fuel S Content	[4]	7.11E-04	lb/HP-hr	1.30	2.72
CO	EPA	[3]	0.48	g/HP-hr	1.93	4.05
VOC	EPA	[3]	0.12	g/HP-hr	0.48	1.01
H_2SO_4	Fuel S Content	[4]	2.22E-05	lb/HP-hr	0.04	8.50E-02

[1] Based on VCU blower power needs.

[2] Emission factors are based on AP-42 Chapter 3, Tables 3.4-1 and 2, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996). An average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-

[3] Per 40 CFR 60.4205(b) and Table 1 of 40 CFR 89.112. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit. Conservatively assume that filterable $PM=PM_{10}=PM_{2.5}$.

[4] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Emissions calculated based on a max 1000 ppm S in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April

[5] Per footnote f of AP-42 Chapter 3, Table 3.4-1, non methane VOC emission factor has calculated as 91% of TOC emission factor.

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42	[6], [7]	2.52E-05	lb/MMBtu	3.22E-04	6.75E-04
Acrolein	AP-42	[6], [7]	7.88E-06	lb/MMBtu	1.01E-04	2.11E-04
Benzene	AP-42	[6], [7]	7.76E-04	lb/MMBtu	9.91E-03	2.08E-02
Formaldehyde	AP-42	[6], [7]	7.89E-05	lb/MMBtu	1.01E-03	2.11E-03
Toluene	AP-42	[6], [7]	2.81E-04	lb/MMBtu	3.59E-03	7.53E-03
Xylenes	AP-42	[6], [7]	1.93E-04	lb/MMBtu	2.46E-03	5.17E-03
Total PAH	AP-42	[6], [7]	2.12E-04	lb/MMBtu	2.71E-03	5.68E-03
Total VOC HAPs					**2.01E-02**	**4.22E-02**

[6] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[7] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
CO_2	EPA	[8], [11]	73.96	kg/MMBtu	2,082	4,369.5
CH_4	EPA	[9], [11]	3.00E-03	kg/MMBtu	8.44E-02	0.18
N_2O	EPA	[9], [11]	6.00E-04	kg/MMBtu	1.69E-02	0.04
CO_2e	EPA	[10]			**2,089**	**4,384.5**

[8] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98. This is consistent with TCEQ 2015 guidance: https://www.tceq.texas.gov/assets/public/permitting/air/factsheets/factsheets-psdghg-6291.pdf

[11] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Blue Marlin Offshore Port, LLC

Fuel Supply Vessel Transport from Port of New Orleans to WC509VCU - Criteria and Greenhouse Gas Emissions

	Emission Factors (g/kw-hr)[1]								
	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	N_2O	CH_4
Main Engine	13	0.27	2.5	0.3	0.3	1.3	690	0.02	0.09
Auxiliary Engines	10	0.27	1.7	0.4	0.4	1.3	690	0.02	0.09

Supply Vessel Engine Data[2]	
Main Engine Power (kW)	1,125
Main Engines per Vessel	2
Auxiliary Engine Power (kW)	100
Auxiliary Engines per Vessel	2
No. of Calls for Fuel Supply/year	63

Travel Segment[3]	**Distances (nautical miles)**
Port of New Orleans to WC509	276
Reduced Speed Zone	
New Orleans, LA	*30*
WC509	*20*
Total RSZ	50
Cruise Zone Distance	226

Emissions Input[4]

Mode	Cruise	RSZ	Maneuver	Hotel
Time (per call)	31.17	8.33	4.00	3.00
Speed (knots)	14.5	12.0	8.0	0.0
Load Factors				
Main Engine[5]	0.83	0.47	0.14	0.00
Auxiliary Engine[6]	0.17	0.27	0.45	0.22

Mode	Emission Rates[7]								
	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$	CO_2	N_2O	CH_4
Cruise (g/call)	147,440	767,919	77,110	16,015	17,901	17,901	40,927,561	1,186	5,338
RSZ (g/call)	22,833	119,254	12,060	2,505	2,828	2,828	6,401,290	186	835
Maneuver (g/call)	3,751	19,921	2,100	436	521	521	1,114,646	32	145
Hotel (g/call)	224	1,320	172	36	53	53	91,080	3	12
Total (g/call)	174,248	908,414	91,442	18,992	21,302	21,302	48,534,577	1,407	6,331
Total (tons/call)	0.19	1.00	0.10	0.02	0.02	0.02	53.50	0.002	0.01

Annual Emissions (tons/yr)									
Pollutant	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$	CO_2	N_2O	CH_4
Total	12.10	63.09	6.35	1.32	1.48	1.48	3370.51	0.10	0.44

1. Tier 0 emission factors (Category 1) from Table 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
2. Obtained from WC509 offshore fuel consumption data provided by the client. Auxiliary Engine data is from Table 3-10 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

3. Distance based on searoutes.com. Reduced Speed Zone distance is based on a conservative estimate. Cruise Zone Distance is difference between Port of New Orleans to WC509 and Total RSZ distances.
4. Time (per call) is for round-trip (Distance/Speed x 2). Speed for each mode is based on Tables 2-5 and 2-6 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. Time (per call) for maneuvering and hoteling modes are based on a conservative estimates.
5. Per Section 2-7.3 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

Calculated using Propeller Law:

$LF = (AS/MS)^3$

Where;

LF = Load Factor
AS = Actual Speed (knots)
MS = Maximum Speed (knots)

6. From Table 2-7 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
7. Emission rates were calculated using the following equation:

$E\ (g/call) = P_{Main} * LF_{Main} * A * EF_{Main} + P_{Aux} * LF_{Aux} * A * EF_{Aux}$

Where

P = Engine Power Rating (kW)
LF = Load Factor
A = Activity (hours)
EF = Emission Factor

Blue Marlin Offshore Port, LLC

Fuel Supply Vessel Transport from New Orleans to WC509VCU - Hazardous Air Pollutant Emissions

	Emission Factors (g/hp-hr)[1]								
	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Main Engine	-	8.00E-05	2.50E-05	2.46E-03	2.51E-04	-	6.73E-04	8.92E-04	6.13E-04
Auxiliary Engines	1.24E-04	2.44E-03	2.94E-04	2.96E-03	3.75E-03	2.69E-04	5.33E-04	1.30E-03	9.05E-04

Supply Vessel Engine Data[2]	
Main Engine Power (hp)	1,125
Main Engines per Vessel	2
Auxiliary Engine Power (hp)	100
Auxiliary Engines per Vessel	2
No. of Calls for Fuel Supply/year	63

Travel Segment[3]	Distances (nautical miles)
Port of New Orleans to WC509	276
Reduced Speed Zone[4]	
New Orleans, LA	*30*
WC509	*20*
Total RSZ	50
Cruise Zone Distance	226

Emissions Input[4]

Mode	Cruise	RSZ	Maneuver	Hotel
Time (per call)	31.17	8.33	4.00	3.00
Speed (knots)	14.5	12.0	8.0	0.0
Load Factors				
Main Engine[5]	0.83	0.47	0.14	0.00
Auxiliary Engine[6]	0.17	0.27	0.45	0.22

Mode	Emission Rates[7]								
	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Cruise (g/call)	0.13	7.24	1.77	146.68	18.57	0.29	39.78	53.35	36.66
RSZ (g/call)	0.06	1.80	0.35	23.08	3.90	0.12	6.18	8.46	5.82
Maneuver (g/call)	0.04	0.98	0.14	4.16	1.66	0.10	1.04	1.59	1.10
Hotel (g/call)	0.02	0.32	0.04	0.39	0.49	0.04	0.07	0.17	0.12
Total (g/call)	0.25	10.34	2.30	174.31	24.62	0.54	47.07	63.57	43.69
Total (tons/call)	2.74E-07	1.14E-05	2.53E-06	1.92E-04	2.71E-05	5.94E-07	5.19E-05	7.01E-05	4.82E-05

Annual Emissions (tons/yr)									
Pollutant	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Total	1.73E-05	7.18E-04	1.60E-04	1.21E-02	1.71E-03	3.74E-05	3.27E-03	4.41E-03	3.03E-03

1. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.
2. Obtained from WC509 offshore fuel consumption data provided by the client. Auxiliary Engine data is from Table 3-10 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
3. Distance based on searoutes.com. Reduced Speed Zone distance is based on a conservative estimate. Cruise Zone Distance is difference between Port of New Orleans to WC509 and Total RSZ distances.
4. From Table 2-18 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
   The barges do not enter open ocean.
5. Per Section 2-7.3 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
   Calculated using Propeller Law:
   $LF = (AS/MS)^3$
   Where;
   LF = Load Factor
   AS = Actual Speed (knots)
   MS = Maximum Speed (knots)
6. From Table 2-7 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
7. Emission rates were calculated using the following equation:
   $E\ (g/call) = P_{Main} * LF_{Main} * A * EF_{Main} + P_{Aux} * LF_{Aux} * A * EF_{Aux}$
   Where
   P = Engine Power Rating (kW)
   LF = Load Factor
   A = Activity (hours)
   EF = Emission Factor

Blue Marlin Offshore Port, LLC
Environmental Impacts of Vapor Capture and Control - Additional Air Emissions

	NO_x (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10}[1] (tpy)	$PM_{2.5}$[1] (tpy)	CO_2e (tpy)
Marine Vapor Combustion Units						
MVCU1	27.43	125.9	3.03	3.41	3.41	75,382
MVCU2	27.43	125.9	3.03	3.41	3.41	75,382
MVCU3	27.43	125.9	3.03	3.41	3.41	75,382
VCU Platform Sources						
Diesel Generator	46.08	4.05	2.72	0.46	0.46	4,384
Fuel Delivery Supply Vessel						
Main and Auxiliary Engines	63.09	12.10	6.35	1.48	1.48	3,412
Total	**191.5**	**394.0**	**18.17**	**12.16**	**12.16**	**233,941**

[1] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emissions

RBLC Database Summary Tables

- Process Type 17.130 – Large Natural Gas Engines
- Process Type 17.110 – Large Emergency Diesel Engines
- Process Type 17.210 – Small Non-Emergency Diesel Engines
- Process Type 42.004 – Marketing Terminal Fugitive Emissions
- Process Type 42.005 – Storage Tanks

Large Natural Gas Engines

RBLC ID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case by Case Basis	Permit Date
CA-1222	CA	Kyocera America Inc.	ICE Spark Igition	Natural gas	2889	BHP	VOC	Oxidation catalyst	30	PPMVD @15% O2	1 HR				Other	1/16/2013
CA-1240	CA	Gold Coast Packing	Internal Combustion Engines	Natural gas	881	BHP	VOC	Oxidation catalyst	25	PPMVD @15 % O2					Other	9/13/2017
*FL-0368	FL	Nucor Steel Florida Facility	Emergency Engines	Natural gas	2000	KW	VOC	Good comubstion practices	1	G/HP-HR					BACT-PSD	3/27/2019
*KS-0030	KS	Mid-Kansas Electric Company, LLC - Rubart Station	Spark Ignition RICE Emergency AC Generators	Natural gas	450	KW	VOC		1	G/HP-HR					BACT-PSD	4/6/2017
*KS-0030	KS	Mid-Kansas Electric Company, LLC - Rubart Station	Spark Ignition RICE Electricity Generating	Natural gas	10	MW	VOC		5.82	LB/HR	1 HR except during startup	8.44	LB/HR	3 HR during startup	BACT-PSD	4/6/2017
KS-0035	KS	Lacey Randall Generation Facility, LLC	Spark ignition four stroke lean burn reciprocating internal combustion Engine (RICE) electric generating units (EGUs)	Natural gas	12526	BHP	VOC	Selective catalytic reduction (SCR) system and an oxidation catalyst	2.67	LB/HR	1 HR except during startup	4.21	LB/HR	3 HR during startup	BACT-PSD	8/11/2017
LA-0257	LA	Sabine Pass LNG Terminal	Generator Engines	Natural gas	2012	HP	VOC	Comply with 40 CFR 60 Subpart JJJJ	4.43	LB/HR	1 HR maximum	1.11	TPY	Annual Maximum	BACT-PSD	1/23/2012
LA-0292	LA	Holebrook Compressor Station	Waukesha 16V-275GL Compressor Engines Nos. 1-12	Natural gas	5000	HP	VOC	CO oxidation catalyst, use of natural gas as fuel, good equipment design, and proper combustion techniques	1.25	LB/HR	1 HR maximum	5.46	TPY	Annual Maximum	BACT-PSD	8/4/2016
MI-0393	MI	Ray Compressor Station	Five Spark Internal Combustion Engines	Natural gas	32	MMBTU/HR	VOC	Oxidation catalyst	0.19	G/BHP-HR					BACT-PSD	6/21/2012
MI-0393	MI	Ray Compressor Station	Emergency Generator	Natural gas	500	HR/YR	VOC		0.81	G/BHP-HR					BACT-PSD	6/21/2012
MI-0412	MI	Holland Board of Public Works - East 5th Street	Emergency Engine Natural Gas (EUNGEngine)	Natural gas	1000	KW	VOC	Oxidation catalyst and good combustion practices	0.5	G/HP-HR					BACT-PSD	8/15/2014
MI-0424	MI	Holland Board of Public Works - East 5th Street	EUNGEngine (Emergency Engine Natural Gas)	Natural gas	500	HR/YR	VOC	Oxidation catalyst and good combustion practices	0.5	G/HP-HR					BACT-PSD	7/28/2017
*MI-0440	MI	Michigan State University	FGEngines	Natural gas	16500	HP	VOC	Oxidation catalyst	11	LB/HR	1 HR except during startup/shutdown	0.7	G/HP-H per engine/HR		BACT-PSD	10/16/2019

Large Natural Gas Engines

RBLC ID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case by Case Basis	Permit Date
*MI-0441	MI	LBWL - Erickson Station	Natural Gas Fueled Emergency Engine (EUEMGNG1)	Natural gas	1500	HP	VOC	Burn natural gas and be NSPS compliant	1	G/HP-HR	1 HR	86	PPMVD @15% O2		BACT-PSD	10/18/2019
*MI-0441	MI	LBWL - Erickson Station	EUEMGNG2	Natural gas	6000	HP	VOC	Burn natural gas and be NSPS compliant	1	G/HP-HR	2 HR	86	PPMVD @15% O2		BACT-PSD	10/18/2019
*MI-0443	MI	Mack Avenue Assembly Plant	EUEMERGEN1	Natural gas	500	HR/YR	VOC		0.5	G/HP-HR	3 HR				LAER	12/19/2019
*MI-0443	MI	Mack Avenue Assembly Plant	EUEMERGEN2	Natural gas	500	HR/YR	VOC		0.5	G/HP-HR	4 HR				LAER	12/19/2019
*MI-0443	MI	Mack Avenue Assembly Plant	EUEMERGEN3	Natural gas	500	HR/YR	VOC		0.5	G/HP-HR	5 HR				LAER	12/19/2019
*MI-0444	MI	Warren Truck Assembly Plant	FGNGEMENG (multiple emission units in this flexible group)	Natural gas	770	HP	VOC	Combustion of pipeline quality natural gas only	0.5	G/HP-HR	1 HR				LAER	2/7/2020
OK-0148	OK	Buffalo Creek Processing Plant	Large Internal Combustion Engines	Natural gas	1775	HP	VOC	Oxidation catalyst	0.22	G/HP-HR	1 HR				BACT-PSD	6/13/2014
OK-0148	OK	Buffalo Creek Processing Plant	Large Internal Combustion Engines	Natural gas	2370	HP	VOC	Oxidation catalyst	0.22	G/HP-HR	1 HR				BACT-PSD	6/13/2014
OK-0153	OK	Rose Valley Plant	Compressor Engine CAT G3606LE	Natural gas	1775	HP	VOC	Oxidation catalyst	0.13	G/HP-HR	3 HR	0.65	LB/HR		BACT-PSD	6/17/2014
OK-0153	OK	Rose Valley Plant	Emergency Generators CAT G3520C IM	Natural gas	2889	HP	VOC	Oxidation catalyst	0.44	G/HP-HR	3 HR	3.51	LB/HR	3 HR	BACT-PSD	6/17/2014
PA-0297	PA	Kelly IMG Energy LLC/ Kelly IMG Plant	3.11 MW Generators (WAUKESHA) #1 and #2	Natural gas	3.11	MW	VOC		0.176	G/BHP-HR					Other	4/17/2014
PA-0301	PA	Carpenter Compressor Station	Three Four Stroke Lean Burn Engine - Caterpillar G3608 TA	Natural gas	2370	BHP	VOC	Oxidation catalyst	0.25	G/BHP-HR					N/A	3/30/2015
PA-0301	PA	Carpenter Compressor Station	One Four Stroke Lean Burn Engine, Caterpillar model G3612 TA	Natural gas	3550	BHP	VOC	Oxidation catalyst	0.25	G/BHP-HR					N/A	3/30/2015
PA-0302	PA	Clermont Compressor Station	Seven Spark Ignited 4 Stroke Rich Burn Engine	Natural gas	1380	HP	VOC	NSCR	0.2	G/BHP-HR					N/A	4/2/2015
TX-0692	TX	Red Gate Power Plant	Twelve Reciprocating Internal Combustion Engines	Natural gas	18	MW	VOC	Oxidation catalyst	0.3	G/HP-HR	1 HR				BACT-PSD	3/19/2015

Large Emergency Diesel Engines

RBLCID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case By Case Basis	Permit Date
AK-0082	AK	Point Thomson Production Facility	Emergency Camp Generators	Ultra Low Sulfur Diesel	2695	HP	VOC		0.0007	LB/HP-HR					BACT-PSD	1/28/2015
AK-0084	AK	Donlin Gold Project	Twelve Large Ultra Low Sulfur Diesel/Natural Gas-Fired Internal Combustion Engines	Diesel and Natural Gas	143.5	MMBTU/HR	VOC	Oxidation catalyst and good combustion practices	0.21	G/KW-HR	3 HR Average	0.09	G/KW-HR	3-HR average	BACT-PSD	6/21/2018
*AL-0318	AL	Talladega Sawmill	Emergency CI Diesel-Fired RICE	Diesel			VOC								N/A	1/11/2018
*AR-0161	AR	Sun Bio Material Company	Emergency Engines	Diesel			VOC	Good operating practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.9	G/KW-HR					BACT-PSD	9/23/2019
*AR-0163	AR	Big River Steel LLC	Emergency Engines	Diesel			VOC	Good operating practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.55	G/KW-HR					BACT-PSD	7/13/2020
FL-0328	FL	ENI - Holy Cross Drilling Project	Emergency Engine	Diesel			VOC	Use of good combustion practices, based on the current manufacturer's specifications for this engine.	0.03	TPY	12 month rolling total				BACT-PSD	10/31/2011
FL-0338	FL	Sake Prospect Drilling Project	Emergency Generator Diesel Engine - Development Driller 1	Diesel	2229	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur diesel, positive crankcase ventilation, turbocharger with aftercooler, high pressure fuel injection with aftercooler	0.04	TPY	12 month rolling total				BACT-PSD	2/28/2014
FL-0338	FL	Sake Prospect Drilling Project	Emergency Generator Diesel Engine - C.R. Luigs	Diesel	2064	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur diesel, positive crankcase ventilation, turbocharger with aftercooler, high pressure fuel injection with aftercooler	0.04	TPY	12 month rolling total				BACT-PSD	2/28/2014
IA-0105	IA	Iowa Fertilizer Company	Emergency Generator	Diesel	142	GAL/HR	VOC	Good combustion practices, sulfur content in fuel shall not exceed 0.0015% by weight	0.4	G/KW-HR	Average of 3 stack test runs	0.44	TPY	12 month rolling total	BACT-PSD	11/1/2012
IA-0106	IA	CF Industries Nitrogen, LLC - Port Neal Nitrogen Complex	Emergency Generators	Diesel	180	GAL/HR	VOC	Good combustion practices	4	G/KW-HR	Average of 3 stack test runs	0.31	TPY	12 month rolling total	BACT-PSD	7/16/2013
ID-0018	ID	Langley Gulch Power Plant	Emergency Generator Engine	Diesel	750	KW	VOC	Tier II engine-based, good combustion practices	6.4	G/KW-HR					BACT-PSD	8/9/2010
IL-0114	IL	Cronus Chemical, LLC	Emergency Generator	Distillate Fuel Oil	3755	HP	VOC	Tier IV standards for non-road engines at 40 CFR 1039.102, Table 7. Ammonia production will be limited to a maximum of 3 months of the year	0.4	G/KW-HR					BACT-PSD	12/24/2014
IN-0158	IN	St. Joseph Energy Center, LLC	Two Emergency Diesel Generators	Diesel	1006	HP	VOC	Combustion design controls and usage limits	1.04	LB/HR	3 HR	500	HR/YR	12 month rolling total	BACT-PSD	8/15/2013
IN-0173	IN	Midwest Fertilizer Corporation	Diesel Fired Emergency Generator	Diesel	3600	BHP	VOC	Good combustion practices	0.31	G/BHP-HR	3 HR				BACT-PSD	7/17/2014
IN-0179	IN	Ohio Valley Resources, LLC	Diesel-Fired Emergency Generator	No. 2 Fuel Oil	4690	BHP	VOC	Good combustion practices	0.31	G/BHP-HR	3 HR				BACT-PSD	8/12/2014
IN-0180	IN	Midwest Fertilizer Corporation	Diesel Fired Emergency Generator	Diesel	3600	BHP	VOC	Good combustion practices	0.31	G/BHP-HR	3 HR				BACT-PSD	8/12/2014
IN-0263	IN	Midwest Fertilizer Company LLC	Emergency GeneratorS (EU014A AND EU-014B)	Diesel	3600	HP	VOC	Good combustion practices	0.35	G/HP-HR	3 HR	500	HR/YR		BACT-PSD	7/7/2017

Large Emergency Diesel Engines

RBLCID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case By Case Basis	Permit Date
*KS-0036	KS	Westar Energy - Emporia Energy Center	Caterpillar C18DITA Diesel Engine Generator	No. 2 Fuel Oil	900	BHP	VOC	Utilize efficient combustion/design technology	0.015	G/BHP-HR					BACT-PSD	8/23/2017
*KY-0109	KY	Fritz Winter North America, LP	Emergency Generators (1 - 3)	Diesel	53.6	GAL/HR	VOC	Good combustion and operation practices plan	4.77	G/HP-HR		3.5	G/HP-HR		BACT-PSD	11/26/2019
LA-0254	LA	Ninemile Point Electric Generating Plant	Emergency Diesel Generator	Diesel	1250	HP	VOC	Ultra low sulfur diesel and good combustion practices	1	G/HP-HR	Annual average				BACT-PSD	9/22/2011
LA-0292	LA	Holebrook Compressor Station	Emergency Generators (1 - 2)	Diesel	1341	HP	VOC	Good combustion practices consistent with the manufacturer's recommendations to maximize fuel efficiency and minimize emissions	0.83	LB/HR	1 HR maximum	0.04	TPY	Annual maximum	BACT-PSD	8/4/2016
LA-0296	LA	Lake Charles Chemical Complex LDPE Unit	Emergency Diesel Generators (EQTs 622, 671, 773, 850, 994, 995, 996, 1033, 1077, 1105, 1202)	Diesel	2682	HP	VOC	Compliance with 40 CFR 60 Subpart IIII; operating the engine in accordance with the engine manufacturer's instructions and/or written procedures (consistent with safe operation) designed to maximize combustion efficiency and minimize fuel usage	0.85	LB/HR	1 HR maximum	0.04	TPY	Annual maximum	BACT-PSD	9/12/2016
LA-0309	LA	Benteler Steel Tube Facility	Emergency Generator Engines	Diesel	2922	HP	VOC	Complying with 40 CFR 60 Subpart IIII							BACT-PSD	3/9/2017
*LA-0312	LA	St. James Methanol Plant	Diesel Fired Emergency Generator Engine (DEG-13; EQT0012)	Diesel	1474	HP	VOC	Compliance with NSPS Subpart IIII	0.04	LB/HR					BACT-PSD	3/10/2017
LA-0313	LA	St. Charles Power Station	SCPS Emergency Diesel Generator 1	Diesel	2584	HP	VOC	Good combustion practices	27.34	LB/HR	1 HR maximum	6.84	TPY	Annual maximum	BACT-PSD	3/13/2017
*LA-0315	LA	G2G Plant	Emergency Diesel Generator 1	Diesel	5364	HP	VOC	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	3.86	LB/HR	1 HR maximum	0.19	TPY	Annual maximum	BACT-PSD	3/13/2017
*LA-0315	LA	G2G Plant	Emergency Diesel Generator 2	Diesel	5364	HP	VOC	Compliance with 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ	3.86	LB/HR	1 HR maximum	0.19	TPY	Annual maximum	BACT-PSD	3/13/2017
LA-0316	LA	Cameron LNG Facility	Emergency Generator Engines (6 units)	Diesel	3353	HP	VOC	Complying with 40 CFR 60 Subpart IIII	-						BACT-PSD	3/14/2017
LA-0331	LA	Calcasieu Pass LNG Project	Large Emergency Engines	Diesel	5364	HP	VOC	Good combustion and operating practices	0.79	G/KW-HR					BACT-PSD	2/14/2019
*LA-0350	LA	Benteler Steel Tube Facility	Emergency Generator	Diesel			VOC	Complying with 40 CFR 60 Subpart IIII	1.55	TPY					BACT-PSD	4/2/2020
MD-0044	MD	Cove Point LNG Terminal	Emergency Generator	Ultra Low Sulfur Diesel	1550	HP	VOC	Use only Ultra low sulfur diesel, good combustion practices, and designed to achieve emission limit; emission limit applies to NOx + NMHC	4.8	G/HP-HR		6.4	G/KW-HR		LAER	8/25/2015
MI-0423	MI	Indeck Niles, LLC	Emergency Engine	Diesel	22.68	MMBTU/H	VOC	Good combustion practices	1.87	LB/HR					BACT-PSD	6/2/2017
MI-0433	MI	MEC North, LLC and MEC South LLC	Emergency Engine	Diesel	1341	HP	VOC	Good combustion practices the engine is designed to be compliant with Tier IV emission standard	0.86	LB/HR	1 HR				BACT-PSD	8/17/2018
MI-0433	MI	MEC North, LLC and MEC South LLC	Emergency Engine	Diesel	1341	HP	VOC	Good combustion practices	0.86	LB/HR	1 HR				BACT-PSD	8/17/2018
MI-0435	MI	Belle River Combined Cycle Power Plant	Emergency Engine	Diesel	2	MW	VOC	State of the art combustion design	1.89	LB/HR	1 HR				BACT-PSD	8/23/2018
*MI-0442	MI	Thomas Township Energy, LLC	FGEM Engine	Diesel	1100	KW	VOC	Comply with Tier II emission standards	0.86	LB/HR	1 HR				BACT-PSD	11/18/2019

Large Emergency Diesel Engines

RBLCID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case By Case Basis	Permit Date
NJ-0079	NJ	Woodbridge Energy Center	Emergency Generator	Ultra Low Sulfur Diesel	100	HR/YR	VOC	Ultra low sulfur diesel	0.49	LB/HR					LAER	11/27/2012
NJ-0080	NJ	Hess Newark Energy Center	Emergency Generator	Ultra Low Sulfur Diesel	200	HR/YR	VOC	Ultra low sulfur diesel	2.62	LB/HR					LAER	4/4/2013
NJ-0084	NJ	PSEG Fossil LLC Sewaren Generating Station	Diesel Fired Emergency Generator	Ultra Low Sulfur Diesel	44	HR/YR	VOC	Ultra low sulfur diersel and limited hours of operation	1	LB/HR					LAER	5/13/2016
NY-0104	NY	CPV Valley Energy Center	Emergency Generator	Ultra Low Sulfur Diesel			VOC	Good combustion practice	0.0331	LB/MMBTU	1 HR				LAER	8/25/2017
OH-0352	OH	Oregon Clean Energy Center	Emergency Generator	Diesel	2250	KW	VOC	Purchased certified to the standards in NSPS Subpart IIII	3.93	LB/HR		0.98	TPY	12 month rolling total	BACT-PSD	7/15/2013
OH-0360	OH	Carroll County Energy	Emergency Generator (P003)	Diesel	1112	KW	VOC	Purchased certified to the standards in NSPS Subpart IIII	1.93	LB/HR		0.48	TPY	12 month rolling total	BACT-PSD	12/30/2015
OH-0366	OH	Clean Energy Future - Lordstown, LLC	Emergency Generator (P003)	Diesel	2346	HP	VOC		3.1	LB/HR		0.76	TPY	12 month rolling total	BACT-PSD	2/27/2019
OH-0367	OH	South Field Energy LLC	Emergency Generator (P003)	Diesel	2947	HP	VOC	State-of-the-art combustion design	3.84	LB/H		0.96	TPY	12 month rolling total	BACT-PSD	2/28/2019
OH-0368	OH	Pallas Nitrogen LLC	Emergency Generator (P009)	Diesel	5000	HP	VOC	Good combustion control and operating practices and engines designed to meet the stands of 40 CFR Part 60, Subpart IIII	1.6	LB/HR		0.08	TPY	12 month rolling total	BACT-PSD	3/1/2019
OH-0370	OH	Trumbull Energy Center	Emergency Generator (P003)	Diesel	1529	HP	VOC	State-of-the-art combustion design	2	LB/H		0.5	TPY	12 month rolling total	BACT-PSD	3/5/2019
OH-0372	OH	Oregon Energy Center	Emergency Generator (P003)	Diesel	1529	HP	VOC	State-of-the-art combustion design	2	LB/H		0.5	TPY	12 month rolling total	BACT-PSD	3/6/2019
OH-0374	OH	Guernset Power Station LLC	Emergency Generators (2 identical, P004 and P005)	Diesel	2206	HP	VOC	Certified to the meet the emissions standards in 40 CFR 89.112 and 89.113 pursuant to 40 CFR 60.4205(b) and 60.4202(a)(2), good combustion practices per the manufacturer's operating manual	23.21	LB/HR		1.16	TPY		BACT-PSD	3/8/2019
OH-0375	OH	Long Ridge Energy Generation LLC - Hannibal Power	Emergency Diesel Generator Engine (P001)	Diesel	2206	HP	VOC	Good combustion design	24.71	LB/HR		1.24	TPY		BACT-PSD	3/12/2019
OH-0377	OH	Harrison Power	Emergency Diesel Generator (P003)	Diesel	1860	HP	VOC	Good combustion practices (Ultra Low Sulfur Diesel) and compliance with 40 CFR Part 60, Subpart IIII	19.68	LB/HR		0.98	TPY		BACT-PSD	3/21/2019
OH-0378	OH	PTTGCA Petrochemical Complex	Emergency Diesel-Fired Generator Engine (P007)	Diesel	3353	HP	VOC	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	37.41	LB/HR		1.87	TPY	12 month rolling total	BACT-PSD	3/25/2019
OH-0378	OH	PTTGCA Petrochemical Complex	Emergency Generators (P008 - P010)	Diesel	1341	HP	VOC	Certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual	14.96	LB/HR		0.75	TPY	12 month rolling total	BACT-PSD	3/25/2019
OK-0154	OK	Mooreland Generating Station	Diesel-Fired Emergency Generator Engine	Diesel	1341	HP	VOC	Combustion control	0.0007	LB/HP-HR					BACT-PSD	6/18/2014

Large Emergency Diesel Engines

RBLCID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Emission Limit 2	Emission Limit 2 Unit	Emission Limit 2 Averaging Time	Case By Case Basis	Permit Date
PA-0278	PA	Moxie Liberty LLC/Asylum Power Plant	Emergency Generator	Diesel			VOC		0.01	G/BHP-HR		0.03	LB/HR		Other	12/3/2012
PA-0291	PA	Hickory Run Energy Station	Emergency Generator	Ultra Low Sulfur Distillate	750	KW	VOC		0.7	LB/HR		0.03	LB/HR	12 month rolling total	Other	8/16/2013
PA-0309	PA	Lackawanna Energy Center - Jessup	Emergency Generator	Ultra Low sulfur Diesel			VOC		0.22	G/HP-HR		0.039	TPY	12 month rolling total	LAER	7/18/2017
PA-0311	PA	Moxie Freedom Generation Plant	Emergency Generator				VOC		0.02	G/HP-HR		0.002	TPY	12 month rolling total	LAER	7/28/2017
*PA-0313	PA	First Quality Tissue - Lock Haven Plant	Emergency Generator	Diesel	2500	BHP	VOC		3.5	G/KW-HR		1.67	TPY	12 month rolling total		11/21/2018
PR-0009	PR	Energy Answers Arecibo Puerto Rico Renewable Energy Project	Emergency Diesel Generator	Ultra Low Sulfur Diesel			VOC		0.15	G/BHP-HR		0.22	LB/HR		BACT-PSD	10/14/2014
SC-0113	SC	Pyramax Ceramics, LLC	Emergency Generators	Diesel	757	HP	VOC	Purchase engines certified to comply with NSPS, Subpart IIII	4	G/KW-HR					BACT-PSD	5/9/2012
SC-0159	SC	US10 Facility	Emergency Generators (GEN1, GEN2)	Diesel	1000	KW	VOC	BACT has determined to be compliance with NSPS, Subpart IIII, 40 CFR60.4202 and 40 CFR60.4205	6.4	G/KW-HR					BACT-PSD	11/6/2013
*SC-0193	SC	Mercedes Benz Vans, LLC	Emergency Generators and Fire Pump	No. 2 Fuel Oil	1500	HP	VOC	Must meet the standards of 40 CFR 60, Subpart IIII	100	HR/YR	12 month rolling total				BACT-PSD	6/25/2019
TX-0728	TX	Peony Chemical Manufacturing Facility	Emergency Diesel Generator	Diesel	1500	HP	VOC	Minimized hours of operations Tier II engine	0.7	LB/HR		0.02	TPY		Other	3/31/2015
*TX-0872	TX	Condensate Splitter Facility	Emergency Generators	Ultra Low Sulfur Diesel			VOC	Limiting duration and frequency of generator use to 100 HR/YR, good combustion practices will be used to reduce VOC including maintaining proper air-to-fuel ratio	0.12	G/KW HR					BACT-PSD	10/16/2019
*TX-0876	TX	Port Arthur Ethane Cracker Unit	Emergency Generator	Diesel			VOC	Tier 4 exhaust emission standards specified in 40 CFR Â§ 1039.101, limited to 100 hours per year of non-Emergency operation							BACT-PSD	10/30/2019
VA-0325	VA	Greensville Power Station	Diesel-Fired Emergency Generator	Diesel			VOC	Good combustion practice and maintenance	6.4	G/KW	1 HR					9/16/2016
VA-0327	VA	Perdue Grain and Oilseed, LLC	Emergency Generator	Diesel	760	BHP	VOC		0.49	LB/HR					BACT-PSD	7/27/2017
*WI-0284	WI	Sio International Wisconsin, INC. Energy Plant	Diesel-Fired Emergency Generators	Diesel			VOC	Good combustion practices	0.56	G/KW-HR					BACT-PSD	8/29/2019
*WI-0286	WI	Sio International Wisconsin, INC. Energy Plant	Diesel Fired Emergency Generator (P42)	Diesel	2346	HP	VOC	Good combustion practices are defined as maintaining the stationary compression ignition internal combustion engine according to the manufacturer's emission-related written instructions, the total hours of operation of the emergency generator may not exceed 200 hours during each consecutive 12-month period	0.56	G/KW-HR					BACT-PSD	8/30/2019
WV-0025	WV	Moundsville Combined Cycle Power Plant	Emergency Generator	Diesel	2015.7	HP	VOC		1.24	LB/YR					BACT-PSD	1/5/2015

Small Non-Emergency Diesel Engines

RBLCID	State	Facility	Process Name	Primary Fuel	Engine Rating	Engine Rating Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Averaging Time	Case by Case Basis	Permit Date
AK-0082	AK	Point Thomson Production Facility	Airstrip Generator Engine	Ultra Low Sulfur Diesel	490	HP	VOC		0.0025	LB/HP-HR		BACT-PSD	1/23/2015
AK-0082	AK	Point Thomson Production Facility	Agitator Generator Engine	Ultra Low Sulfur Diesel	98	HP	VOC		0.0025	LB/HP-HR		BACT-PSD	1/23/2015
AK-0082	AK	Point Thomson Production Facility	Incinerator Generator Engine	Ultra Low Sulfur Diesel	102	HP	VOC		0.0025	LB/HP-HR		BACT-PSD	1/23/2015
AK-0083	AK	Kenai Nitrogen Operations	Diesel Fired Well Pump	Diesel	2.7	MMBTU/HR	VOC	Limited Operation of 168 HR/YR	0.36	LB/MMBTU		BACT-PSD	1/6/2015
FL-0338	FL	Sake Prospect Drilling Project	Wireline Unit Engines - C.R. Luigs	Diesel	300	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, turbocharger with aftercooler, high pressure fuel injection with aftercooler	1.17	TPY	12 month rolling total	BACT-PSD	5/30/2012
FL-0338	FL	Sake Prospect Drilling Project	Port and Stb Fwd and Aft Crane Diesel Engines - C.R. Luigs	Diesel	305	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, positive crankcase ventilation, turbocharger with aftercooler, high pressure fuel injection with aftercooler	6.72	TPY	12 month rolling total	BACT-PSD	5/30/2012
FL-0338	FL	Sake Prospect Drilling Project	Seismic Operations Diesel Engines - Development Driller 1	Diesel	415	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, and turbocharger	6.67	TPY	12 month rolling total	BACT-PSD	5/30/2012
FL-0338	FL	Sake Prospect Drilling Project	Cementing and Nitrogen Pump Diesel Engines - Development Driller 1	Diesel	2001	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, positive crankcase ventilation, turbocharger, and high pressure fuel injection with aftercooler	0.57	TPY	12 month rolling total	BACT-PSD	5/30/2012
FL-0338	FL	Sake Prospect Drilling Project	Wireline Unit Diesel Engines - Development Driller 1	Diesel	2000	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, turbocharger with aftercooler, high pressure fuel injection with aftercooler	1.17	TPY	12 month rolling total	BACT-PSD	5/30/2012
FL-0338	FL	Sake Prospect Drilling Project	Cementing and Nitrogen Pump Diesel Engines - C.R. Luigs	Diesel	2001	HP	VOC	Use of good combustion practices based on the current manufacturer's specifications for these engines, use of low sulfur Diesel, positive crankcase ventilation, turbocharger, and high pressure fuel injection with aftercooler	0.38	TPY	12 month rolling total	BACT-PSD	5/30/2012
*KS-0036	KS	Westar Energy - Emporia Energy Center	Cummins 6BTA 5.9F-1 Diesel Engine Fire Pump	Diesel	182	BHP	VOC	Utilize efficient combustion/design technology	0.77	G/BHP-HR		BACT-PSD	3/18/2013
*LA-0349	LA	Driftwood LNG Facility	IC Engines (18)	Diesel	200-1491	HP	VOC	Comply with 40 CFR 60 Subpart IIII and Good Combustion Practices	0.78	TPY		BACT-PSD	7/10/2018

Marketing Terminal Fugitive Emissions

RBLCID	State	Facility	Process Name	Throughput	Throughput Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Emission Limit 1 Average Time	Case by Case Basis	Permit Date
TX-0765	TX	Sunoco Marine Vessel Loading Operations	Petroleum Refining Equipment Leaks/Fugitive Emissions	100	MMBBL/YR	VOC	Quarterly instrumental monitoring using a method 21 gas analyzer for all valves, pump seals, compressor seals, and agitator seals with a leak definition of 500 ppmv for valves and 2,000 ppmv for pump, compressor and agitator seals; Leaking components must be repaired within 15 days of detection of the leak	10.13	TPY		BACT-PSD	9/21/2015
TX-0797	TX	Corpus Christi Terminal	Petroleum Refining Equipment Leaks/Fugitive Emissions			VOC	Fugitive Leak Detection and Repair (LDAR) per the 28 MID Monitoring program that requires quarterly monitoring of all components with a leak definition of 500 ppmv and directed maintenance	500	PPM		BACT-PSD	4/26/2016
TX-0800	TX	Corpus Crude Oil Terminal	Fugitives			VOC	Uncontrolled VOC fugitive emissions are estimated to be less than 10 TPY; Fugitive components are monitored and minimized via an audio, olfactory, and visual (AVO) inspection once every four hours	0.41	TPY		BACT-PSD	6/21/2016
TX-0808	TX	Houston Fuel Oil Terminal	Fugitives at Marine Loading			VOC	Monitoring under 28LAER Leak Detection and Repair program	0.04	TPY		LAER	8/30/2016
TX-0818	TX	Houston Fuel Oil Terminal	Fugitives Marine Loading			VOC	Monitoring under 28LAER Leak Detection and Repair program	0.16	TPY		LAER	4/18/2017
TX-0825	TX	Pasadena Terminal	Site-wide Equipment Piping Components			VOC	Fugitive emissions will be controlled with the 28LAER Leak Detection And Repair program	0.11	TPY		LAER	7/24/2017
TX-0840	TX	Corpus Christi Terminal	Fugitives			VOC	Fugitive Leak Detection and Repair (LDAR) per the 28 MID Monitoring program that requires quarterly monitoring of all components with a leak definition of 500 ppmv and directed maintenance	500	PPM		BACT-PSD	5/11/2018
TX-0850	TX	Corpus Christi Terminal	Fugitives			VOC	28 MID				BACT-PSD	2/12/2019
TX-0851	TX	Rio Bravo Pipeline Facility	Fugitives			VOC	28 VHP				BACT-PSD	2/12/2019
TX-0852	TX	Corpus Christi Waterfront Terminal	Fugitive Components			VOC	28 LAER				BACT-PSD	2/12/2019
*TX-0855	TX	Buckeye South Texas Gateway Terminal	Fugitives			VOC	28 VHP, 28PI LDAR				BACT-PSD	7/29/2019
*TX-0872	TX	Magellan Processing, LP - Condensate Splitter Facility	Fugitives (Routine)			VOC	28VHP leak-less connectors	15.63	LB/HR		BACT-PSD	10/16/2019
*TX-0879	TX	Motiva Enterprises LLC - Port Arthur Terminal	Fugitives			VOC	28PET leak detection and repair program; Monthly Audio/Visual/Olfactory (AVO) inspection requirements				LAER	11/13/2019
*TX-0879	TX	Motiva Enterprises LLC - Port Arthur Terminal	Process Fugitives			VOC	28VHP leak detection and repair program. 97% credit for valves, 85% for pumps and compressors				BACT-PSD	11/13/2019
*TX-0887	TX	Midland Plains Marketing Terminal	Fugitives			VOC	The site-wide fugitive emissions are less than 10 tpy uncontrolled VOC emissions; LADR program and emission reduction credit is not applied				BACT-PSD	2/13/2020
*TX-0892	TX	Nederland Terminal	Fugitives			VOC	28-VHP LDAR fugitive				BACT-PSD	4/9/2020

Storage Tanks

RBLCID	State	Facility	Process Name	Throughput	Throughput Unit	Pollutant	Control Method Description	Emission Limit 1	Emission Limit 1 Unit	Case by Case Basis	Permit Date
IL-0119	IL	Phillips 66 Pipline LLC	Distillate Storage Tank (Tank 2001)	200000	BBL	VOC	Low vapor pressure material	0.1	PSIA	LAER	7/26/2016
TX-0731	TX	Corpus Christi Terminal Condensate Spiltter	Petroleum Liquids Storage in Fixed Roof Tanks	3.4	MMBBL/YR	VOC	Temperature reduced to maintain volatile organic compound (VOC) vapor pressure < 0.5 pounds per square inch actual (psia) at all times	15.78	TPY	BACT-PSD	4/14/2015
TX-0756	TX	CCI Corpus Christi Condensate Splitter Facility	Storage Tanks, TK-110, TK-111, TK-112	57960	GAL/HR	VOC	Tanks are required to be painted white and be equipped with submerged fill pipes	3.07	LB/HR	BACT-PSD	7/20/2015
TX-0756	TX	CCI Corpus Christi Condensate Splitter Facility	Storage Tanks, TK-113, TK-114, and TK-115	47000000	GAL/YR	VOC	Tanks are required to be painted white and be equipped with submerged fill pipes	0.85	LB/HR	BACT-PSD	7/20/2015
TX-0756	TX	CCI Corpus Christi Condensate Splitter Facility	Storage Tanks, TK-107, TK-108, TK-109	60,300	GAL/HR	VOC	Material w/vapor press < 0.5 psia. Tanks are required to be painted white and be equipped with submerged fill pipes	4.2	LB/HR	BACT-PSD	7/20/2015
TX-0840	TX	Corpus Christi Terminal	Heavy Oil Storage			VOC	1 Fixed roof tank has storage of heavy oil (EPN: T-1334) with VP < 0.5 psia, painted white and equipped with submerged fill pipe	21.01	LB/HR	BACT-PSD	5/11/2018
TX-0850	TX	Corpus Christi Terminal	Heavy Oil Storage in Fixed Roof Tank			VOC	Storage of heavy oil (EPN: T-1334) in a fixed roof tank with VP < 0.5 psia, painted white and equipped with submerged fill pipe	21.01	LB/HR	BACT-PSD	2/12/2019
*TX-0855	TX	Buckeye South Texas Gateway Terminal	Fixed Roof Tanks			VOC	Painted white and equipped with the submerged fill piping	10.02	LB/HR	BACT-PSD	7/29/2019
*TX-0861	TX	Buckeye Texas Processing Corpus Christi Facility	Fixed Roof Tanks			VOC	Painted white and equipped with the submerged fill piping.			BACT-PSD	9/3/2019
*TX-0864	TX	Equistar Chemicals Channelview Complex	Fixed Roof Storage Tanks			VOC	Painted white and equipped with the submerged fill piping			LAER	10/1/2019
*WI-0279	WI	Enbridge Energy Limited Partnership	Fixed Diesel Fuel Tank Storage			VOC	Good operating practices			BACT-PSD	8/28/2019

PSD AIR CONSTRUCTION PERMIT APPLICATION VOLUME 2

PSD and Toxics Air Quality Dispersion Modeling Report

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September 2020

Project 191001.0117

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1. INTRODUCTION

Blue Marlin Offshore Port LLC (BMOP; the Applicant) is proposing to develop the Blue Marlin Offshore Port Project (Project) in the Gulf of Mexico (GOM). BMOP is filing this application for a license to construct, own, and operate the Deepwater Port (DWP) pursuant to the Deepwater Port Act (DWPA) of 1974, as amended, and in accordance with U.S. Coast Guard (USCG) and U.S. Maritime Administration (MARAD) regulations. The DWP will be utilized to load crude oil onto very large crude carriers (VLCCs) (and other crude oil carriers) for export to the global market.

1.1 Prevention of Significant Deterioration Applicability

The DWP will be approximately eighty-two (82) statute miles from the nearest point on land in Cameron Parish, Louisiana. Cameron Parish is designated by the U.S. Environmental Protection Agency (EPA) as "attainment" or "unclassifiable" with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.[1] Therefore, the Project is not subject to nonattainment New Source Review (NNSR) permitting requirements for any criteria pollutants. Under Prevention of Significant Deterioration (PSD) permitting rules, the major source threshold is 250 tons per year (tpy), unless the facility is listed specifically in Title 40 of the Code of Federal Regulations (40 CFR) Section (§) 52.21(b)(1)(i)(a) as having a lower 100 tpy threshold. The Project is not included on the list of operations subject to the more stringent 100 tpy threshold. As such, the Project will be subject to PSD permitting should emissions from the Project exceed the major source threshold of 250 tpy of any regulated pollutant.

The table below summarizes the potential to emit (PTE) of the relevant PSD pollutants compared to the major source threshold and significant emission rates (SER) defined in 40 CFR 52.21(b). See Volume I of the PSD air construction permit application for additional details.

Table 1-1. Project PSD PTE Summary

Pollutant	Major Source Threshold (tpy)	Significant Emissions Rate (tpy)	Potential to Emit (tpy)	PSD Air Quality Impacts Analysis Required?
NO_X	250	40	26.02	No
CO	250	100	57.88	No
VOC	250	40	21,881	Yes
SO_2	250	40	1.64	No
PM	250	25	0.16	No
PM_{10}	250	15	1.07	No
$PM_{2.5}$	250	10	1.07	No
H_2S	250	10	9.50	No
H_2SO_4	250	7	0.05	No
CO_2e	100,000	75,000	16,510	No

As shown above, the Project is subject to PSD permitting as potential emissions of volatile organic compounds (VOC) are greater than the 250 tpy threshold. Potential emissions of all other criteria pollutants remain below their applicable SER, and therefore do not trigger an air quality impacts evaluation under PSD regulations.

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[1] 40 CFR §81.319

As provided in 40 CFR Part 50, VOC does not have a specific ambient air quality standard but is considered a precursor to ozone emissions. Per 40 CFR §50.10, the 8-hour ambient air quality standards for ozone apply to the Project. As such, BMOP has evaluated the air quality impacts from the Project by performing a Tier I Modeled Emission Rates for Precursors (MERPS) analysis for ozone to demonstrate that the Project will not result in a violation of the NAAQS for ozone. This report provides a detailed description of the analysis methodology and approach and demonstrates that direct impacts from the offshore portion of the Project do not result in a violation of the NAAQS.

Due to the distance of the Project location from the nearest shoreline, BMOP believes that the following impact analysis would not be applicable to the Project, and therefore are not included in this report:

- Growth analysis;
- Soil and vegetation analysis; and
- Visibility analysis.

Federal guidelines typically require that an air quality dispersion modeling analysis (including a visibility analysis) is performed for each Class I area located within 100 km of a facility undergoing an installation or modification that exceeds PSD SER.[2] The nearest Class I area (the Breton Wildlife Refuge) is greater than 300 km (~382 km) to the Project location. Due to the distance from the nearest Class I and area and since potential annual emissions of pollutants that impact air quality related values (e.g. SO_2, NO_X, PM_{10}, and H_2SO_4) are less than 1,000 tpy, per the revised FLAG 2010 Report, the Project would not be considered to cause or contribute to the visibility impairment of the Class I area.[3] As such, the Q/d calculation for the Project is less than 10, and a Class I air quality dispersion modeling analysis has not been performed for this Project.

1.2 Louisiana TAP Emissions Control Program Applicability

As discussed in Volume I of the PSD air construction permit application, the nearest onshore County/Parish to the Project is Cameron Parish, Louisiana. Therefore, the Project must demonstrate compliance with all applicable Louisiana specific air quality rules and regulations. Specifically, the Louisiana Department of Environmental Quality (LDEQ) defines Toxic Air Pollutant (TAP) ambient air standards (AAS), which all applicable projects must comply with, in Louisiana Administrative Code (LAC) 33:III Chapter 51. TAPs are pollutants that are known or suspected carcinogens or cause other serious health effects. LDEQ has defined TAPs to include all federally defined hazardous air pollutants (HAP) and include 13 additional pollutants that LDEQ has determined meet the criteria of a TAP. The TAPs are categorized into the following three (3) classes based on the toxic effects:

- Class I – known and probably human carcinogens;
- Class II – Suspected human carcinogens and known or suspected human reproductive toxins; and
- Class III – Acute and chronic (non-carcinogenic) toxins.

Per LAC 33:III Chapter 51, a major source has the potential to emit 10 tpy of a single TAP or 25 tpy of total TAPs. The following table summarizes the potential emissions for all applicable TAP from the Project.

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[2] Per the Federal Land Managers AQRV Workgroup (FLAG) Phase I Report (Revised FLAG 2010 Report).

[3] Per Section 3.2, *Initial Screening Criteria (New)*, of the revised FLAG 2010 Report.

Table 1-2. Project Applicable Source TAPS PTE Summary

Component	Chapter 51 Class	Major Source Threshold (lb/year)	PTE (tpy)
H_2S	III	10	9.50
n-Hexane	III	10	894.88
Benzene	I	10	175.13
Toluene	III	10	77.75
Ethylbenzene	II	10	10.87
Mixed Xylene Isomers	II	10	63.13
Cumene (i-propylbenzene)	III	10	1.28
Biphenyl	II	10	4.38E-3
Cresols	III	10	0.16
Naphthalene	II	10	0.14
Phenol	II	10	0.33
Total TAP	--	25	1,233.2

Per LAC 33:III Chapter 51.5105.B.3(a), emissions from the combustion of Group 1 virgin fossil fuels (which include natural gas and diesel fuel) are exempt from meeting the requirements for the TAPs AAS requirements. As such, TAP emissions from combustion sources (e.g. natural gas generators, crane engines, etc.) would not be included in the analysis. However, to simplify the TAPs analysis performed for the Project, BMOP utilized the following methodology for determining the PTE of TAPs from applicable Project sources:

- The annual VOC emissions (in tpy) from all direct Project sources were conservatively totaled;
  - This includes a relatively small amount of VOC emissions from exempt combustion sources.
- Since emissions from crude oil loading make up more than 99.5% of total VOC emissions on a maximum hourly and annual average basis, the total VOC emissions were speciated according to the maximum vapor concentration of the TAPs in crude oil; and
- Annual H_2S emissions from all direct Project sources were totaled.

Additional sources of TAP emissions that are considered exempt according to LAC 33:III Chapter 51.5105.B.3(a) (e.g. individual TAP emissions from combustion, sulfuric acid emissions from combustion, etc.) were not included in this analysis.

As such, the Project will be subject to the LDEQ LAC 33:III Chapter 51 - Comprehensive TAP Emission Control Program, as potential emissions from the Project exceed 10 tpy of any individual TAP and 25 tpy of total TAPs.

BMOP has evaluated the air quality and source impacts from the Project to demonstrate compliance with the Louisiana specific TAP Emissions Control Program. The following report provides a detailed description of the air quality dispersion modeling methodology, analyses, and approach, and demonstrates that direct impacts from the offshore portion of the Project do not result in a violation of the LDEQ ambient air standards for TAPs under the Comprehensive TAP Emission Control Program.

1.3 Project Description

The primary purpose of the Project will be to provide a safe and reliable long-term supply of crude oil for export to the global market. Oil for export will be transported from the Nederland Terminal (NT), an existing terminal and storage facility owned by Sunoco Partners Marketing and Terminals, L.P., located in Jefferson County, Texas. This terminal has direct access to multiple crude oil pipelines connecting to production from across the U.S. and North America. In addition, the Applicant owns the Stingray Pipeline System and has confirmed that its subsea pipeline and offshore platforms are suitable for converting to facilitate crude oil export from a DWP in the northern GOM.

The DWP will be located in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Blocks (WC) 509, WC 508, and East Cameron (EC) Block 263. The DWP will be approximately eighty-two (82) statute miles from the nearest point on land in Cameron Parish, Louisiana, with an approximate water depth of 162 feet. Crude oil will be routed to the DWP from pumps at the Nederland, through a new 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at Station 501 . The crude oil will be metered on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline End Manifolds (PLEMs) located on the seafloor below two Catenary Anchor Leg Mooring (CALM) Buoys located in WC 508 and in East Cameron Block 263 (EC 263). From each PLEM, the crude oil will be routed to its respective floating CALM Buoy through submerged flexible hoses. VLCCs (or other large seafaring crude oil vessels) will moor at a CALM Buoy, retrieve and connect the floating crude oil hoses connected to the CALM Buoy and the crude oil will then route from the Buoy to the VLCC for loading. Up to 365 large seafaring crude oil vessels will load per year. The BMOP facilities consist of the pumps and meters at NT; a new 37-mile, 42-inch OD pipeline; the existing 36-inch OD Mainline; an existing fixed, manned platform complex at WC 509; an existing platform at WC 148; and two new PLEM and CALM Buoys located in WC 508 and EC 263. A schematic of the proposed DWP is provided in Figure 3 of Appendix A of Volume I of the Deepwater Port License Application (DPLA) and is reproduced for quick reference as Figure 1-2 of this document, below. The crude oils that would be exported range from light to heavy grade crudes and will be sent from the existing NT facility.

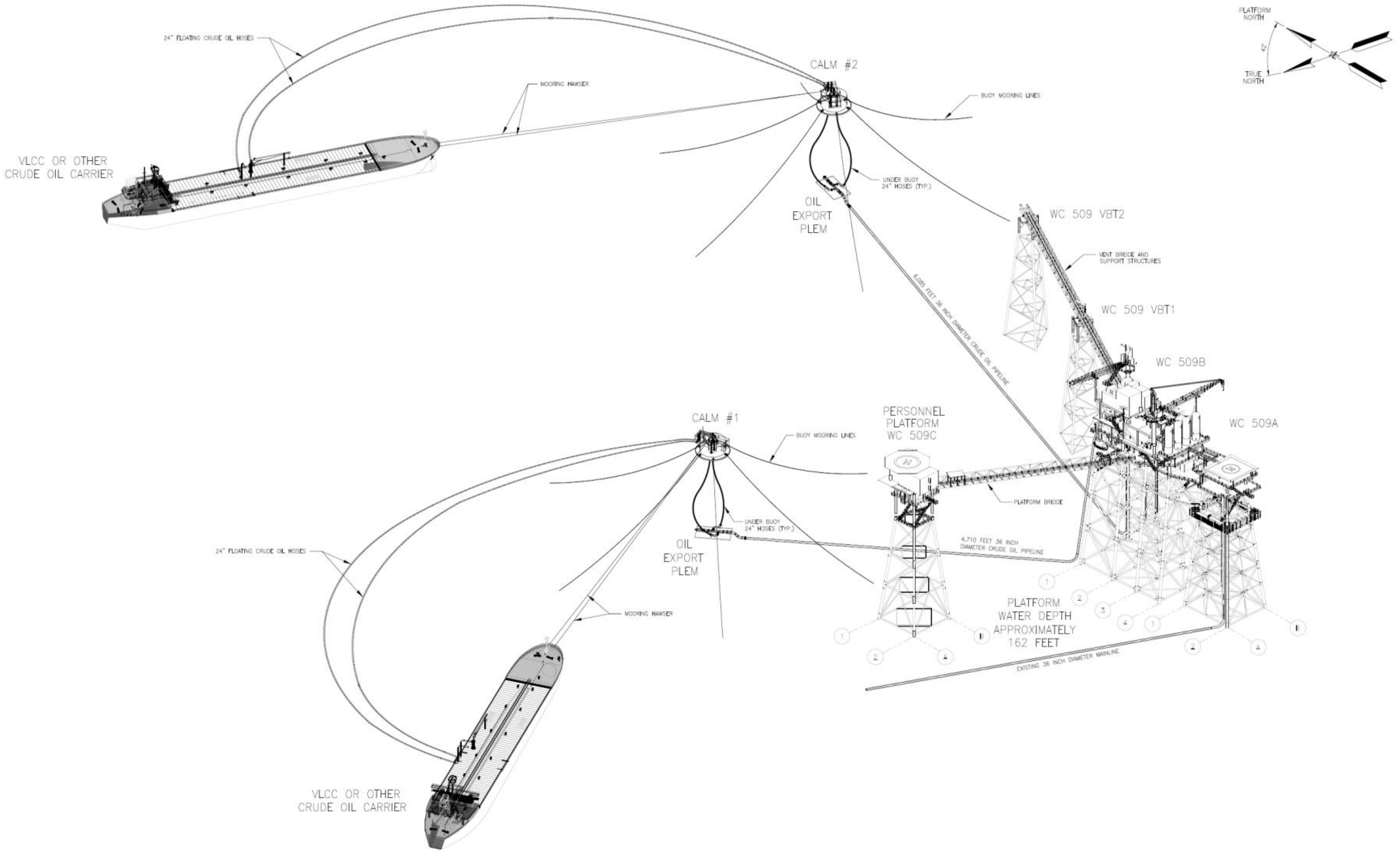

Figure 1-1. Schematic of the WMP with VLCCs

1.4 Report Contents

The rest of the report is organized as follows:

- Section 2 details the Ozone Tier I MERPS Analysis;
- Section 3 details the TAPS Air Quality Dispersion Modeling Analysis;
- Appendix A includes the regional inventory; and
- Appendix B includes a summary of the electronic modeling files.

2. OZONE TIER I MERPS ANALYSIS

Secondary pollutants are air pollutants formed through chemical reactions in the atmosphere. Secondary $PM_{2.5}$ and ozone share common sources of emissions and are formed in the atmosphere from chemical reactions with similar precursors. Surface-level ozone concentrations are the result of photochemical reactions among various chemical species. The chemical species that contribute to ozone formation, referred to as ozone precursors, include NO_X and VOC emissions from both anthropogenic (e.g., mobile and stationary sources) and natural sources (e.g., vegetation). Regarding $PM_{2.5}$, total mass is often categorized into primary (i.e., emitted directly as $PM_{2.5}$ from sources) and secondary (i.e., $PM_{2.5}$ formed in the atmosphere by precursor emissions from sources). $PM_{2.5}$ is dominated by a variety of chemical components including sulfate, nitrate, ammonium, organic carbon, and sea-spray constituents.[4] $PM_{2.5}$ sulfate and nitrate are predominantly the result of chemical reactions of the oxidized products of SO_2 and NO_X precursor emissions.[5]

The methods presented in this section are based on each precursor pollutant from the Project that is greater than or equal to its respective SER triggering a secondary impacts analysis for that individual pollutant following Table III-1 (*EPA Recommended Approaches for Assessing O_3 Impacts by Assessment Case*) and Table III-2 (*EPA Recommended Approaches for Assessing Primary and Secondary $PM_{2.5}$ Impacts by Assessment Case*) of the EPA *DRAFT Guidance for Ozone and Fine Particulate Matter Permit Modeling*.[6] If a precursor pollutant is less than its respective SER, a secondary impacts analysis for that individual pollutant will not be required. As provided in Volume I of the PSD air permit application, potential Project emissions of $PM_{2.5}$, NO_X, and SO_2 were below their respective SER's, and therefore, primary and secondary impact analyses of $PM_{2.5}$ were not required as part of the PSD application. Potential emissions of VOC from the Project exceed the corresponding major source threshold and SER, and therefore, secondary impacts from ozone are evaluated as part of the PSD application.

Because the Project location is >130 km from the nearest coastline, BMOP estimated both (1) offshore secondary impacts and (2) onshore secondary impacts using the methods described below for ozone. This section of the report describes the methods BMOP used to estimate the impact of the Project's proposed precursor emissions of ozone (i.e., NO_X and VOC impact on ozone).

2.1 MERPs as a Tier 1 Demonstration Tool

The latest revisions to the *Guideline on Air Quality Models* (hereafter referred to as *Guideline*), which was published in the Federal Register (FR) on January 17, 2017[7] and fully promulgated May 22, 2017,

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[4] U.S. EPA, *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program*, EPA-454/R-19-003 (April 30, 2019). Office of Air Quality Planning and Standards, Research Triangle Park, NC. Pg. 13. Refer to: https://www3.epa.gov/ttn/scram/guidance/guide/EPA-454_R-19-003.pdf. (hereafter referred to as *MERPs Guidance*)

[5] Seinfeld, J.H., Pandis, S.N., 2012. *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change*. John Wiley & Sons.

[6] U.S. EPA, *DRAFT Guidance for Ozone and Fine Particulate Matter Permit Modeling*, EPA-457/P-20-002 (February 2020). Office of Air Quality Planning and Standards, Research Triangle Park, NC. Refer to: https://www3.epa.gov/scram001/guidance/guide/Draft_Guidance_for_O3_PM25_Permit_Modeling.pdf.

[7] *Revisions to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter*, FR 82, No. 10 (January 17, 2017). Pgs. 5182-5235.

established a two-tiered demonstration approach for addressing single-source impacts on ozone.[8] Tier 1 demonstrations rely on the use of technically credible relationships between emissions and ambient impacts based on existing modeling studies deemed sufficient for evaluating a source's impacts. One suggested Tier 1 demonstration approach in the *Guideline* is the use of MERPs. The EPA discusses this approach in detail in the *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program* (hereafter referred to as *MERPs Guidance*).[9]

In the *MERPs Guidance*, the EPA presents photochemical modeling of hypothetical single source impacts on downwind ozone in four geographical regional domains with varying source release types (either "high" at 90 meters or "low" at 10 meters) and varying NO_X and VOC emission rates (either 500, 1,000, or 3,000 tpy). To use the EPA MERPs hypothetical sources in a PSD secondary impacts determination, the EPA recommends following a three-step process as displayed in Figure 4-1 of the *MERPs Guidance.*[10] In Step 1, the permit applicant should identify a representative hypothetical source from the EPA's *MERPs Guidance* modeling. Additionally, the permit applicant should provide a technically credible justification that the source characteristics of the specific project and the physical and chemical environment near that project source are adequately represented by the selected hypothetical source.[11]

2.2 Selection of MERPs U.S. EPA Hypothetical Source

To begin Step 1, BMOP examined the available EPA hypothetical sources in the Gulf Coast region from the *MERPs Guidance*. Figure 2-1 shows the Project location (green circle) and the nearest four hypothetical sources (red stars): Harris, Texas – FIPS 48201; Acadia, Louisiana – FIPS 22001; Orleans, Louisiana – FIPS 22071; and Bay, Florida – FIPS 12005.[12]

2.2.1 Physical Environment

2.2.1.1 Terrain and Urban Landcover

The EPA provides information for each hypothetical source to facilitate qualitative comparison between hypothetical sources and the project source to determine representativeness.[13] The *MERPs Guidance* information includes the terrain within 50 km of each hypothetical source and maximum grid cell percent urban landcover within 50 km of each hypothetical source to inform the permit applicant about nearby orography and whether the hypothetical source is in proximity to population centers. Table 2-1 provides this information for each of the four Gulf Coast hypothetical sources being considered.[14] The maximum nearby terrain across all four hypothetical sources are all relatively low elevation with only slight variation: Bay is the highest (55 m) and Orleans is the lowest (10 m). The Acadia and Bay hypothetical sources have low maximum nearby urban percentages (6.5% and 9.8%, respectively). The Harris and Orleans hypothetical

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[8] U.S. EPA, *Guideline on Air Quality Models*, 40 CFR Part 51 - Appendix W (Revised, January 17, 2017).

[9] *MERPs Guidance*.

[10] *MERPs Guidance*, pg. 40.

[11] *MERPs Guidance*, pg. 40.

[12] Note, hypothetical sources that are far inland are not considered in this analysis such as Guadalupe, Texas – FIPS 48187.

[13] *MERPs Guidance*, pg. 21.

[14] *MERPs Guidance*, Table A-1, pg. 64.

sources have much higher maximum nearby urban percentages (64.7% and 50.4%, respectively) due to their proximity to Houston, Texas and New Orleans, Louisiana. The Project location is > 130 km from the nearest coastline in the Gulf of Mexico with no terrain changes and no urban activity. While the Acadia and Bay hypothetical sources do not exactly align with regard to terrain and urban activity, these two hypothetical sources do align better than the Harris and Orleans hypothetical sources especially with regard to fewer changes in land use/land cover that can impact pollutant dispersion. As such, **because of the respective urban features, the Harris and Orleans hypothetical sources are not selected as representative.** To help determine whether the remaining Acadia or Bay hypothetical source is more representative, BMOP proceeds with the physical and chemical environment comparison.

Figure 2-1. U.S. EPA Hypothetical Sources Considered

Table 2-1. Information for U.S. EPA Hypothetical Sources Considered

County, State	FIPS #	Max Nearby Terrain[a] (m)	Max Nearby Urban[a] (%)
Harris, Texas	48201	41	64.7
Acadia, Louisiana	22001	16	6.5
Orleans, Louisiana	22071	10	50.4
Bay, Florida	12005	55	9.8

Source: U.S. EPA hypothetical sources (city, state – FIPS #) as provided in the *MERPs Guidance*.

a. "Max Nearby Terrain (m)" and "Max Nearby Urban (%)" are from Table A-1 of the *MERPs Guidance*. Per the U.S. EPA, the "Max Nearby Urban (%)" provides the highest percentage urban landcover in any grid cell near (within 50 km) the hypothetical source.

2.2.1.2 Planetary Boundary Layer Meteorology

The planetary boundary layer (PBL) is the lowest layer of the atmosphere that is directly influenced by the Earth's surface through forces such as frictional drag, evaporation/transpiration, heat transfer, and pollutant emission.[15] The depth of the PBL extends from the Earth's surface to a few hundred meters to a few kilometers depending on environmental conditions. This variability in PBL height is important for air quality and atmospheric chemistry because the PBL height determines the volume available for pollutant dispersion. In general, urban areas produce more heat (resulting in buoyant air parcels and convective turbulence), and as a result, the PBL height tends to be higher over cities. Because water has a larger heat capacity and due to the tremendous mixing within the top of the ocean (i.e., the ocean does not respond the same to diurnal

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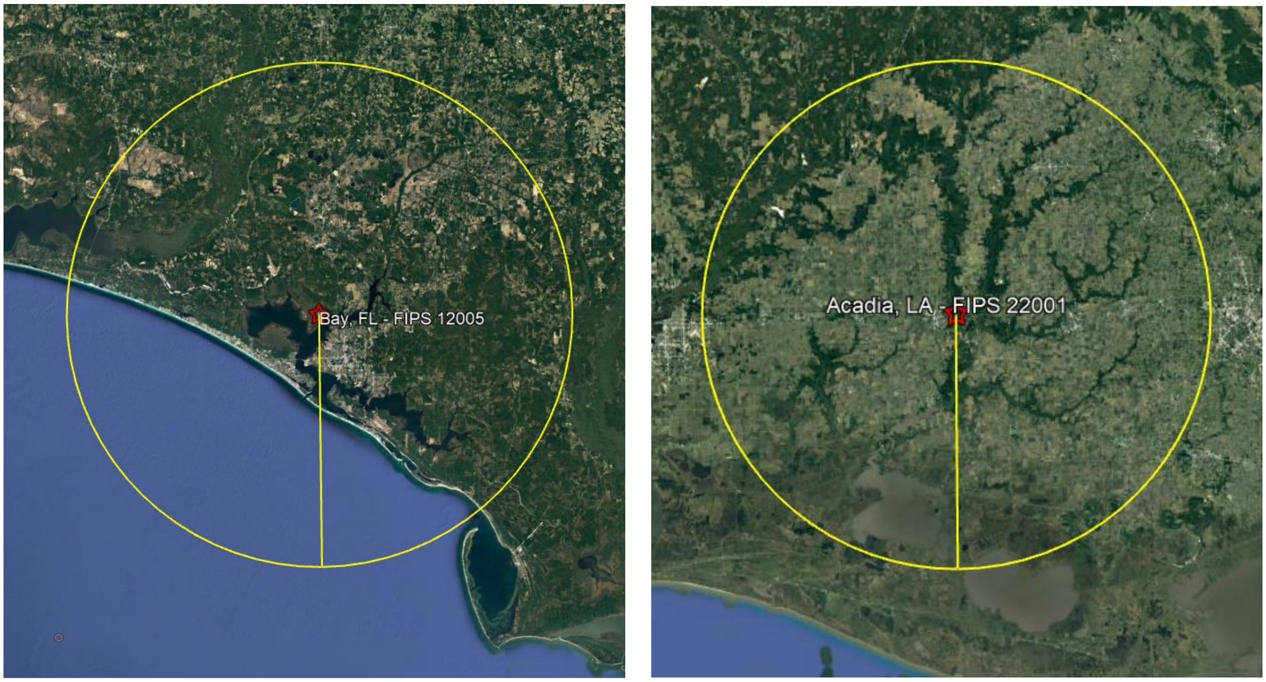
[15] Stull, Ronald B., 1988. *An Introduction to Boundary Layer Meteorology.* Kluwer Academic Publishers.

heating and cooling effects as land does),[16] PBL heights tend to be much lower over the ocean and along the coast.

Figure 2-2 displays both the Bay and Acadia hypothetical sources and the land/ocean within a 50 km radial distance (consistent with the U.S. EPA 50 km distance used for maximum nearby terrain and maximum nearby urban in the *MERPs Guidance*). Based on Figure 2-2, the Acadia hypothetical source has no grid cells within 50 km over the ocean whereas the Bay hypothetical source has ~30% of the grid cell area within 50 km over the ocean. Additionally, the Bay hypothetical source is ~1 km from Panama City Bay and ~14 km from the ocean. As such, the PBL features (e.g., height and diurnal variation) of the Bay hypothetical source location and modeling domain are expected to be more similar to the PBL features of the Project offshore location compared to the Acadia hypothetical source. **Based on this comparison, the Bay hypothetical source is selected as more representative with regard to PBL features.**

Figure 2-2. 50 km Radius Domain for Bay (left) and Acadia (right) Hypothetical Sources



2.2.2 Chemical Environment

2.2.2.1 Regional/Local Emissions

The U.S. EPA National Emissions Inventory (NEI) data is utilized to determine nearby local and regional sources of pollutants and their emissions (e.g., other industry, mobile, biogenic) for the Acadia and Bay hypothetical sources.[17] A similar approach was completed to determine a representative ambient monitor in Table 3 of Appendix C of the U.S. EPA memorandum *DRAFT Guidance for Ozone and Fine Particulate Matter*

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[16] U.S. EPA, *User's Manual AERCOARE Version 1.0*, EPA 910-R-12-008 (October 2012). Office of Environmental Assessment, Region 10, Seattle, WA. Refer to: https://www3.epa.gov/ttn/scram/models/relat/aercoare/AERCOAREv1_0_Users_Manual.pdf.

[17] *MERPs Guidance*, pg. 9.

Permit Modeling.[18] Table 2-2 presents the Acadia County and Bay County 2017 NEI NO_X and VOC emissions.[19] The VOC emissions are substantially higher for Bay County compared to Acadia County (29,105.28 tpy versus 9,553.35 tpy). Specifically, the Bay County 29,105.28 tpy VOC emissions are comparable to the VOC Project potential emissions of 21,881 tpy. The NO_X Bay County and Acadia County emissions, however, are of similar magnitude (6,621.20 tpy versus 5,044.12 tpy, respectively) and are both higher than the NO_X Project potential emissions of ~26 tpy. **Based on this comparison (specifically VOC), the Bay hypothetical source is selected as more representative of the Project geographical area with regard to regional and local emissions.**

Table 2-2. 2017 U.S. EPA NEI County Emissions for Acadia and Bay Hypothetical Sources

County, State	County NO_X Emissions (tpy)	County VOC Emissions (tpy)
Acadia, Louisiana	5,044.12	9,553.35
Bay, Florida	6,621.20[a]	29,044.89[a]

Source: U.S. EPA 2017 National Emissions Inventory (NEI) Data. Refer to: https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#tab-3.

a. The Bay hypothetical source location is within 1 km of the Acadia County and Jefferson Davis County border. The Jefferson Davis County NO_X and VOC emission totals are 1,902.35 and 9,956.81, respectively.

2.2.2.2 *Ozone Sensitivity*

Ozone formation may be limited by either NO_X or VOC emissions depending on the meteorological conditions and the relative mix of these pollutants.[20] When ozone concentrations are directly related to changes in NO_X emissions, the ozone formation regime is termed "NO_X limited." Alternatively, the ozone formation regime is termed "VOC limited" when ambient ozone concentrations are very sensitive to changes in ambient VOC. In a NO_X-limited regime, ozone decreases with decreasing NO_X and has very little response to changes in VOC. The NO_X-limited formation regime is more common in rural areas of the U.S. where high levels of biogenic VOC exist and relatively few man-made, or anthropogenic, NO_X emissions occur.[21] Ozone decreases with decreasing VOC in a VOC-limited formation regime. Utilizing the complete hypothetical source impact versus distance dataset available on the EPA MERPs View Qlik webpage, BMOP examined the ozone sensitivity to VOC emissions for both the Bay and Acadia hypothetical sources up to distances of 300 km.[22]

Figure 2-3 displays the U.S. EPA Qlik ozone impact versus distance for the Bay and Acadia hypothetical sources for the 3,000 tpy and 90 m stack height scenario in the *MERPs Guidance*. BMOP chose to focus solely on VOC due to the relatively higher Project emissions compared to NO_X. Figure 2-3 shows a maximum impact of ~1 ppb within 50 km for both hypothetical sources. For the Bay hypothetical source, the ozone impact steadily decreases from 40 to 300 km. For the Acadia hypothetical source, the ozone impact begins

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[18] U.S. EPA, *DRAFT Guidance for Ozone and Fine Particulate Matter Permit Modeling*, EPA-457/P-20-002 (February 10, 2020). Office of Air Quality Planning and Standards, Research Triangle Park, NC.

[19] In Louisiana, a "County" is refferred to as a "Parish." For simplicity, Acadia is referred to as "Acadia County" rather than "Acadia Parish" in this analysis.

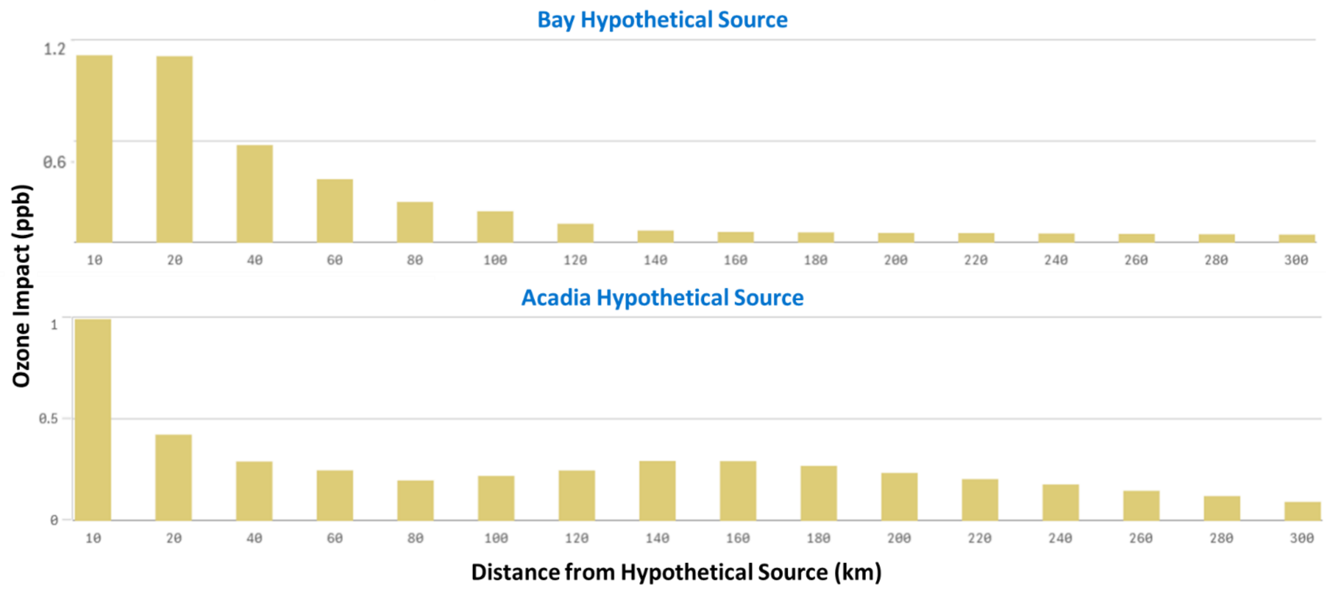
[20] *MERPs Guidance*, pg. 12.

[21] *MERPs Guidance*, pg. 12.

[22] U.S. EPA, *Support Center for Regulatory Atmospheric Modeling – MERPs View Qlik*. Refer to: https://www.epa.gov/scram/merps-view-qlik.

to steadily decrease from 40 to 80 km. However, the ozone impact begins to increase at 80 km and does not go below the 80 km impact of 0.2 ppb until 240 km. Because of the remote offshore area of the Project, BMOP expects the ozone impact versus distance to resemble the Bay hypothetical source pattern rather than the Acadia pattern. **Based on this comparison, the Bay hypothetical source is selected as more representative of the Project with regard to ozone sensitivity to VOC emissions at large distances.**

Figure 2-3. U.S. EPA Qlik Ozone Impact Versus Distance for the Bay and Acadia Hypothetical Sources (3,000 tpy and 90 m Stack Height Scenario)



Based on the physical and chemical environment comparison above between the Bay and Acadia hypothetical sources, BMOP selects the Bay hypothetical source as more representative of the Project.

2.3 Offshore Secondary Impacts

2.3.1 Offshore Source Impact Analysis

In accordance with the *MERPs Guidance*, BMOP estimated the offshore impact of the Project emissions on ambient ozone based on the data provided for the U.S. EPA Bay hypothetical source. To do so, BMOP reviewed the Bay hypothetical source model scenarios provided in the *MERPs Guidance* and selected the most representative scenario based on emissions and stack height for NO_X and VOC. Next, BMOP estimated a project specific impact based on the proration of the Project emissions by the ratio of the Bay hypothetical source impact to the Bay hypothetical source emissions.[23] In other words, BMOP calculated the project source impact using the product of the hypothetical source impact relative to emissions scaled either upwards or downwards to the emission rate of the Project.[24]

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[23] *MERPs Guidance*, pg. 55.

[24] *MERPs Guidance*, pg. 55.

BMOP considered the precursor impacts together as shown in Equation 1 below. A total project impact calculated in Equation 1 that is less than the applicable Significant Impact Level (SIL) demonstrates the project will not cause or contribute to violation of the applicable NAAQS, and no further analysis is required.[25] If the total project impact in Equation 1 exceeded the corresponding SIL, BMOP performed a cumulative impacts analysis.

<u>8-Hour Ozone Impact using a 1.0 ppb SIL:</u>

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = \left(\left(\frac{WC509\ Project\ NOx\ (tpy)}{Bay\ Hyp.Source\ NOx\ O_3\ MERP}\right) + \left(\frac{WC509\ Project\ VOC\ (tpy)}{Bay\ Hyp.Source\ VOC\ O_3\ MERP}\right)\right) \times SIL$$

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = \left(\left(\frac{26.02\ tpy}{482\ tpy^{26}}\right) + \left(\frac{21{,}881\ tpy}{2{,}701\ tpy^{27}}\right)\right) \times 1.0\ ppb$$

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = 8.15$$

As shown above, the total impact from the Project is greater than the corresponding SIL for ozone. Therefore, a cumulative impacts analysis was performed below.

2.3.2 Offshore Cumulative Impact Analysis

As detailed in Section 9 of the *Guideline*, for situations where the proposed project is not able to demonstrate compliance through the source impact analysis, a cumulative impact analysis is required. The cumulative impact is then compared to the applicable NAAQS to determine whether the proposed project could cause or contribute to a NAAQS exceedance. As provided in the *MERPs Guidance*, the cumulative assessment includes the sum of the source impact analysis and the monitored design value as shown below:[28]

$$\boldsymbol{EQ.2}: Projected\ Design\ Value\ with\ Project = Total\ Project\ Impact\ (from\ Eq.1\ above) + Monitored\ Design\ Value$$

BMOP determined the offshore cumulative impacts using Equation 2 for ozone as required. For this offshore cumulative impacts analysis, BMOP utilized a representative offshore ozone value as no ambient ozone monitors exist in the Gulf of Mexico for design value NAAQS purposes. Based on the following references, BMOP determined 40 ppb is a representative, yet conservative, offshore ozone value to use in Equation 2 for the cumulative impacts analysis for ozone:

- Remote marine typical summertime daily maximum ozone concentrations range from 20-40 ppb.[29]

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[25] *MERPs Guidance*, pg. 10.

[26] MERP value based on maximum impacts from the Bay hypothetical source with 500 tpy of NO_X emissions and a 90 ft stack.

[27] MERP value based on maximum impacts from the Bay hypothetical source with 3,000 tpy of VOC emissions and a 90 ft stack.

[28] *MERPs Guidance*, pg. 55.

[29] National Research Council, 1991. *Rethinking the Ozone Problem in Urban and Regional Air Pollution*. Washington, DC: The National Academies Press. Refer to Table 8-1: https://www.nap.edu/read/1889/chapter/10.

- Ozone measurements taken at a Texas Commission on Environmental Quality (TCEQ) monitoring station in Galveston, Texas, show that levels below 20 ppb are common when air masses originate from the Gulf of Mexico.[30]
- During the Gulf of Mexico and East Coast Carbon Cruise (GOMECC) study aboard the National Oceanic and Atmospheric Administration (NOAA) research vessel Ronald Brown, ozone remained in the 20–30 ppb range in the Gulf of Mexico when southerly winds were encountered.[31]
- Gulf of Mexico background ozone is ~39 ppb based on data from 21 Tunable Optical Profiler for Aerosol and ozone lidar (TOPAZ) flights according to the TCEQ.[32]
- Back-trajectories originating in central Houston, Texas were run for all days with available data from May through October 2000-2007 using the NOAA Air Resource Laboratory (ARL) HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model. Next, a clustering algorithm built into HYPSLIT was used to sequester individual back-trajectories into a relatively small set of classes based on shape and direction (i.e., clusters). The mean background Houston-Galveston-Brazoria (HGB) ozone was 21 and 25 ppb for the two trajectory clusters originating over the Gulf of Mexico.[33,34]
- Back-trajectories originating in Galveston, Texas were run for all days with available data from May through September 2007-2011 using the NOAA ARL HYSPLIT model. The SAS FASTCLUS procedure was used to define clusters of back trajectories. Clusters 1 and 5 from the Gulf of Mexico were associated with 20-30 ppb ozone.[35]

$$\boldsymbol{EQ.2}: Projected\ Design\ Value\ with\ Project = \ 8.15\ ppb + 40\ ppb$$
$$\boldsymbol{EQ.2}: Projected\ Design\ Value\ with\ Project = \ 48.15\ ppb$$

As shown above, the cumulative impacts analysis for ozone results in an air quality level less than the applicable primary NAAQS of 70 ppb, which demonstrates that the Project will not cause or contribute to a violation of the NAAQS.

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[30] Tuite, K., N. Brockway, S.F. Colosimo, K. Grossmann, C. Tsai, J. Flynn, et al. (2018). *Iodine catalyzed ozone destruction at the Texas coast and Gulf of Mexico*. Geophysical Research Letters, 45, 7800–7807. https://doi.org/10.1029/2018GL078267.

[31] Helmig, D., E. K. Lang, L. Bariteau, P. Boylan, C. W. Fairall, L. Ganzeveld, J. E. Hare, J. Hueber, and M. Pallandt (2012). *Atmosphere-ocean ozone fluxes during the TexAQS 2006, STRATUS 2006, GOMECC 2007, GasEx 2008, and AMMA 2008 cruises*. Journal of Geophysical Research, 117, D04305, doi:10.1029/2011JD015955.

[32] Estes, M. (2010), TCEQ. *Background Ozone: Recent Research in the US and Texas*. Presented at the Southeast Texas Photochemical Modeling Technical Committee Meeting. Slide 9 of 24. Refer to: https://www.tceq.texas.gov/assets/public/implementation/air/am/committees/pmt_set/20100407/20100407-estes.pdf.

[33] Estes, M. (2009), TCEQ. *Flow Regimes Associated with High Ozone in Houston*. Slide 5 of 45. Refer to: https://www.tceq.texas.gov/assets/public/implementation/air/am/committees/pmt_set/20090917/20090917-estes-flow_regimes.pdf.

[34] Sullivan, D. (2009), The University of Texas at Austin. *Effects of Meteorology on Pollutant Trends*. Final Report to TCEQ. Refer to: https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/da/5820586245FY0801-20090316-ut-met_effects_on_pollutant_trends.pdf.

[35] Estes, M., J. Smith, and F. Mercado (2014), TCEQ. *Regional Background Ozone in the Eastern Half of Texas*. Presented at the 2014 Community Modeling and Analysis System (CMAS) Conference. Slide 24 of 28. Refer to: https://www.cmascenter.org/conference//2014/slides/mark_estes_regional_sbackground_2014.pptx.

2.4 Onshore Secondary Impacts

2.4.1 Onshore Source Impact Analysis

BMOP estimated the onshore impact of the Project emissions on ambient ozone based on Equation 1 above that was utilized to estimate the offshore impact. BMOP utilized the Bay hypothetical source impact versus distance data available on the U.S. EPA MERPs View Qlik webpage rather than utilizing the default maximum impact within 50 km from the *MERPs Guidance.*[36] Specifically, BMOP utilized the U.S. EPA Qlik impact value at the distance from the Project location to the nearest onshore location. Consistent with the offshore analysis, a calculated total project impact that is less than the applicable SIL demonstrates the project will not cause or contribute to violation of the applicable NAAQS, and no further analysis is required. If the calculated total project impact exceeded the corresponding SIL, BMOP performed a cumulative impacts analysis.

<u>8-Hour Ozone Impact using a 1.0 ppb SIL:</u>

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = \left(\left(\frac{WC509\ Project\ NOx\ (tpy)}{Bay\ Hyp.Source\ NOx\ O_3\ MERP}\right) + \left(\frac{WC509\ Project\ VOC\ (tpy)}{Bay\ Hyp.Source\ VOC\ O_3\ MERP}\right)\right) \times SIL$$

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = \left(\left(\frac{26.02\ tpy}{1{,}086\ tpy^{37}}\right) + \left(\frac{21{,}881\ tpy}{26{,}620\ tpy^{38}}\right)\right) \times 1.0\ ppb$$

$$\boldsymbol{EQ.1}: Total\ Project\ Impact\ (ppb) = 0.85$$

As shown above, the total project impact is below the corresponding SIL, which demonstrates that the Project will not cause or contribute to a violation of the NAAQS. Additionally, since total project impacts are below the ozone SIL, a cumulative impacts analysis is not required.

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[36] U.S. EPA, *Support Center for Regulatory Atmospheric Modeling – MERPs View Qlik*. Refer to: https://www.epa.gov/scram/merps-view-qlik.

[37] Per guidance from EPA, MERP value based on impacts 120 km from the Bay hypothetical source with 500 tpy of NO_X emissions and a 90 ft stack.

[38] Per guidance from EPA, MERP value based on impacts from the Bay hypothetical source with 3,000 tpy of VOC emissions and a 90 ft stack.

3. TAPS AIR QUALITY DISPERSION MODELING

BMOP has performed air quality dispersion modeling in support of the LDEQ TAPs Emissions Control Program to demonstrate that the proposed operations associated with the Project will not result in a violation of the LDEQ TAPs Emission Control Program.

3.1 Guidance Documents

The TAPs dispersion modeling analysis was conducted in consideration of the following guidance documents:

- August 2006 Louisiana DEQ Air Quality Modeling Procedures[39]
- Guideline on Air Quality Models 40 CFR 51, Appendix W (EPA, Revised, January 17, 2017)

3.2 TAPS Air Quality Dispersion Modeling Methodology

BMOP performed an air quality analysis to demonstrate that direct emissions of TAPs from the Project are in compliance with the TAP Ambient Air Standards (AAS) of LAC 33:III. Chapter 51.

The modeling analysis was conducted to estimate the ground-level concentrations (GLCs) of the TAPs listed in the table below that exceed the applicable minimum emission rate (MER). As discussed in Section 1 of this report, the TAPs PTE calculations are based on annual VOC emissions from all direct Project sources and speciated based on the maximum vapor concentration of the TAPs in crude oil. Additionally, annual H_2S emissions from all applicable direct Project sources were totaled.

Table 3-1. TAPs MER Analysis

Component	PTE (lb/year)	Chapter 51 Class	MER (lb/year)	Modeling Analysis Required?
H_2S	18,998	III	1,000	Yes
n-Hexane	1,789,769	III	13,000	Yes
Benzene	350,269	I	260	Yes
Toluene	155,507	III	20,000	Yes
Ethylbenzene	21,741	II	20,000	Yes
Mixed Xylene Isomers	126,269	II	20,000	Yes
Cumene (i-propylbenzene)	2,569	III	18,000	No
Biphenyl	9	II	97.5	No
Cresols	315	III	1,600	No
Naphthalene	276	II	1,990	No
Phenol	652	II	1,400	No

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[39] https://deq.louisiana.gov/assets/docs/Air/ModelingProcedures0806.pdf

The following steps are outlined in the LDEQ Air Quality Modeling Procedures (AQMP) for air toxic modeling and were used in the analysis:

1. If modeled results using the latest year of meteorological data are less than 7.5 percent of the LAC Table 51.2 AAS at all off-property receptors, then no further analysis is necessary.

2. If modeled results using the latest year of meteorological data are greater than or equal to 7.5 percent of the LAC Table 51.2 AAS at any off-property receptor, additional sources within the area of impact (AOI) must be considered. The AOI is defined as a circle whose radius is equal to the maximum distance from the applicant's facility to an off-property receptor where modeled concentrations exceed 7.5 percent of the LAC Table 51.2 AAS (50-kilometer maximum). If all results achieve compliance with 75 percent of the AAS, no further analysis is necessary. However, if 75 percent of the LAC Table 51.2 AAS is exceeded at any off-property receptor, then four additional consecutive years of pre-processed meteorological data shall be used to complete a more refined modeling analysis. When employing these five years of meteorological data, if every off-property receptor is attributed a concentration less than the LAC Table 51.2 AAS, no further analysis is necessary.

3. Finally, if exceedances of the AAS still exist, then an analysis should be performed for the worst-case year to determine if the exceedances are allowable by satisfying LAC 33:III.5109.B.1 or LAC 33:III.5109.B.2.

BMOP demonstrated compliance with the TAP AAS of LAC 33:III. Chapter 51 using the aforementioned air toxic modeling analyses steps.

3.3 TAPS Modeling Analyses

This section of the modeling report describes the modeling procedures and data resources utilized in the setup of the TAPs air quality modeling analyses. The techniques used for the air quality analysis are consistent with current EPA guidance.

3.3.1 Dispersion Model Selection

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) is a refined, steady-state, multiple source, Gaussian dispersion model and was promulgated in December 2005 as a preferred model for use by industrial sources for NSR and PSD air quality analysis.[40] Due to the steady-state assumption of AERMOD, gaussian plume models are generally applicable to distances less than 50 km.

The AERMOD, Version 19191 modeling system is composed of three modular components: AERMAP, the terrain preprocessor; AERMET, the meteorological preprocessor; and AERMOD, the dispersion and post-processing module. AERMAP is the terrain pre-processor that is used to import terrain elevations for selected model objects and to generate the receptor hill height scale data that are used by AERMOD to drive advanced terrain processing algorithms. AERMET generates a separate surface file and vertical profile file to pass meteorological observations and turbulence parameters to AERMOD.

For the purpose of modeling offshore air dispersion, AERCOARE, the overwater meteorological data processor, was used as an alternative to the AERMET data processor. As required by Section 3.2.2 of 40 CFR 51, Appendix W, a request for approval for the use of an alternative model was submitted to EPA,

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[40] 40 CFR Part 51, Appendix W, Guideline on Air Quality Models, Appendix A.1 AMS/EPA Regulatory Model (AERMOD).

providing justification that the use of AERCOARE Processor to generate overwater meteorological data to use with AERMOD (referred to as AERMOD/AERCOARE model) is more appropriate and applicable over EPA's preferred air quality model.[41] Accordingly, BMOP used AERMOD/AERCOARE model for the NEPA modeling analysis. As AERMOD's accuracy is limited to 50 km, BMOP evaluated impacts from the TAPs model up to 50 km surrounding the Project.

3.3.2 Meteorological Data

Overwater hourly meteorological data obtained from the NOAA - National Data Buoy Center for 2012 through 2017 were used for the air dispersion modeling analyses. AERCOARE requires measurements of wind speed, wind direction, air and sea temperature, atmospheric pressure, wave height, and wave period. This data was obtained from the NOAA website[42]. The required relative humidity values were calculated from measurements of dew point temperature and dry bulb temperature. Buoy 42035 was identified as the closest buoy with sufficient and current meteorological measurements. Other nearby buoys either did not monitor all the required meteorological parameters, did not have historical measurements, or the data records did not meet the 90% by quarter completeness criterion of the USEPA's Meteorological Monitoring Guidance.[43]

Figure 3-1. Locations of Buoy 42035 and BMOP Project

Buoy 42035 is located 22 nautical miles (25.3 statute miles, or 40.7 kilometers) east of Galveston, Texas, and approximately 88.2 nautical miles (101.5 statute miles, or 163.4 kilometers) northwest of the Project location. Prior to substitution, the data from this buoy met the 90% by quarter completeness criterion for all required meteorological parameters except for relative humidity data. The relative humidity data is not provided by Buoy 42035 which is required by AERCOARE. Thus, the relative humidity data from the nearest National Weather Association (NWA) station, Scholes International Airport (KGLS) was substituted. The buoy

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[41] The alternative modeling request was submitted under separate cover to EPA.

[42] https://www.ndbc.noaa.gov/station_page.php?station=42035

[43] U.S. Environmental Protection Agency (USEPA). 2000, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-0005. February 2000.

42035 data completeness evaluation results are shown in table below. As provided in the table below, calendar year 2014 did not meet the minimum data requirements required for the modeling analysis, and therefore it was excluded from air dispersion modeling.

Table 3-2. Buoy 42035 Data Completeness Evaluation Results

Year	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Wind Direction				Pressure			
2012	99.9%	99.9%	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%
2013	99.6%	99.9%	99.8%	99.9%	100.0%	100.0%	100.0%	100.0%
2014 [1]	99.9%	45.2%	45.5%	100.0%	100.0%	100.0%	100.0%	100.0%
2015	100.0%	99.4%	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%
2016	99.9%	99.0%	99.4%	99.4%	100.0%	100.0%	100.0%	100.0%
2017	99.8%	98.4%	98.9%	99.3%	100.0%	100.0%	100.0%	100.0%
Year	Wind Speed				Air Temperature			
2012	99.9%	99.9%	100.0%	99.8%	99.9%	99.9%	100.0%	99.8%
2013	99.6%	99.9%	99.8%	99.9%	99.6%	99.9%	99.8%	99.9%
2014 [1]	99.9%	45.1%	45.1%	100.0%	99.9%	45.0%	44.5%	100.0%
2015	100.0%	99.4%	100.0%	99.8%	100.0%	99.4%	100.0%	99.8%
2016	99.9%	99.0%	99.4%	99.4%	99.9%	99.0%	99.4%	99.4%
2017	99.8%	98.4%	98.9%	99.3%	99.8%	98.4%	98.9%	99.3%
Year	Relative Humidity							
2012	100.0%	100.0%	99.8%	99.5%				
2013	100.0%	99.9%	96.7%	99.9%				
2014 [1]	98.7%	100.0%	100.0%	99.7%				
2015	99.4%	99.9%	97.8%	99.6%				
2016	99.6%	99.8%	99.7%	99.5%				
2017	99.9%	99.1%	99.8%	99.9%				

[1] The 2014 meteorological data was excluded because it did not meet the 90% completeness criterion.

Additionally, the figures below represent the 5-year average (for 2012, 2013, 2015-2017) wind rose data for both the surface and profile data sets used in the air quality analysis. The surface and profile data sets contain surface characteristics along with wind and temperature observations necessary to determine specific meteorological factors for dispersion calculations. The surface data is based on hourly observations while the profile data is based on twice-daily upper air observations.[44] As shown below, the 5-year average primary wind direction is from the Southeast.

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[44] https://www3.epa.gov/ttn/scram/7thconf/aermod/aermet_userguide.pdf

Figure 3-2. Buoy 42035 Surface Data Wind Rose

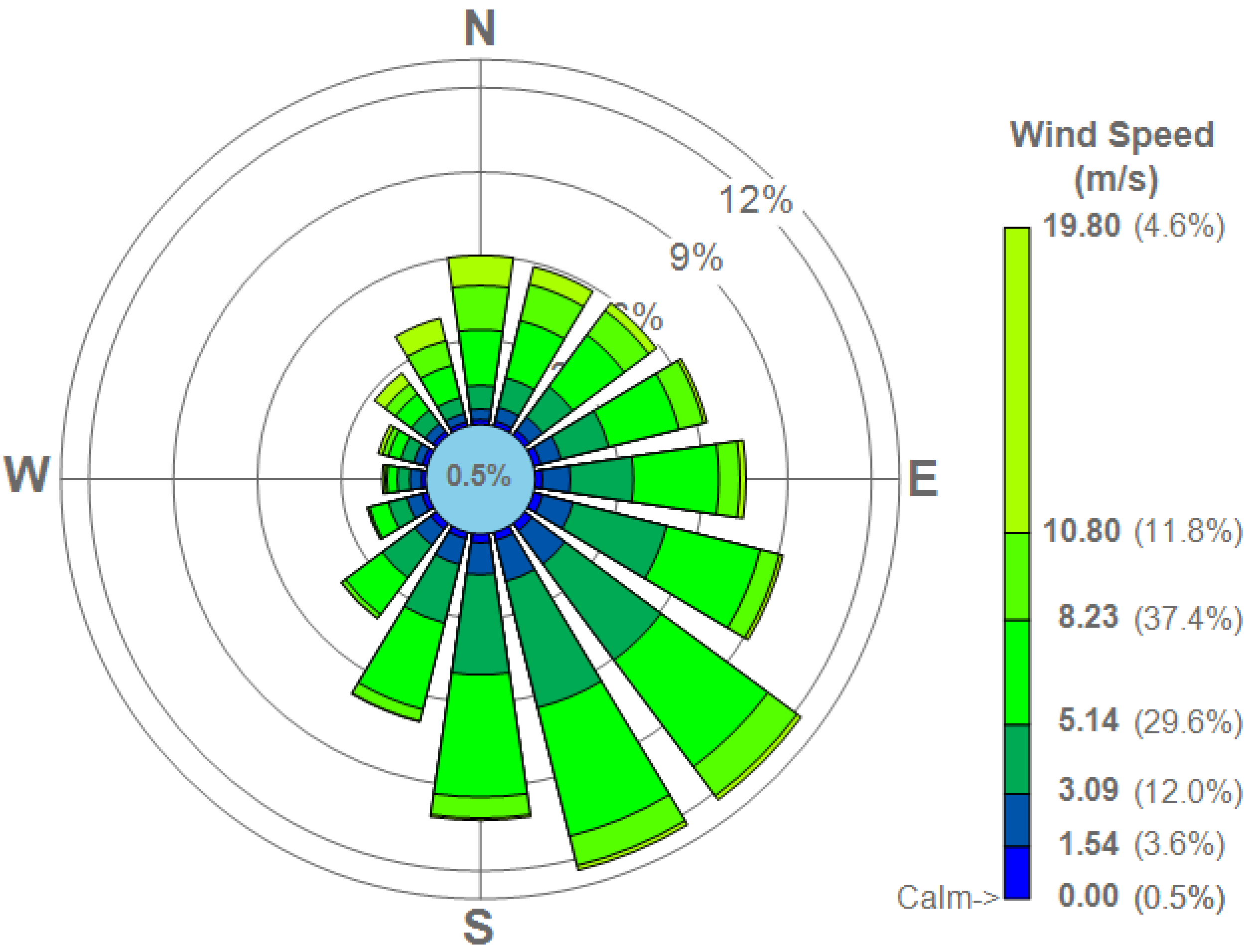
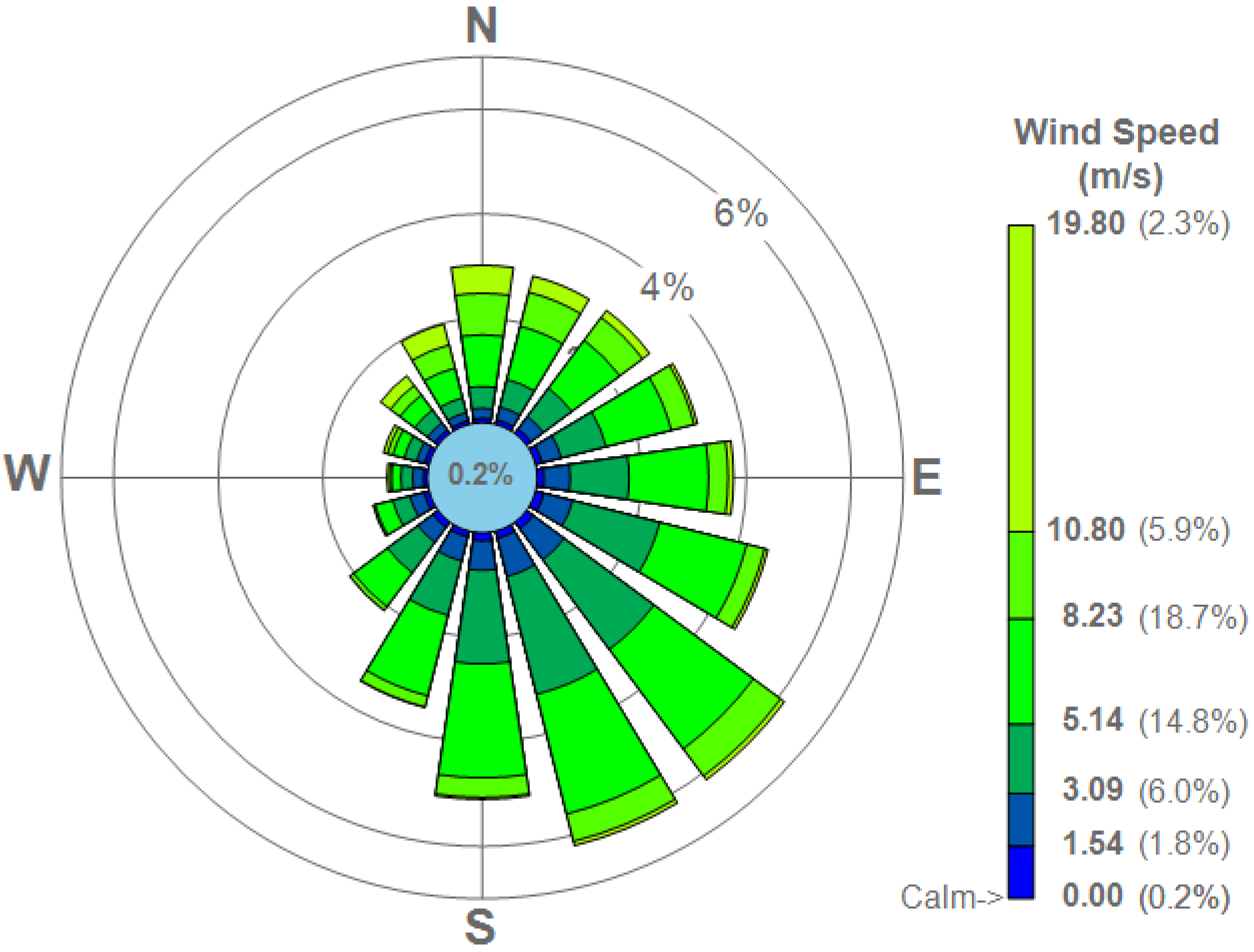


Figure 3-3. Buoy 42035 Profile Data Wind Rose



3.3.3 Regional Inventory Sources

If modeled results using the latest year of meteorological data were greater than 7.5% of the AAS, then BMOP performed Step 2 of the modeling analysis. As discussed above, Step 2 requires that additional sources within the AOI must be considered in the modeling analysis.

For demonstrating compliance with Step 2 of the modeling analysis, emissions from nearby off-site sources (also known as the regional inventory) were incorporated in the dispersion modeling analysis along with the Project sources. The regional inventory sources within the AOI radius circle surrounding the Project location were obtained from Bureau of Ocean Energy Management (BOEM)'s latest published emission inventory data: the 2017 Gulfwide Emission Inventory. BOEM collects the operational activity data on a tri-annual basis under the Gulfwide Offshore Activity Data System (GOADS) program from both platform and non-platform sources in the GOM. BOEM publishes the emissions generated from these sources for the reporting year, therefore, the GOADS data collected for the Project is based on emissions for the 2017 reporting year.

For developing the off-site emission source inventory, only the platform emission sources were considered as the non-platform sources are mobile sources such as helicopters, support vessels etc.

To develop the regional inventory to be used in the Step 2 analysis, only non-exempt source emissions were included (e.g. emissions from fossil fuel combustion are not included).[45] Appendix A includes the regional inventory reviewed for this modeling analysis as well as modeling parameter assumptions used to incorporate the regional inventory sources into the dispersion modeling analysis.

3.3.4 Terrain Elevations

The Project location in the Gulf of Mexico is approximately eighty-two (82) statute miles from the nearest point on land in Louisiana. As such, the Project is situated at sea level and terrain features have not been considered (i.e. simple terrain only).

3.3.5 Receptor Grid and Coordinate System

Modeled concentrations were calculated at sea-level receptors placed in areas outside the Project area, per 40 CFR 50.1(e), or along the boundary of BMOP's safety zone surrounding the DWP platform. Typically, due to the types of operations of a DWP, a well-defined facility boundary does not exist. However, for the Project, the facility boundary will be marked by private lighted buoys at the four (4) distinct corners of the safety zone, as described in the table below. BMOP proposes that the area within the four (4) corners be defined as the Project safety zone, in consideration of extensive subsea pipelines and associated subsea equipment for the CALM buoys. The following figure demonstrates the location of the safety zone relative to the modeled sources included in the modeling analyses.

Table 3-3. Safety Zone Coordinates

Safety Zone Buoy Location	Latitude	Longitude	UTM WGS84 Z15 X (m)	UTM WGS84 Z15 Y (m)
North Corner	28° 28′ 41.76″	92° 59′ 44.41″	500,413.4	3,150,214.0
East Corner	28° 26′ 07.13″	92° 57′ 32.72″	503,995.8	3,145,455.6
South Corner	28° 23' 58.81"	93° 0' 44.53"	498,777.8	3,141,506.8
West Corner	28° 26' 33.47"	93° 2' 55.90"	495,205.2	3,146,266.8

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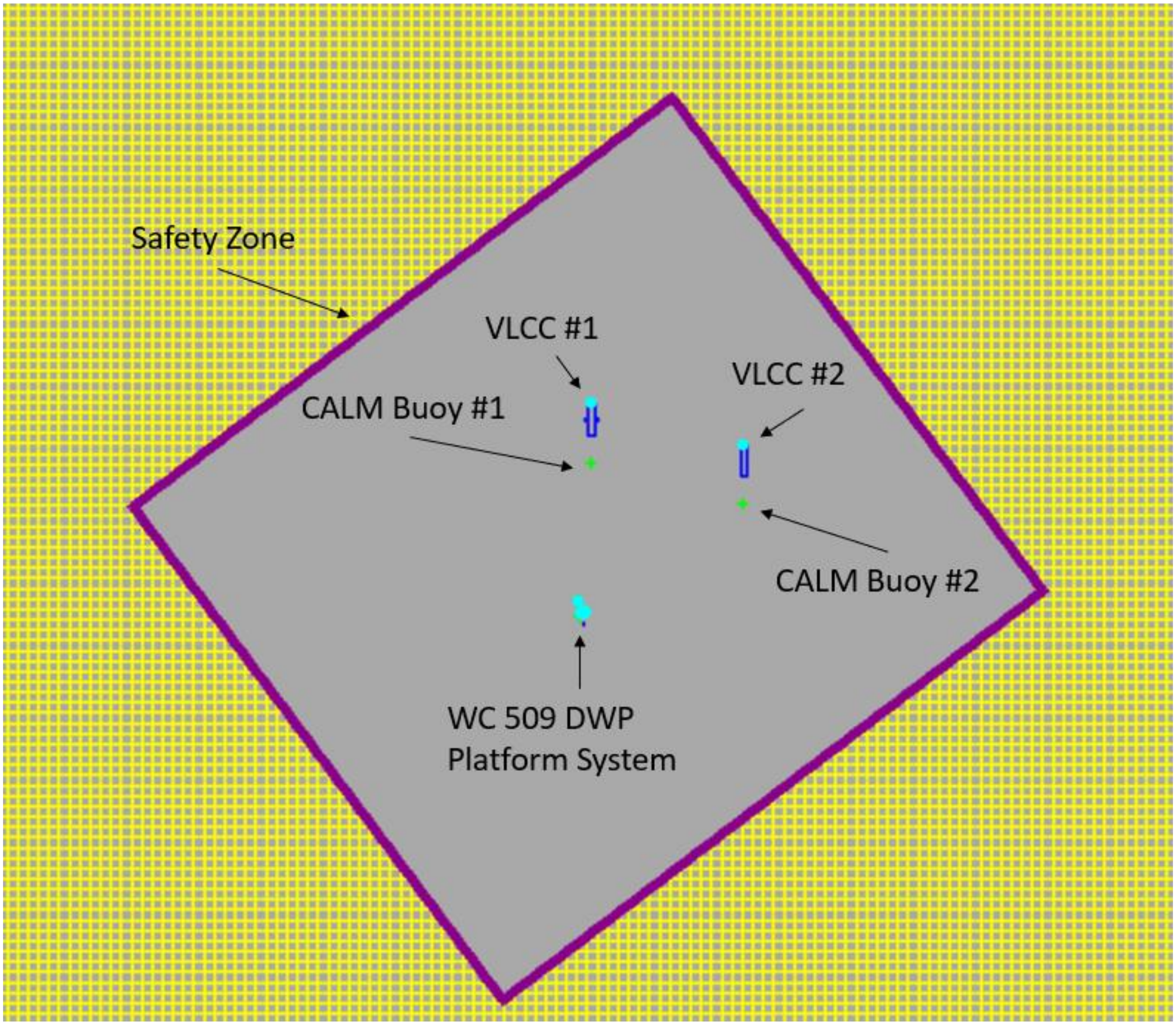
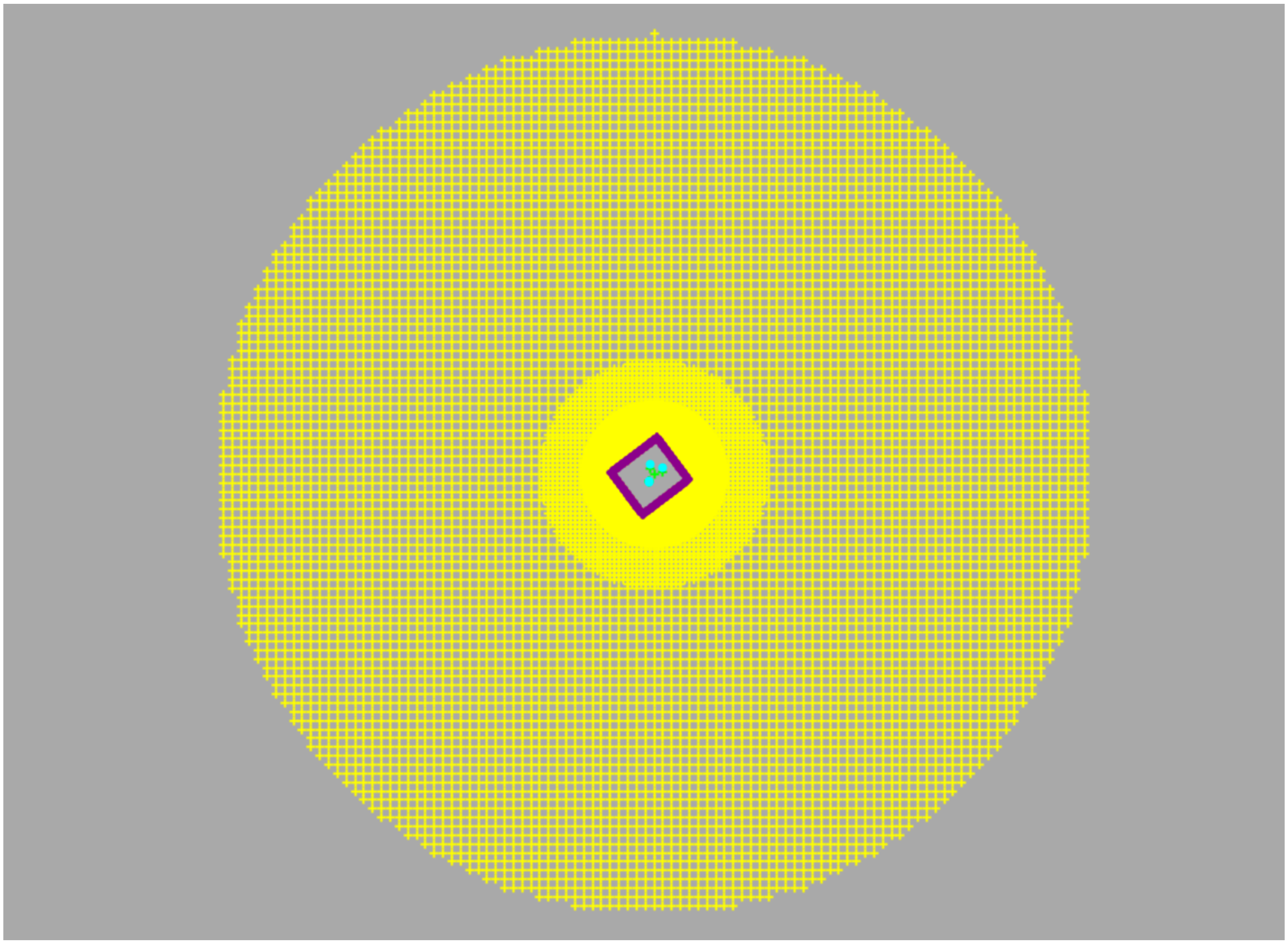
[45] LAC 33:III Chapter 51.5105.B.3(a)

Figure 3-4. Safety Zone for the Project



To demonstrate that dispersion modeling results reduce as distance between the DWP and receptors increase, BMOP placed receptors on a variable cartesian receptor grid, similar to an onshore PSD model setup. Fenceline receptors were placed along the safety zones, discussed above, approximately 25m apart. Beyond the fenceline, receptors were spaced 100m apart on a Cartesian grid (fine grid) extending out to a distance of 8,000 meters (8 km) from the fenceline, spaced 500m apart on a Cartesian grid (medium grid) extending out 13,000 meters (13 km) from the fenceline, and spaced 1,000m apart on a Cartesian grid (coarse grid) extending out 50,000 meters (50 km) from the fenceline. The following figure shows the layout of the entire modeling receptor grid setup.

Figure 3-5. TAPs Analysis Receptor Locations



3.3.6 Source Types and Parameters

3.3.6.1 Modeled Sources

For the purpose of the TAPs dispersion modeling analysis, only project-related (e.g. stationary or direct) sources associated with the DWP platform were modeled. The following emissions sources, including point and volume sources, were included as part of the TAPs air quality analysis:

Table 3-4. TAPs Modeled Point Sources

Source ID	Source	Modeled Location	UTM WG84, Zone 15 Easting (m)	UTM WGS84, Zone 15 Northing (m)
UNLD1	Uncontrolled Loading at Buoy #1	North of CALM Buoy #1[46]	499,627.30	3,147,270.30
UNLD2	Uncontrolled Loading at Buoy #2	North of CALM Buoy #2[46]	501,099.00	3,146,871.60

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[46] Locations were based on the most conservative direction surrounding the CALM buoy based on the 5-year average primary wind direction.

Source ID	Source	Modeled Location	UTM WG84, Zone 15 Easting (m)	UTM WGS84, Zone 15 Northing (m)
AFS	Aviation Fuel Storage	Platform A	499,533.20	3,145,229.00
NGGEN1	Natural Gas Generator #1	Platform B	499,558.50	3,145,263.24
NGGEN2	Natural Gas Generator #2	Platform B	499,563.03	3,145,259.16
DGEN	Emergency Diesel Generator	Platform B	499,567.56	3,145,255.08
BCRANE1	Platform B Crane #1	Platform B	499,573.09	3,145,256.67
BCRANE2	Platform B Crane #2	Platform B	499,528.13	3,145,242.60
BFWP	Platform B Firewater Pump	Platform B	499,552.80	3,145,247.80
BCDT1	Platform B Crane Tank #1	Platform B	499,573.09	3,145,256.67
BCDT2	Platform B Crane Tank #2	Platform B	499,528.13	3,145,242.60
PDST	Primary Diesel Storage Tank	Platform B	499,557.40	3,145,253.30
ST	Surge Tank	Platform B	499,536.88	3,145,247.78
CFWP	Platform C Firewater Pump	Platform C	499,507.67	3,145,358.27

Table 3-5. TAPs Modeled Volume Sources

Source ID	Source	Modeled Location	UTM WG84, Zone 15 Easting (m)	UTM WGS84, Zone 15 Northing (m)
FUG1	Gas Inlet Scrubber No. 1	Platform B	499,530.6	3,145,238.2
FUG2	Gas Inlet Scrubber No. 2	Platform B	499,535.1	3,145,234.2
FUG3	Gas Inlet Scrubber No. 3	Platform B	499,539.5	3,145,230.2
FUG4	Gas Inlet Scrubber No. 4	Platform B	499,544.0	3,145,226.2
FUG5	Condensate Pump No. 1	Platform B	499,531.5	3,145,243.0
FUG6	Condensate Pump No. 2	Platform B	499,536.0	3,145,239.0
FUG7	Condensate Pump No. 3	Platform B	499,540.4	3,145,235.0
FUG8	Condensate Pump No. 4	Platform B	499,544.9	3,145,231.0
FUG9	Pig Launcher (Gas Export)	Platform B	499,552.7	3,145,259.8
FUG10	Pig Receiver (Oil Import)	Platform A	499,533.6	3,145,212.5
FUG11	Oil Meter Skid	Platform B	499,544.8	3,145,241.9
FUG12	Meter Prover Skid	Platform B	499,546.3	3,145,249.0
FUG13	Pig Launcher No. 1 (Export to VLCC)	Platform B	499,540.5	3,145,242.2
FUG14	Pig Launcher No. 2 (Export to VLCC)	Platform B	499,545.0	3,145,246.6
FUG15	CALM Buoy #1	CALM Buoy #1	499,627.3	3,146,692.3
FUG16	CALM Buoy #2	CALM Buoy #2	501,099.0	3,146,293.6
FUG17	Surge Relief Valve Skid	Platform B	499,549.8	3,145,245.3
FUG18	Surge Tank	Platform B	499,539.9	3,145,250.9
FUG19	Surge Tank Pump No. 1	Platform B	499,533.6	3,145,246.8
FUG20	Surge Tank Pump No. 2	Platform B	499,535.9	3,145,244.3
FUG21	Sump System No. 1	Platform B	499,549.1	3,145,244.5
FUG22	Sump System No. 2	Platform C	499,507.2	3,145,364.5
FUG23	Firewater Pump No. 1	Platform B	499,552.8	3,145,247.8
FUG24	Firewater Pump No. 2	Platform C	499,507.7	3,145,358.3
FUG25	Air Compressor No. 1	Platform B	499,548.1	3,145,253.8
FUG26	Air Compressor No. 2	Platform B	499,549.8	3,145,252.1
FUG29	Platform Crane No. 1	Platform B	499,573.1	3,145,256.7
FUG30	Platform Crane No. 2	Platform B	499,528.1	3,145,242.6
FUG31	Diesel Transfer Skid	Platform B	499,565.9	3,145,261.4
FUG32	Gas Generator No. 1	Platform B	499,558.5	3,145,263.2

Source ID	Source	Modeled Location	UTM WG84, Zone 15 Easting (m)	UTM WGS84, Zone 15 Northing (m)
FUG33	Gas Generator No. 2	Platform B	499,563.0	3,145,259.2
FUG34	Emergency Diesel Generator	Platform B	499,567.6	3,145,255.1
FUG35	Knockout System	Platform B	499,561.1	3,145,252.9
FUG36	Fuel Gas Skid	Platform B	499,555.3	3,145,262.3
FUG37	Aviation Refueling	Platform A	499,533.2	3,145,229.0

The figures below provide a detailed description of the modeled sources at the Project location.

Figure 3-6. TAPs Model Source Layout

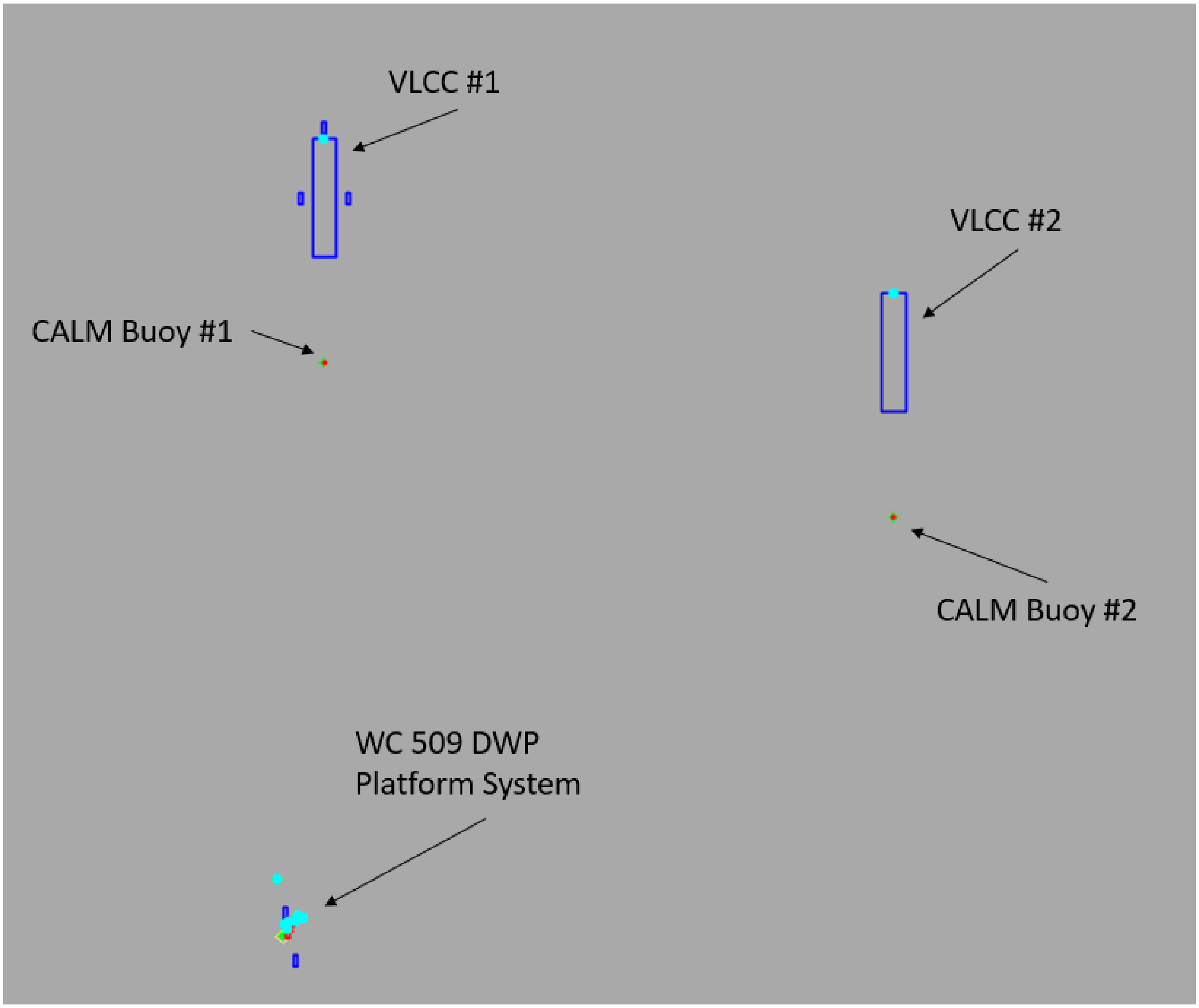
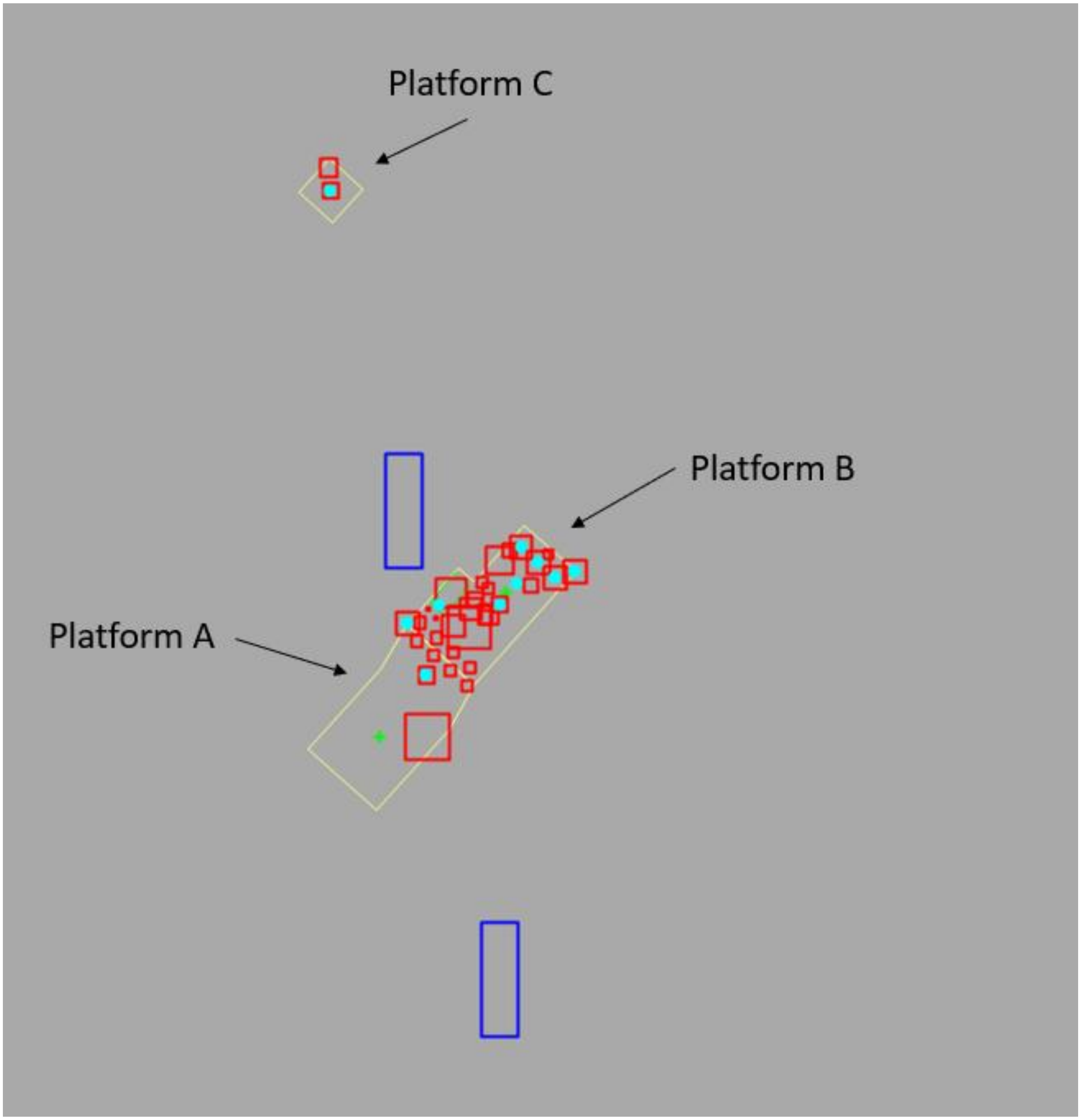


Figure 3-7. TAPs Model Platform Layout



3.3.6.1.1 Emission Rates

As discussed in Section 1 of this report, the TAPs PTE calculations are based on the annual VOC emissions from all direct Project sources and speciated based on the maximum vapor concentration of the TAPs in crude oil. Therefore Step 1 of the modeling analysis was performed by modeling the maximum and annual average hourly VOC emission rates for each direct Project source. Maximum TAP impacts, for each averaging period, were then determined by multiplying the modeled results by the maximum vapor concentration of each TAP requiring a modeling analysis, as demonstrated in the TAPS MER Analysis (Table 3-1).

The hourly and annual VOC emission rates used for the air dispersion modeling analysis are based on Project design specifications. Detailed emissions calculations, including the calculation methodology, is provided in Volume 1 of the PSD air permit application. The table below provides a summary of the modeled VOC emission rates utilized for the air dispersion modeling analysis.

Table 3-6. Modeled VOC Emission Rates

Source ID	Maximum Hourly (lb/hr)	Annual Average (lb/hr)
UNLD1	5,422	4,986
UNLD2	5,422	4,986
AFS	1.17E-4	1.17E-4
NGGEN1	3.59	3.59
NGGEN2[47]	0	0
DGEN	21.2	0.24
BCRANE1	0.22	0.11
BCRANE2	0.22	0.11
BFWP	4.3	0.049
BCDT1	4.42E-4	4.42E-4
BCDT2	4.42E-4	4.42E-4
PDST	1.94E-3	1.94E-3
ST	0.85	0.85
CFWP	4.3	0.049
FUG1	0.07	0.07
FUG2	0.07	0.07
FUG3	0.07	0.07
FUG4	0.07	0.07
FUG5	0.05	0.05
FUG6	0.05	0.05
FUG7	0.05	0.05
FUG8	0.05	0.05
FUG9	0.13	0.13
FUG10	0.10	0.10
FUG11	0.57	0.57
FUG12	0.08	0.08
FUG13	0.21	0.21
FUG14	0.21	0.21
FUG15	0.20	0.20
FUG16	0.20	0.20
FUG17	0.19	0.19
FUG18	0.21	0.21
FUG19	0.04	0.04
FUG20	0.04	0.04

---

[47] Based on current Project designs, only one natural gas engine will be operating at any given time, therefore, a single engine was modeled at maximum hourly and annual emission rates.

Source ID	Maximum Hourly (lb/hr)	Annual Average (lb/hr)
FUG21	0.25	0.25
FUG22	0.25	0.25
FUG23	0.05	0.05
FUG24	0.05	0.05
FUG25	0.04	0.04
FUG26	0.04	0.04
FUG29	0.04	0.04
FUG30	0.04	0.04
FUG31	0.27	0.27
FUG32	0.01	0.01
FUG33	0.01	0.01
FUG34	0.09	0.09
FUG35	0.08	0.08
FUG36	0.23	0.23
FUG37	0.11	0.11

3.3.6.1.2 Load/Operating Conditions

For stationary sources located on the platform, the maximum hourly operations were modeled against both the short term and long term averaging period thresholds, to ensure a conservative air dispersion modeling approach.

3.3.6.1.3 Stack Parameters

The source specific stack parameters used for the air dispersion modeling analysis are based on Project design specifications. The table below provides the modeled stack parameters utilized for the modeling analysis.

Table 3-7. Modeled Point Source Stack Parameters

Source ID	Elevation (ft)	Stack Height (ft)	Stack Temp. (K)	Stack Velocity (ft/s)	Stack Diameter (ft)
UNLD1	0	36	305	33.7	2.17
UNLD2	0	36	305	33.7	2.17
AFS	0	64	298	3.28	0.50
NGGEN1	0	104	769	126	0.67
NGGEN2	0	104	769	126	0.67
DGEN	0	104	676	103	0.67
BCRANE1	0	155	800	97.3	0.33
BCRANE2	0	155	800	97.3	0.33
BFWP	0	56	800	133	0.33
BCDT1	0	155	298	3.28	0.50
BCDT2	0	155	298	3.28	0.50
PDST	0	102	298	3.28	0.50
ST	0	105	339	3.28	0.50
CFWP	0	56	800	133	0.33

Table 3-8. Modeled Volume Source Stack Parameters

Source ID	Elevation (ft)	Release Height (ft)	Init. Lat. Dim. (ft)	Init. Vert. Dim. (ft)
FUG1	92.4	92.4	10	32
FUG2	92.4	92.4	10	32
FUG3	92.4	92.4	10	32
FUG4	92.4	92.4	10	32
FUG5	56.2	56.2	9.8	8
FUG6	56.2	56.2	9.8	8
FUG7	56.2	56.2	9.8	8
FUG8	56.2	56.2	9.8	8
FUG9	56.2	56.2	23.9	5
FUG10	56.2	56.2	38.9	8
FUG11	92.4	92.4	37.1	15
FUG12	92.4	92.4	12.7	10
FUG13	122	122	19.4	8
FUG14	122	122	19.4	8
FUG15[48]	0	0	20	20
FUG16[48]	0	0	20	20
FUG17	122	122	17.7	12
FUG18	92.4	92.4	26.3	18
FUG19	92.4	92.4	2.65	7.5
FUG20	92.4	92.4	2.65	7.5
FUG21	56.2	56.2	11.4	10
FUG22	56.1	56.1	15	8
FUG23	56.2	56.2	13.0	14
FUG24	56.1	56.1	13.0	14
FUG25	92.4	92.4	9.01	16
FUG26	92.4	92.4	9.01	16
FUG29	155	155	20	30
FUG30	155	155	20	30
FUG31	56.2	56.2	7.48	9
FUG32	92.4	92.4	19.6	12
FUG33	92.4	92.4	19.6	12
FUG34	92.4	92.4	19.6	12
FUG35	56.2	56.2	12.4	9
FUG36	56.2	56.2	12.3	11
FUG37	56.2	56.2	14.0	13

3.3.6.1.4 Good Engineering Practice Stack Height Analysis

EPA has promulgated stack height regulations that restrict the use of stack heights in excess of "Good Engineering Practice" (GEP) in air dispersion modeling analyses. Under these regulations, that portion of a stack in excess of the GEP height is generally not creditable when modeling to determine source impacts. This essentially prevents the use of excessively tall stacks to reduce ground-level pollutant concentrations.

---

[48] Conservatively estimated a 0 ft release height and 20 ft initial vertical and lateral dimensions to encompass the esimated fugitive sources from the CALM buoy.

For this analysis, the modeled sources stacks did not exceed the GEP height and therefore the actual release heights of each source were utilized.

3.3.6.2 Building Downwash Analysis

AERMOD incorporates the Plume Rise Model Enhancements (PRIME) downwash algorithms. Direction specific building parameters required by AERMOD are calculated using the BPIP-PRIME (BPIPP) preprocessor (version 04272). For the proposed project, vessel dimensions were included, based on current project designs.

For the Project, a base elevation of zero (sea level) and the building/structure's height above sea level were used for the modeling analysis. This method was utilized because BPIPP is not designed to calculate structure dimensions that are not located on the ground.

Building sources for the marine support vessels were included in the air dispersion modeling analysis. Based on current Project designs, it is likely that the platform structures will not be 4-walled structures and will allow air flow to pass through for greater than 50% of the surface area. As such, building sources for the platform structures were not included.

3.4 Air Quality Analysis Results

As provided above, BMOP performed Step 1 of the LDEQ AQMP for each TAP requiring a modeling analysis in the TAP MER Analysis. For Step 1, BMOP modeled the maximum hourly and annual average VOC emissions for the latest year of meteorological data and speciated the results to compare directly to the TAPs AAS, as shown below. Modeled concentrations below are based on the highest first high result of each model run.

Table 3-9. Step 1 TAPs Modeled Concentration Results

Component	H_2S and VOC Modeled Conc. (µg/m^3)		Speciated Conc. (µg/m^3)			AAS (µg/m^3)	7.5% AAS (µg/m^3)	AOI (km)	Step 2 Analysis Required?
	8-hr	Annual	Spec. wt%[49]	8-hr	Annual				
H_2S	223.12			223.12		330	24.75	34.0	Yes
n-Hexane	17,247		4.09	705.35		4,190	314.25	7.75	Yes
Benzene		508.65	0.80		4.07	12	0.9	10.31	Yes
Toluene	17,247		0.36	61.29		8,900	667.5	-	No
Ethylbenzene	17,247		0.05	8.57		10,300	772.5	-	No
Mixed Xylene Isomers	17,247		0.29	49.76		10,300	772.5	-	No

As shown above, model results for H_2S, hexane, and benzene require Step 2 modeling analysis.

For completing the analysis of Step 2, the regional inventory sources were reviewed within each modeled AOI.

---

[49] Maximum vapor TAP weight percent of total VOC modeled.

- Based on the review of inventory sources surrounding the Project, no inventory sources are located within 7.75 km, therefore, no additional modeling was performed for n-hexane.
- None of the sources in the GOADS inventory reported H_2S emissions. BMOP has added conservatism in the H_2S model as the maximum hourly emissions are modeled at both possible loading locations at the platform, essentially doubling maximum emissions from the facility. Even with emissions from the Project doubled, modeled concentrations for H_2S are below 75% of the AAS.
- The regional inventory was reviewed and modeled for benzene, and results are provided in the table below.

Modeled concentrations below are based on the highest first high result of each model run.

Table 3-10. Step 2 TAPs Modeled Concentration Results

Component	Modeled Conc. (µg/m³)		Speciated Conc. (µg/m³)			AAS (µg/m³)	75% AAS (µg/m³)	Step 3 Required?
	8-hr	Annual	Spec. wt%[50]	8-hr	Annual			
H_2S	223.12			223.12		330	247.5	No
n-Hexane	17,247		4.09	705.35		4,190	3,142.5	No
Benzene		4.07			4.07	12	9.0	No

The highest modeled impacts from benzene emissions are in the vicinity of the Project in Step 1. Since the distance of inventory sources from the highest modeled impacts is greater than 8 km, the contribution from the inventory source emissions on the refined modeled impacts in Step 2 is minimal. As shown above, modeled concentrations for all three (3) pollutants are below 75% of their respective AAS and no further analysis is required.

Based on the air dispersion modeling analysis presented in this section, BMOP has demonstrated that the Project will not result in, or contribute to, a violation of the LDEQ AAS established in LAC 33:III.Chapter 51 .

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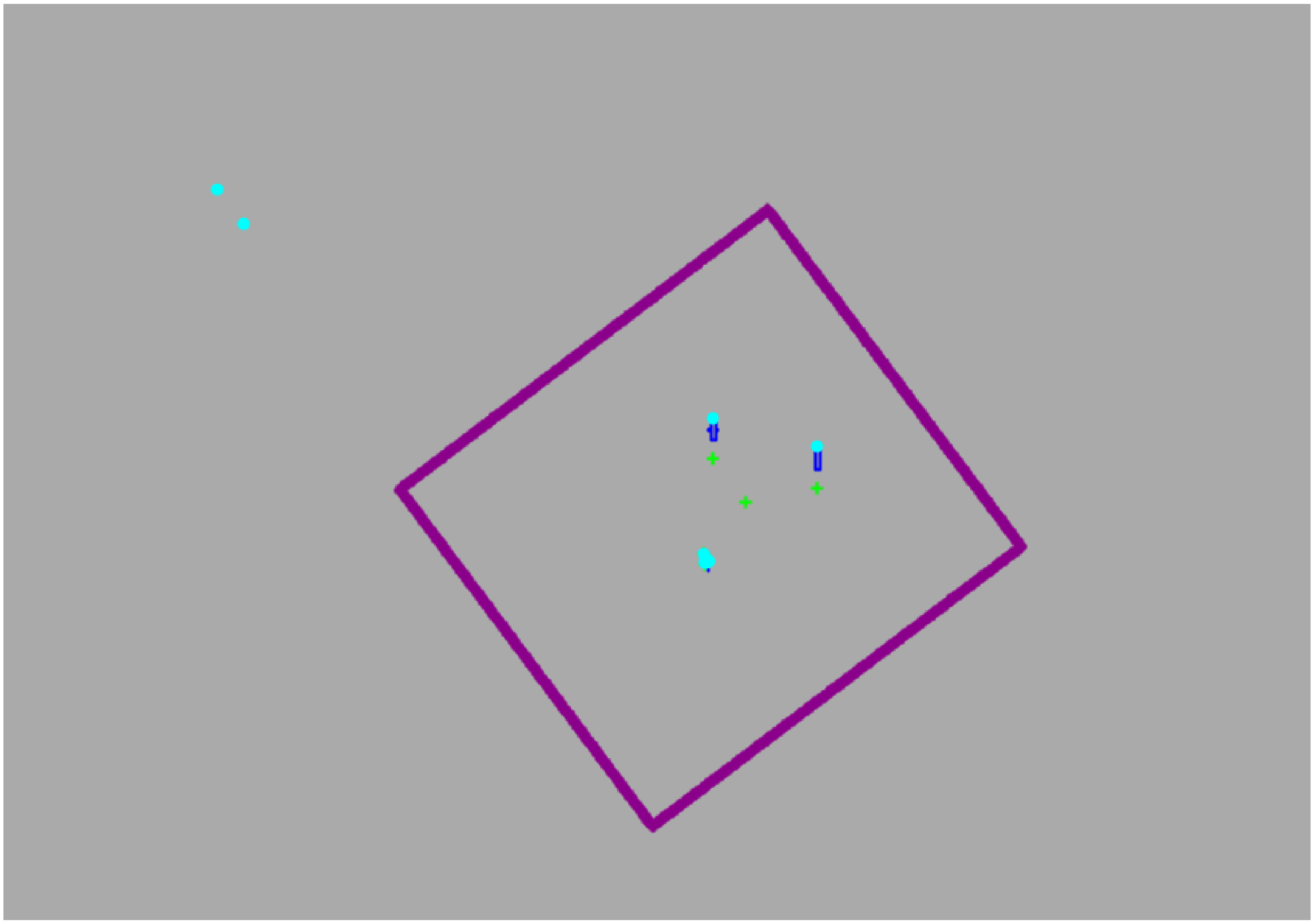
[50] Maximum vapor TAP weight percent of total VOC modeled.

APPENDIX A. REGIONAL INVENTORY SOURCES

Figure A-8. Benzene Regional Inventory Source Layout



Blue Marlin Offshore Port LLC
Air Quality Modeling Report
Appendix A - Regional Inventory

Off-site Sources based on Year 2017 Gulfwide Offshore Activity Data System (GOADS) Emissions Inventory published by Bureau of Ocean Energy Management (BOEM).
https://www.boem.gov/environment/environmental-studies/ocs-emissions-inventory-2017

Company Name	Area Block	Distance from BMOP Facility (km)	ID	Description	Easting (m)	Northing (m)	Base Elevation* (ft)	Stack Height (or Release Height for Volume Sources) (ft)	Initial Lateral Dimension* (ft)	Initial Vertical Dimension* (ft)	Stack Temp (°F)	Stack Velocity (ft/s)	Stack Diameter (ft)	Orientation (degrees)	Benzene (tons)	Benzene (lb/hr, annualized)
Fieldwood Energy, LLC	**WC485**	**8.70**	**Volume Sources**													
			INV1	WC485FUG100	492610	3150512	60	60	10	10	-	-	-	-	3.37E-04	7.70E-05
			INV2	WC485FUG101	492610	3150512	60	60	10	10	-	-	-	-	3.68E-03	8.40E-04
			INV3	WC485FUG102	492610	3150512	60	60	10	10	-	-	-	-	2.04E-02	4.66E-03
			Point Sources													
			INV4	WC485LOS500	492610	3150512	60	50	-	-	70	0.10	0.50	0	2.39E-04	5.45E-05
			INV5	WC485PNE700	492610	3150512	60	50	-	-	70	249.16	0.08	0	2.88E-04	6.59E-05
			INV6	WC485PNE701	492610	3150512	60	50	-	-	70	249.16	0.08	0	6.28E-05	1.43E-05
			INV7	WC485PNE702	492610	3150512	60	52	-	-	70	17.44	0.02	0	8.71E-05	1.99E-05
			INV8	WC485PNE703	492610	3150512	60	52	-	-	70	17.44	0.02	0	8.71E-05	1.99E-05
			INV9	WC485PNE704	492610	3150512	60	52	-	-	70	17.44	0.02	0	8.71E-05	1.99E-05
			INV10	WC485PNE705	492610	3150512	60	52	-	-	70	17.44	0.02	0	8.71E-05	1.99E-05
			INV11	WC485PNE706	492610	3150512	60	52	-	-	70	17.44	0.02	0	8.71E-05	1.99E-05
			INV12	WC485PRE001	492610	3150512	60	50	-	-	70	0.00	0.00	0	1.06E-03	2.43E-04
			INV13	WC485VEN100	492610	3150512	60	74	-	-	70	0.00	0.50	0	1.32E-05	3.01E-06
	WC507	**8.12**	**Volume Sources**													
			INV14	WC507FUG500	492991	3150013	50	50	10	10	-	-	-	-	1.52E-04	3.46E-05
			INV15	WC507FUG501	492991	3150013	50	50	10	10	-	-	-	-	8.16E-04	1.86E-04
			INV16	WC507FUG502	492991	3150013	50	50	10	10	-	-	-	-	1.44E-04	3.28E-05
			Point Sources													
			INV17	WC507PNE500	492991	3150013	50	50	-	-	70	17.44	0.02	0	7.50E-05	1.71E-05
			INV18	WC507PNE501	492991	3150013	50	50	-	-	70	17.44	0.02	0	7.50E-05	1.71E-05
			INV19	WC507PNE700	492991	3150013	50	52	-	-	70	17.44	0.02	0	7.50E-05	1.71E-05
			INV20	WC507PNE701	492991	3150013	50	72	-	-	70	109.01	0.17	0	3.90E-06	8.90E-07
			INV21	WC507PRE500	492991	3150013	50	50	-	-	70	0.00	0.00	0	1.50E-04	3.42E-05
			INV22	WC507PRE501	492991	3150013	50	50	-	-	70	0.00	0.00	0	3.57E-05	8.15E-06

*Representative assumptions due to lack of actual data.

APPENDIX B. ELECTRONIC MODELING FILES

Modeling files for this analysis will be provided separately to EPA. Modeling files will include the following:

- LDEQ Step 1 TAPs modeling files for the following pollutants and averaging periods:
  - VOC;
    - 8-hr and annual average files for 2017.
  - Annualized VOC; and
    - Annual average files for 2017.
  - H_2S
    - 8-hr average files for 2012, 2013, 2015, 2016, and 2017.
- LDEQ Step 2 TAPs modeling files for the following pollutants and averaging periods:
  - Benzene
    - Annual average files for 2017.

Each set of modeling files provided above includes the following files utilized in the air quality dispersion analysis:

- Meteorological files;
- AERMOD Input file;
- AERMOD Output file;
- BPIPP Input file;
- BPIPP Output file; and
- BPIPP Summary file.

APPENDIX C-5

TITLE V APPLICATION

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ENERGY
TRANSFER

September 28, 2020

Ms. Melanie Magee
Environmental Engineer
Air Permits Section (APRE)
U.S. Environmental Protection Agency, Region 6
Mail Code: ARPE
1201 Elm Street, Suite 500
Dallas, TX 75201
magee.melanie@epa.gov

RE: Title V Air Operating Permit Application for Blue Marlin Offshore Port LLC

Dear Ms. Magee:

Blue Marlin Offshore Port (BMOP) LLC (Applicant) is providing U.S. Environmental Protection Agency (EPA) Region 6 the enclosed Title V Air Operating Permit (Title V) application. BMOP is proposing to develop the BMOP Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, BMOP will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block 509 (WC 509). At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year.

This application is being submitted to the EPA Region 6 for a Title V permit to authorize operation of the direct emissions sources proposed for the offshore DWP under the Clean Air Act Title V federal permitting program.

The enclosed document describes an overview of the BMOP Project, its location, and regulatory applicability. The Title V application includes a summary of the proposed applicable requirements included in the Prevention of Significant Deterioration (PSD) application (i.e., best available control technology [BACT]) and the Case-by-Case Maximum Achievable Control Technology (MACT) application, submitted concurrently under separate covers.

BMOP has completed Louisiana Department of Environmental Quality (LDEQ) air permit application forms to assist with the evaluation of the project equipment and potential emissions in the context of LDEQ and EPA regulations. In addition, BMOP is providing EPA's Part 71 forms: Initial Compliance Plan and Compliance Certification (Form I-Comp), Fee Calculation Worksheet (Form FEE), and Certification of Truth, Accuracy, and Completeness (Form CTAC).

BMOP appreciates the EPA's review of this Title V application. If you have any questions about this application, please contact Weston Threeton, P.E., PMP, at (713) 989-7733 or email at Weston.threeton@energytransfer.com.

Sincerely,

Gregory Mcilwain
SVP – Operations
Energy Transfer Partners, LLC

Enclosure

TITLE V AIR OPERATING PERMIT APPLICATION

BLUE MARLIN OFFSHORE PORT LLC

Prepared By:

TRINITY CONSULTANTS
1 Galleria Blvd
Suite 1030
Metairie, LA 70001
(504) 828 - 5845

September 2020

Project 191001.0117

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1. EXECUTIVE SUMMARY

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, BMOP will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block (WC) 509, WC 508, and East Cameron (EC) Block 263. At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year.

The proposed project will require a DWP license in accordance with the Deep Water Port Act (DWPA). The U.S. Environmental Protection Agency (EPA) is identified as a cooperating agency in the review of a DWP license, in accordance with Title 33 of the Code of Federal Regulations (CFR) §148.3(d). The DWPA also requires evaluation of the DWP in accordance with the Clean Air Act (CAA). The Project consists of both onshore and offshore components. As defined in 33 CFR §148.5, a deep water port is:

> *"[A]ny fixed or floating manmade structures other than a vessel, or any group of structures, located beyond State seaward boundaries that are used or are intended for use as a port or terminal for the transportation, storage, or further handling of oil or natural gas for transportation to any State, except as otherwise provided in the Deepwater Port Act of 1974, as amended, and for other uses not inconsistent with the purposes of the Deepwater Ports Act, including transportation of oil or natural gas from the United States' OCS… Must be considered a 'new source' for the purposes of the Clean Air Act…"*

Title V of the CAA requires air operating permits for major sources, which are regulated under 40 CFR §70 (state administered program) and §71 (federally administered program). The operating permits outline the emission limits, applicable requirements, compliance, and operating conditions applicable to the emission units at a major source. The Project will be a Title V major source since potential emissions exceed the Title V major source threshold for Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAPs) and will require a federal Title V operating permit under Part 71. For sources located outside of the state seaward boundary on the OCS, EPA Region 6 administers the Title V permit program, consistent with adjacent state regulations.

As such, this initial Title V air operating permit application is being submitted to the EPA Region 6 in accordance with 40 CFR §71.5(a)(1)(ii). At the request of EPA Region 6, this application includes Louisiana Department of Environmental Quality (LDEQ) application forms and applicable Part 71 forms (Appendix B of this application).

The Applicant has separately evaluated air permit authorizations for the onshore components of the Project, in accordance with the requirements of LDEQ and Texas Commission on Environmental Quality (TCEQ).

1.1 Air Permit Applicability Overview

The DWP site will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.[1] The nearest Parish onshore is Cameron Parish, Louisiana. Cameron Parish is designated by EPA as "attainment" or "unclassifiable" with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.[2] Therefore, the Project is not subject to Nonattainment New Source Review (NNSR) permitting requirements for any criteria pollutants.

Based on potential air emissions calculations, the Project will be a major source under Title V as potential emissions of VOC and HAPs are greater than the applicable major source thresholds. Therefore, the project will require a federal Title V air operating permit under Part 71.

1.2 Request for Permit Shield

Section 504(f) of the Clean Air Act Amendments (CAAA) of 1990 defines the permit shield provision, whereby the permitting authority is empowered to provide that compliance with a Title V permit shall be deemed in compliance with all other applicable provisions of the Act in effect, provided that applicability was addressed in the permit application. A provision may be included in the major source air operating permit stating that compliance with the conditions of the major source air operating permit shall be deemed in compliance with all applicable requirements (as of the date of permit issuance) provided that the following conditions are met:

- Such applicable requirements are identified and included in the permit; and
- The permitting authority, in acting on the permit application which addresses applicability of the requirement, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or concise summary thereof.

BMOP is requesting through this application that the permit shield provisions be included in the initial Title V air operating permit consistent with this regulation. Therefore, BMOP has specifically addressed in summary all regulations potentially applicable at the time of this application. Furthermore, this application also provides non-applicability determinations for certain regulations to assist EPA Region 6 in determining in writing that identified regulations are not applicable to operations at the Project. Note that this non-applicability review is limited to those regulations for which there may be some question of applicability specific to the Project.

1.3 Application Contents

This application includes all information required pursuant to 40 CFR §71.5(a)(2):

- Section 2 includes a detailed description of the Project with an overview of the project emission sources;

- Section 3 provides additional project details defining the characteristics, design capacity, and expected operating schedule for the equipment associated with the Project along with the detailed description of emissions estimation methodologies;

- Section 4 outlines the analysis of potentially applicable state and federal air regulations;

---

[1] The DWP will be approximately 99 statute miles from where the pipe leaves the shore, also in Cameron Parish, Louisiana.

[2] 40 CFR §81.319

- Section 5 includes a summary of the proposed best available control technology (BACT) determination and proposed BACT requirements, evaluated in the Prevention of Significant Deterioration (PSD) application, as well as the proposed maximum achievable control technology (MACT) requirements, evaluated in the Case-by-Case MACT application, submitted concurrently under separate covers;

- Appendix A includes site maps and plot plans for the Project;

- Appendix B provides LDEQ air permit application forms and the relevant Part 71 forms including: Initial Compliance Plan and Compliance Certification (Form I-Comp), Fee Calculation Worksheet (Form FEE), and Certification of Truth, Accuracy, and Completeness (Form CTAC), including the required information of 40 CFR §71.5(c); and

- Appendix C provides the detailed emission calculations described in Section 3.

The Responsible Official (RO) has completed the certification of truth, accuracy, and completeness, based on information and belief formed after reasonably inquiry, in accordance with 40 CFR §71.5(d).

Based on the requirements under 40 CFR §71.9, each permit application requires an application fee that is based upon the actual emissions from the Project. Form FEE (5900-03) of Appendix B provides the application fee calculation worksheet. Since the Project is not yet constructed and operating, the Project has zero actual emissions. Accordingly, the initial application fee is calculated as zero. BMOP will remit payment of fees owed under the fee schedule established pursuant to 40 CFR §71.9(b) after start-up of the Project, based on actual emissions.

2. PROJECT DESCRIPTION

The Applicant is proposing to develop the BMOP Project in the GOM to load crude oil into VLCCs, and other crude oil carriers, for export to the global market.

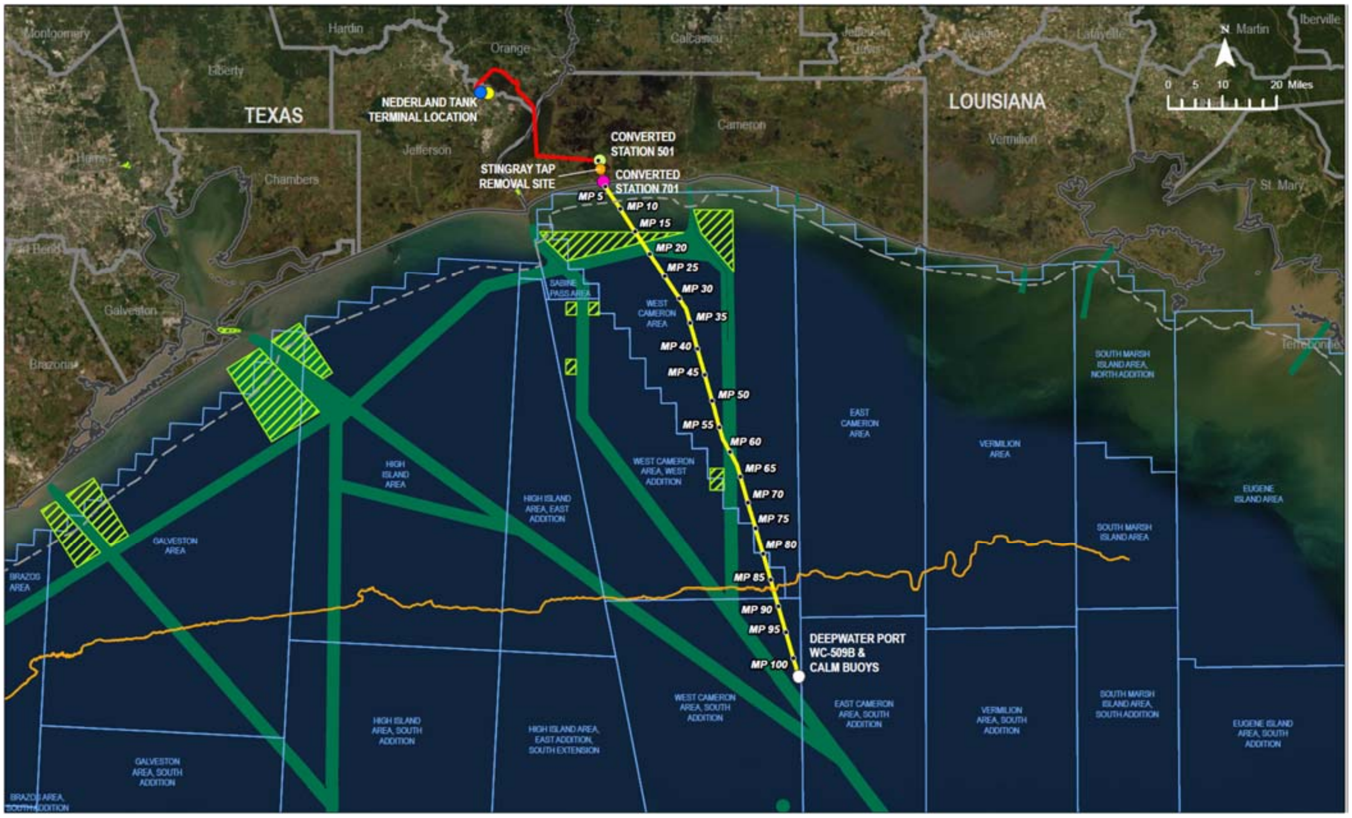
The primary purpose of the Project is to provide for safe and reliable long-term supply of crude oil for export to the global market. To fulfill the primary purpose, the Project must be capable of fully loading the international fleet of crude-carrying marine vessels to accommodate the safe and efficient transport of crude. Accordingly, the Project requires a DWP that can accommodate the draft and berth of a fully loaded VLCC with the ability to load in varying meteorological conditions. This ensures safety in transfer and transit by minimizing risks of transportation incidents (e.g., spills, allisions, collisions). It is not possible for existing onshore terminals in the GOM to fully load a VLCC due to limited draft. There are only a couple existing onshore terminals in the GOM that can partially load a VLCC; loading is completed offshore via reverse lightering. The proposed DWP design avoids the inefficiency and cost of idled time at a fixed port for partial VLCC loading while offering the benefit of avoiding dock-constrained ports to free up dock space for other commodities. This approach also resolves the logistical challenges and added vessel traffic of reverse lightering while mitigating the risks and additional environmental impacts of multiple loadings for a single fully-loaded VLCC.

2.1 Project Overview

The proposed Project utilizes many existing facilities, both onshore and offshore. Crude oil for export at BMOP will be transported out of the existing Sunoco Partners Marketing and Terminals, L.P. terminal and storage facility in Jefferson County, Texas (Nederland Terminal or NT). This terminal is connected to multiple crude oil pipelines from across the U.S. In addition, an affiliate of the Applicant owns the Stingray Pipeline System (Stingray) and has confirmed that its existing subsea pipeline and offshore platforms are suitable for conversion to facilitate crude oil export from a DWP in the northern GOM.

The existing terminal and existing offshore pipeline and platforms provide direct access to supply for export with minimal impacts necessary for new infrastructure to access the market. Only minor additions and new equipment are needed, with minimal footprint. The new equipment will support the existing infrastructure and include a new onshore pump station located at the Nederland Terminal to control loading rates up to the pipeline capacity of 80,000 barrels per hour (bbl/hr). Crude oil will be routed from the NT pump station through a new 37.02 mile, 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at the existing Station 501, and from there through the existing 36” OD Stingray Mainline to the existing offshore platform complex at WC 509. The following figure presents a map of the Project. This figure is reproduced in Appendix A with additional detail.

Figure 2-1. Project Overview Map



The DWP will be located in federal waters within and adjacent to the OCS in WC 509, WC 508 and EC 263. The DWP will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.[3] The crude oil will be metered at the pump station on the NT and on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline End Manifolds (PLEMs) located on the seafloor below two CALM Buoys located in WC 508 and in EC 263. From each PLEM, the crude oil will be routed to its respective floating CALM Buoy through submerged flexible hoses. VLCCs (or other large seafaring crude oil vessels) will moor at a CALM Buoy, retrieve and connect the floating crude oil hoses connected to the CALM Buoy and the crude oil will then route from the Buoy to the VLCC for loading. Up to 365 VLCCs (or other crude oil carriers) will load per year.

The crude oils that will be exported range from light to heavy grade crudes and will be sent from the existing NT facility. The Project will accommodate loading up to 365 large seafaring crude oil vessels with the use of two CALM buoys. Loading will not occur at both buoys simultaneously. During the time necessary for a loaded vessel to disconnect and depart the safety zone, and for a subsequent vessel to approach the same buoy, moor, and attach to the loading hoses, the second buoy will be loading a moored ship at up to 80,000 bbl/hr. The loading operation will then switch to the alternate buoy, providing the ability to continuously load one ship at a time.

This application is for the aggregated stationary sources subject to the Title V air permitting requirements at the proposed offshore DWP. Site maps and plot plans at WC 509 are included in Appendix A to this application. The following subsections identify the stationary emissions sources.

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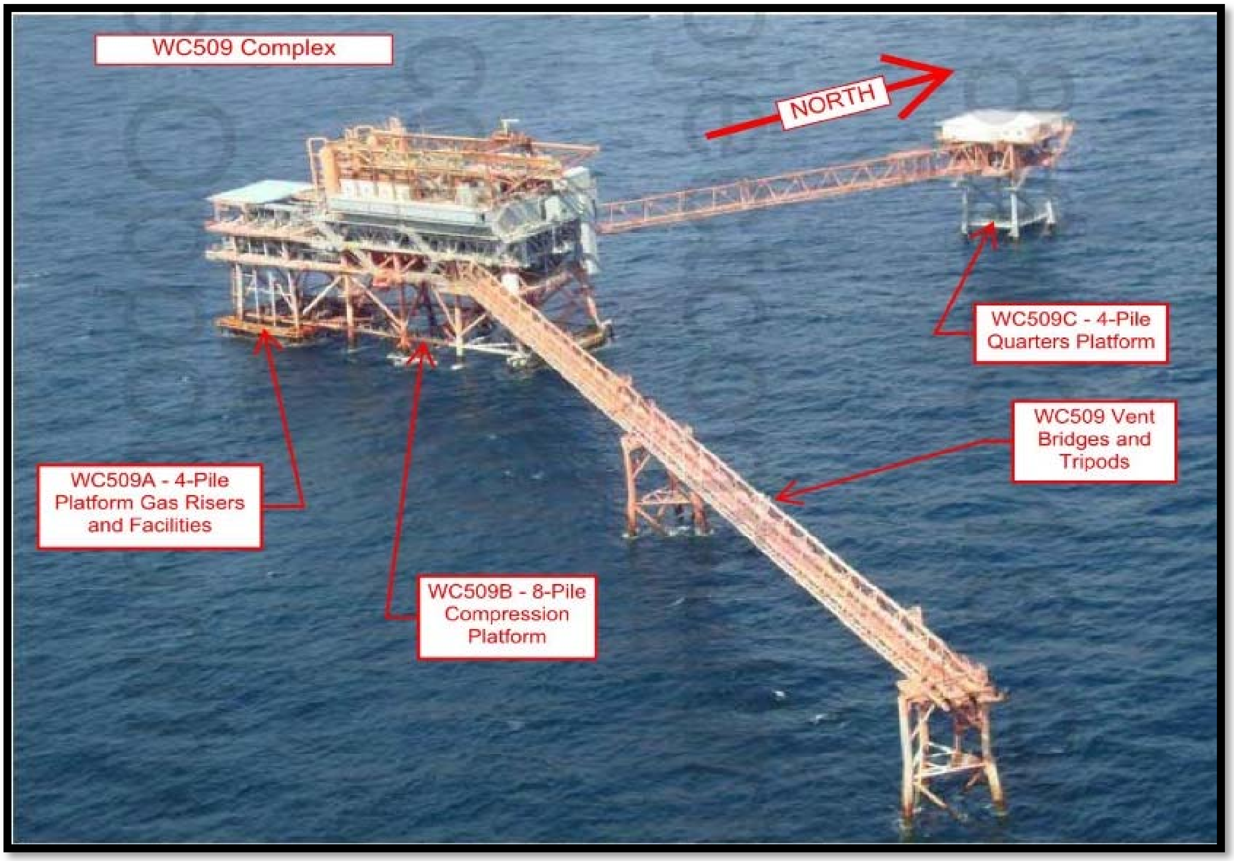
[3] The DWP will be approximately 99 statute miles from where the pipe leaves the shore, also in Cameron Parish, Louisiana.

2.1.1 Modified WC 509 Operations

Flow through the existing offshore Stingray Pipeline will be reversed to transfer crude oil from the existing Station 501 onshore to the existing WC 509 platform complex.

Figure 2-2. Existing WC 509 Platform Complex



This existing platform complex is near existing shipping channels currently used by large seafaring crude oil vessels with a water depth >160 feet. The platform complex has access to offshore natural gas supply to serve basic platform utilities without necessitating that all utilities be powered by fuel delivered from shore.[4]

The proposed Project will repurpose the WC 509B platform from natural gas service to dual purpose oil and gas service. This will entail removal of natural gas compressors and ancillary equipment with some equipment remaining to support gas operations. The following equipment will remain:

- Existing natural gas piping and risers on 509A platform;
- Natural gas blowdown Vent Boom on 509VBT platform;
- Natural gas separation systems for natural gas blowdowns on 509B platform;
- Heliport on 509A platform;

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[4] While the Project has the benefit of natural gas supply for basic utilities at the WC 509 complex, there is insufficient natural gas supply at WC 509 for supporting additioinal platforms or vapor combustion assist gas, discussed further in Section 5 of this application.

- Helicopter fuel tank on 509A platform; and,
- Expansion and continued use of WC 509C for crew quarters.

To support the crude oil export operation, new components for oil service and other ancillary utility equipment will be installed at the WC 509 platform complex. The following new emission sources will be added at WC 509:

- Fugitive Emissions from crude oil piping components;
  - New 36" OD risers;
  - Batch switching/pigging capability;
  - Crude oil meter and meter prover;
- Crude oil 1,000 barrel (bbl) capacity surge vessel and surge system;
- Fugitive Emissions from lube oil, waste oil, and sump collection systems;
- Ancillary utility equipment;
  - Two (2) redundant 1,736 kilowatt (kW) natural gas-fired engine-driven generators, Caterpillar G3516C, or similar;
  - One (1) 1,500 kW emergency diesel-fired engine-driven generator, Caterpillar 3512C, or similar;
    - Primary diesel fuel tank;
  - Two (2) 475 horsepower (hp) diesel-fired engine-driven cranes, Caterpillar G13, or similar;
    - Two (2) diesel fuel tanks (one for each crane); and
  - Two (2) 650 hp emergency diesel-fired engine-driven firewater pumps, one on WC 509B and one on WC 509C.

2.1.2 New Offshore Equipment for Marine Loading

From the existing WC 509 platform complex, new equipment will be added offshore to serve the DWP, including:

- **Two new CALM Buoys**
  - The CALM Buoys will be anchored to the seafloor using a multiple-point, chain anchoring system. Each CALM Buoy will have floating hoses for vessel loading.
- **Two new PLEMs** connecting to each of the CALM Buoys, one for each buoy.
- **Two 36-inch, lateral subsea pipelines** installed from the existing WC 509 Platform Complex to the PLEM locations, one for each PLEM.

The location of the new equipment for marine loading in comparison to the existing WC 509 Platform Complex is delineated in the following table.

Table 2-1. DWP Components for Offshore Loading

Component	Latitude (N) (degrees minutes seconds)	Longitude (W) (degrees minutes seconds)	Water Depth (feet)
WC 509 Platform Complex [a]	28° 26' 00.01"	93° 00' 15.23"	162
CALM Buoy No. 1 and PLEM (WC 508)	28° 26' 47.33"	93° 00' 13.30"	156
CALM Buoy No. 2 and PLEM (EC 263)	28° 26' 34.37"	92° 59' 19.21"	159

a. Riser #1.

CALM Buoy No. 1 is 4,710 feet from its WC 509B riser, while CALM Buoy No. 2 is 6,085 feet from its WC 509B riser. VLCCs or other crude carrying vessels will moor to the CALM buoys. As an SPM system, the vessels will be able to weathervane around the CALM buoy while moored and loading. No fixed structures or platforms will be located within ~ 4,500 feet of the buoy to allow safe vessel movement. This capability is an important design characteristic due to the DWP location of approximately 82 statute miles (71 nautical miles) from the nearest point on land. This location is classified as "exposed waters" by the United States Coast Guard (USCG), as it is greater than 20 nautical miles from the nearest harbor of safe refuge.[5] As well, the National Weather Service (NWS) provides distinct wind, wave, and weather forecasts for "offshore waters" greater than 60 nautical miles from shore, in comparison to "coastal water" forecasts inside of 60 nautical miles in the GOM.[6]

Floating and flexible 20- or 24-inch diameter hoses approximately 1,500 feet long will be installed for loading from the CALM Buoy to the VLCC, or other large seafaring crude carrier. The floating hoses will be recovered by one of the DWP support vessels, lifted to the VLCC, or other crude carrier, loading manifold, and connected to the receiving flange. The floating hoses will simply float on the surface of the water and will weathervane depending on the current when not being used for loading. The floating hoses will contain a butterfly valve on the end that will be utilized to isolate the hose after loading is complete and prior to placing the hoses back in the water. Additionally, a blind flange will be installed to further prevent any potential contamination or leakage while the hose is floating and waiting for the next VLCC (or other large seafaring crude carrier) to be loaded.

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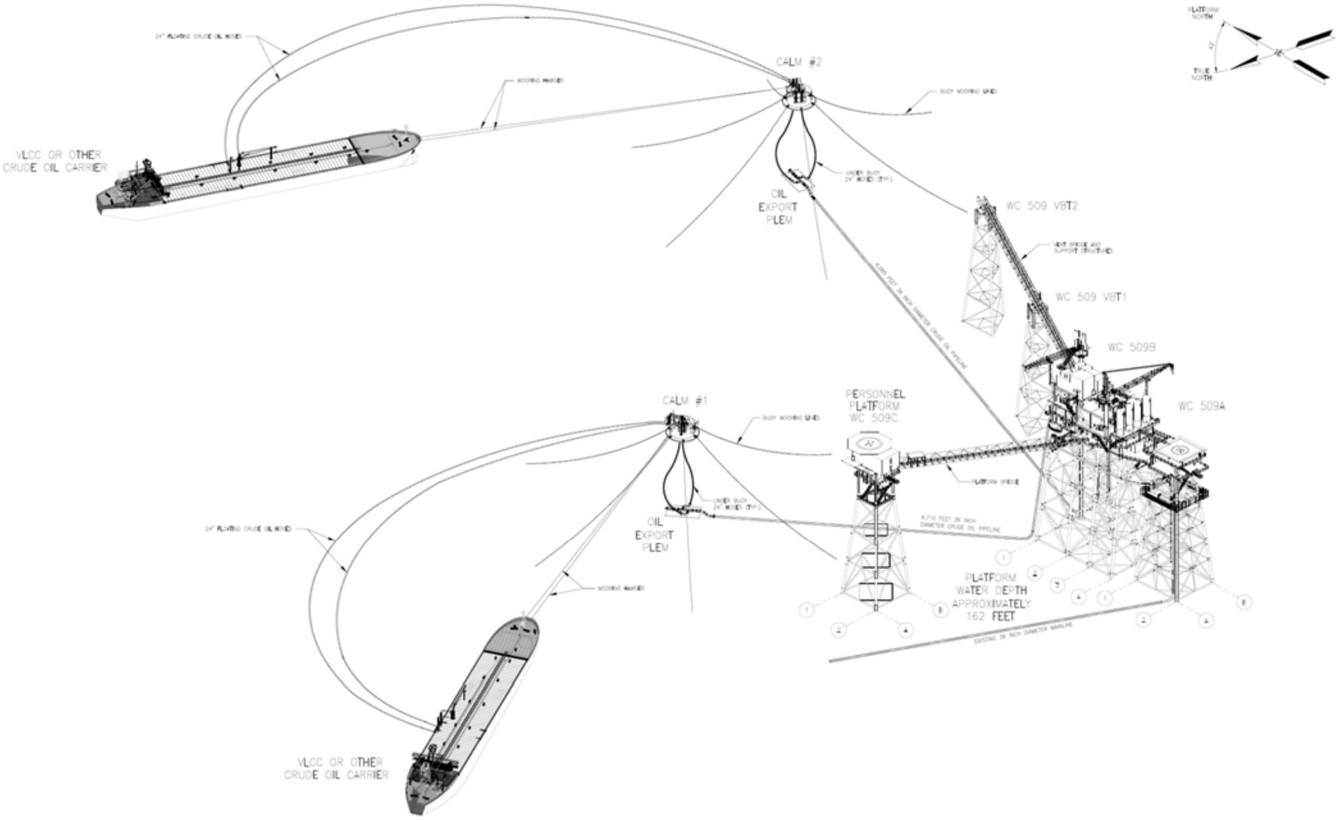
[5] 46 CFR §170.050.

[6] https://www.nhc.noaa.gov/abouttafbprod.shtml

Figure 2-3. Schematic of Proposed Offshore Loading from WC 509



The schematic is presented again in Appendix A to this application.

The BMOP Project is unique from other sources and contemporary crude oil export operations because of its conversion of existing offshore facilities to support new CALM buoys in loading crude oil for export into an international fleet of VLCCs, or other crude oil carriers.

2.2 Proposed Schedule

Refurbishment of the existing WC 509 Platform Complex will begin in May 2021. The on-site installation of the crude oil subsea pipelines, PLEMs, and CALM buoy systems is expected to commence in December 2022. The expected completion date of construction is May 2023. Commissioning is planned to occur in May, June, and July 2023, with the anticipated date of startup as August 5, 2023.

3. EMISSIONS QUANTIFICATION

3.1 Potential Emissions Summary

A summary of the potential emissions of oxides of nitrogen (NO_X), carbon monoxide (CO), VOC, sulfur dioxide (SO_2), particulate matter (PM) with an aerodynamic diameter less than 10 microns (PM_{10}), PM with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), hydrogen sulfide (H_2S), sulfuric acid mist (H_2SO_4), hazardous air pollutants (HAPs), and greenhouse gases (GHG), represented as carbon dioxide-equivalents (CO_2e) is shown in Table 3-1.

Table 3-1. Potential Emissions Summary

	NO_X (tpy)	CO (tpy)	VOC (tpy)	SO_2 (tpy)	PM_{10}[7] (tpy)	$PM_{2.5}$ (tpy)	H_2S (tpy)	H_2SO_4 (tpy)	HAPs (tpy)	CO_2e (tpy)
Marine Loading										
Crude Oil Loading	--	--	21,840	--	--	--	9.49	--	1,224	--
Platform A Sources										
Aviation Fuel Tank	--	--	5.12E-4	--	--	--	--	--	7.65E-5	--
Platform B Sources										
Natural Gas Generators (x2)	22.48	44.96	15.74	0.05	0.80	0.80	--	2.34E-3	4.22	12,871
Emergency Diesel Generator	1.06	0.58	1.06	0.07	0.04	0.04	--	2.23E-3	1.11E-3	115.2
Platform B Cranes (x2)	2.05	11.97	0.97	1.48	0.21	0.21	--	0.05	0.06	2,383
Platform B Cranes Diesel Tank #1	--	--	1.93E-3	--	--	--	--	--	2.65E-4	--
Platform B Cranes Diesel Tank #2	--	--	1.93E-3	--	--	--	--	--	2.65E-4	--
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	--	7.22E-4	3.58E-4	37.22
Primary Diesel Tank	--	--	0.01	--	--	--	--	--	1.17E-3	--
Surge Tank #1	--	--	3.73	--	--	--	--	--	0.07	--
Platform C Sources										
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	--	7.22E-4	3.58E-4	37.22
Fugitive Sources										
Total Fugitive Emissions	--	--	18.65	--	--	--	0.005	--	1.91	1,060
Total	**26.02**	**57.88**	**21,881**	**1.64**	**1.07**	**1.07**	**9.50**	**0.05**	**1,230**	**16,503**

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[7] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emissions.

3.2 Detailed Emissions Calculations

Potential emissions were calculated for the stationary offshore sources by using the following calculation methodologies.

3.2.1 Marine Loading

VOC emissions from marine loading of crude oil are calculated based on the maximum hourly loading rate (gallons per hour [gal/hr]) and Equations 2 and 3 of EPA's AP-42, Section 5.2 (07/08), which was developed specifically for loading crude oil into ships and ocean barges,[8] and has also been utilized by EPA in the development of the National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart Y for onshore/near shore loading of crude oil.[9] The Project will load only crude oil, and no refined products. In addition to EPA's explicit direction in AP-42 to utilize Equations 2 and 3 for crude oil loading into ocean-going ships, this methodology is consistent with other marine loading of crude and permitting determinations in Louisiana,[10] which is the nearest onshore state. To align with the nearest state consistent with the DWPA,[11] and based on Louisiana's recent determinations for crude loading into ships, Equations 2 and 3 are most appropriate to estimate emissions for the Project.

The application of Equations 2 and 3 are described below.

$$C_L = C_A + C_G$$

Where:

$C_L = Total\ Loading\ Loss, pounds\ per\ 1000\ gallons\ \left(\frac{lb}{10^3 gal}\right) of\ crude\ oil\ loaded$

$C_A = Arrival\ emission\ factor, contributed\ by\ vapors\ in\ the\ empty\ tank\ compartment\ before\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

$C_G = Generated\ emission\ factor, contributed\ by\ evaporation\ during\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

BMOP conservatively uses the average arrival emission factor for an uncleaned ship/ocean barge tank, as provided in AP-42 Table 5.2-3. The generated emissions factor, C_G is calculated based on Equation 3 of AP-42, Section 5.2, as described below.

$$C_G = 1.84 \times (0.44 \times P - 0.42) \times \frac{MG}{T}$$

Where:

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[8] AP-42 Chapter 5.2 Transportation and Marketing of Petroleum Liquids, 6/08.

[9] "*We agree with the commenter that the emission factors for ships and barges, as applicable to the type of marine vessel being loaded, should be considered for estimating VOC and HAP emissions. We have revised the emission estimates using the barge and ship emission factors from AP–42,"* referenced from 76 FR 22582, April 21, 2011, left column. Also see Subpart Y: Email from Michelle Herman, Chevron to Steve Shedd, EPA Chevron Pipe Line Nederland TX Emissions Data for MVL, 5/18/2010, ID: EPA-HQ-OAR-2010-0600-0044, which uses AP-42 Eq. 2 and 3 for crude oil loading into ships, and Eq. 1 for gasoline loading.

[10] See examples: Part 70 Permit No. 2520-00033-V-14 for International Matex Tank Terminals – IMTT – St. Rose, Louisiana, 8/14/2019, based on crude loading emissions from Eq. 2 and 3 from application for Title V Revision, dated June 3, 2019, and also Part 70 Permit No. 2560-00034-V9 for Sugarland Pipeline Station/Terminal, Shell Pipeline Company, LP, St. James, Louisiana, based on crude loading emissions from Eq. 2 and 3.

[11] 33 USC §1518(b).

$P = True\ vapor\ pressure\ of\ loaded\ crude\ oil, psia$
$M = Molecular\ weight\ of\ vapors, \frac{lb}{lb - mol}$
$G = Vapor\ growth\ factor, 1.02\ (dimensionless)$
$T = Temperature\ of\ vapors, °R$

BMOP estimates a maximum hourly loading rate of 80,000 bbl/hr of crude oil and the annual loading rate is equivalent to continuous (e.g. 8,760 hours per year) loading at the maximum hourly loading rate.[12] The project will be able to load 700,800,000 barrels per year (bbl/yr). To calculate the VOC loading loss rate (in lb/10^3 gal), maximum hourly and annual average crude loading temperatures and crude true vapor pressures are used, based on Project design specifications. Because the crude oil will be subsea for approximately 100 nautical miles, the long-term temperature representative of the sea floor was used to estimate the loading temperatures.[13] The molecular weight of the crude oil (liquid and vapor) is based on AP-42, Chapter 7, Table 7.1-2 (06/20). A summary of the characteristics used to calculate VOC emissions are provided in Table 3-2.

3.2.1.1 Marine Loading – H_2S Emissions

Emissions of H_2S from marine loading are based on the hourly maximum and annual average H_2S content in the crude oil, and the following mass balance equation.

$$H_2S\ Emission\ Rate\ \left(\frac{lb\ H_2S}{lb\ VOC}\right) = \frac{X}{1x10^6} \times \frac{M_{crude}}{M_{H2S}} \times \frac{M_{H2S}}{M_{Vapor}} \times k$$

Where:
$X = Crude\ H_2S\ Content, parts\ per\ million\ by\ weight\ (ppmw)$
$M_{crude} = Molecular\ weight\ of\ crude\ liquid, \left(\frac{lb}{lb - mol}\right)$
$M_{H_2S} = Molecular\ weight\ of\ H_2S, \left(\frac{lb}{lb - mol}\right)$
$M_{Vapor} = Molecular\ weight\ of\ crude\ vapor, \left(\frac{lb}{lb - mol}\right)$
$k = Vapor\ to\ liquid\ H_2S\ partition\ factor$[14]

A summary of the characteristics used to calculate H_2S emissions are also provided in the table below.

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[12] 80,000 bbl/hr is approximately 3,360,000 gal/hr.

[13] Temperature data from ROMS Texas A&M University Outputs, Location: WC509, Depth 150.672 feet. Long-term average of 72.66°F used for annual average conditions and a maximum of 90°F used for short-term maximum conditions (max of dataset is 85.4°F.

[14] Per the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93.

Table 3-2. Marine Loading Emissions Specifications

	Maximum Hourly	**Annual Average**
Crude Loading Rate (bbl/hr)	80,000	80,000
Arrival Emission Factor	0.86	0.86
Loading Temperature (°R)	550	532
Vapor Molecular Weight (lb/lbmol)	50	50
Liquid Molecular Weight (lb/lbmol)	207	207
True Vapor Pressure [TVP] (psia)[15]	10.99	9.00
Liquid H_2S Partition	25	21
H_2S Concentration (ppmw)[16]	125	5
H_2S Molecular Weight (lb/lbmol)	34.1	34.1

3.2.1.2 Marine Loading – HAP Emissions

Emissions of HAP are based on an identified maximum crude oil vapor HAP speciation, by individual HAP, provided in weight percent (wt%) of the vapor. These maximum individual HAP concentrations were determined from thirteen samples of various crude types at the Nederland Terminal from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.[17] The analytical results provided an extensive speciation of the crude oil, of which >99.9% was identified as VOCs. From these 13 samples, the average total HAP concentration in the liquid was 3.2 wt%. This identifies the expected average HAP concentration to be less than 5%, by weight, in the liquid.

For calculating potential emissions, the concentration in the vapor phase was calculated. Consistent with AP-42, Chapter 7.1.4 (06/2020), Raoult's Law was followed to determine the HAP content in the vapor phase of the crude oil from the HAP content in the liquid phase. Raoult's Law states that the mole fraction in the liquid of a speciated component, when multiplied by the vapor pressure of that component is equal to the partial pressure of that component, or:

$$P_i = (P)(x_i)$$

Where:

$P_i = partial\ pressure\ of\ component\ i, psia$

$P = vapor\ pressure\ of\ pure\ component\ i\ at\ the\ average\ daily\ liquid\ surface\ temperature, psia$

$x_i = liquid\ mole\ fraction\ of\ component\ i, \frac{lb-mole}{lb-mole}$

The vapor pressure of each HAP species was determined using published Antoine Coefficients at the average daily temperature, described above.

The liquid mole fraction was determined from the liquid weight fraction of the component in the samples per:

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[15] Maximum short-term and annual average true vapor pressure aligned with the permit limits for the origination of the crude oil for the BMOP Project – the Nederland Terminal. Note that the purpose of the project is to load a variety of both heavy and light crude oils, so using the permit limits is a conservative estimate of potential emissions for the Project.

[16] H_2S concentration aligned with permit limits for the origination of the crude oil for the BMOP Project – the Nederland Terminal. Annual mass H_2S emissions calculated from a conservative assumption of 5 ppmw. The average of all samples from Nederland (>3000 samples) is 1.31 ppmw.

[17] 49 CFR §171.7(h)(45).

$$x_i = \left(\frac{Z_{Li} M_L}{M_i}\right)$$

Where:

$x_i = liquid\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$Z_{Li} = weight\ fraction\ of\ component\ i\ in\ the\ liquid, lb/lb$

$M_L = molecular\ weight\ of\ liquid\ stock, \left(\frac{lb}{lb - mol}\right)$

$M_i = molecular\ weight\ of\ component\ i, \left(\frac{lb}{lb - mol}\right)$

The vapor mole fraction was determined by:

$$y_i = \frac{P_i}{P_{VA}}$$

Where:

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$P_i = partial\ pressure\ of\ component\ i, psia$

$P_{VA} = total\ vapor\ pressure\ of\ liquid\ mixture, psia$

The weight fraction in the vapor phase can then be determined from the mole fractions in the vapor phase.

$$Z_{Vi} = \frac{y_i M_i}{M_V}$$

Where:

$Z_{Vi} = vapor\ weight\ fraction\ of\ component\ i, lb/lb$

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$M_i = molecular\ weight\ of\ component\ i, \left(\frac{lb}{lb - mol}\right)$

$M_V = molecular\ weight\ of\ vapor\ stock, \left(\frac{lb}{lb - mol}\right)$

The resulting total HAP in the vapor averaged 2.4% for all 13 samples.

In order to ensure a conservative representation of potential emissions on a short-term basis, the 99% upper prediction limit (UPL) was calculated for each individual HAP identified in the 13 samples. The data and approach to calculating the UPL of the vapor weight percent of each HAP is discussed in the Case-by-Case MACT Application, submitted concurrently with this Title V air permit application.

BMOP used the higher of the 99% UPL from the 13 samples, or the Nederland Terminal Permit basis for each individual HAP, whichever was greater. The result is a conservative estimate for each individual HAP, and the total HAP (which is the sum of the highest values for each individual HAP).

BMOP has used the following crude oil vapor HAP speciation to estimate emissions.

Table 3-3. Crude Oil Vapor HAP Speciation

HAP	Vapor Weight %
Hexane	4.09
Benzene	0.80
Toluene	0.36
Ethylbenzene	0.05
1,2,4-Trimethylbenzene	0.01
1,3-dimethylbenzene	0.05
1,4-dimethylbenzene	0.03
1,2-dimethylbenzene (Xylene)	0.21
i-propylbenzene (Cumene)	0.01
Biphenyl	0.00002
Cresols	0.001
Naphthalene	0.001
Phenol	0.001
Total HAP	5.60

Hourly and annual VOC emissions are multiplied by each HAP speciation, above, to determine the hourly and annual HAP mass emission rates.

Table 3-4. Potential VOC and HAP Mass Emissions from Marine Loading

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC	5,422	21,840
HAP speciation:		
Hexane	221.8	893.2
Benzene	43.40	174.8
Toluene	19.27	77.61
Ethylbenzene	2.69	10.85
1,2,4-Trimethylbenzene	0.58	2.33
1,3-dimethylbenzene	2.58	10.41
1,4-dimethylbenzene	1.80	7.25
1,2-dimethylbenzene (Xylene)	11.26	45.36
i-propylbenzene (Cumene)	0.32	1.28
Biphenyl	0.001	0.004
Cresols	0.04	0.16
Naphthalene	0.03	0.14
Phenol	0.08	0.33
Total HAP	303.8	1,244

3.2.1.3 Marine Loading – GHG Emissions

None of the 13 samples of varying crude types identified methane (CH_4) or carbon dioxide (CO_2) in the crude. Although produced crude may have some amount of methane, methane is highly volatile and will quickly be released in vapor prior to being loaded into a marine vessel in the BMOP DWP, after many steps of production (which is initially extracted at pressure, then stored in atmospheric tanks where the majority of light ends flash off), processing, storage, and hundreds of miles of transmission. Referred to as "weathering," it is typical for the lightest volatile compounds, including methane and carbon dioxide, to be released well before reaching a storage terminal. This is evident in that none of the 13 samples contained even a small fraction of methane or carbon dioxide in the crude at the Nederland Terminal.

Accordingly, GHG emissions from crude oil loading at the BMOP project are not expected or will be negligible.

3.2.2 Natural Gas Generators

The Project will operate two (2) natural gas-fired generators. BMOP design identifies that the make/model of each generator will be similar to a Caterpillar G3516C, each rated at approximately 2,000 hp. To conservatively estimate emissions from the proposed units, a maximum power of 2,328 hp was used, per the manufacturer's specification sheet at 100% load.

Emissions from NO_X, CO, and VOC are based on the applicable emission standards provided in Table 1 of New Source Performance Standards (NSPS) Subpart JJJJ, in grams per horsepower-hour (g/hp-hr).[18] Emissions from formaldehyde are limited to 14 ppmvd or less at 15% O_2, based on Table 2a of NESHAP Subpart ZZZZ.[19] Emissions from CO_2 and CH_4 are estimated based on the manufacturer's specifications sheet, in grams per kilowatt hour (g/kW-hr). Emissions from filterable PM_{10}, $PM_{2.5}$, condensable PM, SO_2, and the remaining HAPs were estimated based on emission factors from AP-42 Chapter 3, Table 3.2-2 (07/00), *Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines*, in pounds per million British thermal units (lb/MMBtu). Filterable PM emissions are assumed to be equivalent to filterable PM_{10} and $PM_{2.5}$ emissions. H_2SO_4 emissions are assumed to be 5% of SO_2 emissions. The natural gas specific emission factor from 40 CFR §98 Subpart C, Table C-2, *Default CH_4 and N_2O Emission Factors for Various Types of Fuel,* was used to estimate N_2O emissions, in kilograms per MMBtu (kg/MMBtu). The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O emission rates, weighted according to their global warming potentials (GWP) of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a natural gas higher heating value (HHV) of 1,020 British thermal units per standard cubic foot (Btu/scf)[20] and average brake-specific fuel consumption rate of 17,820 scf per hour (scf/hr) were used.[21]

Based on current Project design, only one engine will be operating at any given time to continuously power the sources of the DWP platform. Therefore, potential annual emissions are based on the continuous operation of a single engine at 100% load.

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[18] For non-emergency spark ignition natural gas engines greater than 500 hp manufacturered after July 1, 2010.

[19] Table 2a of NESHAP Subpart ZZZZ for four-stroke lean burn (4SLB) stationary RICE.

[20] Per footnote b of AP-42, Table 3.2-2.

[21] Per the manufacturer's specification sheet at 100% load.

3.2.3 Emergency Diesel Generator

The Project will operate one (1) emergency, diesel-fired generator. BMOP design identifies that the make/model of the emergency generator will be similar to a Caterpillar G3512C, rated at approximately 1,500 kW (~2,000 hp).

Emissions from filterable PM, NO_X, VOC, and CO are estimated based on the emissions standards provided in 40 CFR §60.4205(b), in g/kW-hr.[22] Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions. Condensable PM and HAP emissions were estimated based on emission factors from AP-42 Chapter 3, Table 3.4-1, 2, and 3 (10/96), *Emission Factors for large Stationary Diesel and All Stationary Dual-Fuel Engines,* in lb/MMBtu. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 British thermal units per pound (Btu/lb) and average brake-specific fuel consumption (BSFC) rate of 7,000 British thermal units per horsepower-hour (Btu/hp-hr) were used.[23]

The emergency diesel-fired generator will only operate during periods where both natural gas generators are unavailable or for maintenance and readiness testing. Therefore, to estimate potential emissions, BMOP conservatively assumes that the emergency generator will not operate more than 100 hours per year, operating at 100% load.

3.2.4 Platform Crane Engines

The Project will operate a number of platform cranes for various types of operation. Based on current design specifications for the Project, the following diesel-fired crane engines will be located at the WC 509 platform complex:

- Two (2) 354 kW (~475 hp) diesel engines.

Emissions from filterable PM, NO_X, CO, and VOC are estimated based on the emissions standards provided in 40 CFR §60.4204(b), in g/kW-hr.[24] To conservatively estimate emissions from the crane engines, emissions of PM, NO_X, and VOC are multiplied by the appropriate Not to Exceed (NTE) multiplier provided in 40 CFR §1039.101(e), which, for engines with a NO_X standard less than 2.5 g/kW-hr and PM standard less than 0.07 g/kW-hr is 1.5. Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions.

Emissions from HAP were estimated based on emission factors from AP-42 Chapter 3, Tables 3.3-1 and 2 (10/96), *Emission Factors for Uncontrolled Gasoline And Diesel Industrial Engines*. AP-42 Chapter 3.3 does

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[22] Per 40 CFR §60.4205(b) and 40 CFR §89.112, for 2007 model year or later emergency combustion ignition internal combustion engines less than 3,000 hp with a displacement less than 10 liters per cylinder. It is conservatively assumed that NO_X and VOC emissions are equivalent to the NMHC+NO_X emission limit.

[23] Per footnote e of AP-42 Table 3.4-1.

[24] Per 40 CFR §60.4204(b) and 40 CFR §1039.101, for 2014 model year or later combustion ignition internal combustion engines between 130 kW to 560 kW.

not provide an emission factor for condensable PM, therefore, the condensable PM emission factor provided in AP-42, Table 3.4-2, *Emission Factors for Large Uncontrolled Stationary Diesel Engines,* was conservatively used. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 Btu/lb and average BSFC rate of 7,000 Btu/hp-hr were used.[25]

To conservatively estimate emissions from the crane engines, BMOP assumes that each crane engine will operate up to 4,380 hours per year.

3.2.5 Firewater Pump Engines

The Project will operate two (2) firewater pump engines. Current design specifications for the Project identify that the engines will be rated at approximately 485 kW (~650 hp).

Emissions from filterable PM, NO_X, CO, and VOC are estimated based on the emissions standards provided in Table 4 of NSPS Subpart IIII[26] and 40 CFR §60.4204(b), in g/kW-hr.[27] Filterable PM emissions are assumed to be equivalent to PM_{10} and $PM_{2.5}$ emissions.

Emissions from HAP were estimated based on emission factors from AP-42 Chapter 3, Tables 3.3-1 and 2 (10/96), *Emission Factors for Uncontrolled Gasoline And Diesel Industrial Engines*. AP-42 Chapter 3.3 does not provide an emission factor for condensable PM, therefore, the condensable PM emission factor provided in AP-42, Table 3.4-2, *Emission Factors for Large Uncontrolled Stationary Diesel Engines,* was conservatively used. SO_2 and H_2SO_4 emissions are based on a diesel fuel sulfur content of 0.1%. It is estimated that 98% of the sulfur is oxidized to SO_2 and the remaining 2% is hydrolyzed to H_2SO_4. GHG emissions of CO_2, CH_4, and N_2O were based on emission factors provided in 40 CFR §98, Subpart C, Tables C-1 and C-2, for distillate fuel oil No. 2. The CO_2e emission rate was calculated based on the CO_2, CH_4, and N_2O GWP's of 1, 25, and 298, respectively.

To calculate emissions for heat rate based emission factors (lb/MMBtu or kg/MMBtu), a distillate fuel oil HHV of 19,300 Btu/lb and average BSFC rate of 7,000 Btu/hp-hr were used.[28]

The emergency firewater pump engines will only operate during periodic maintenance testing and during emergencies. Therefore, to estimate potential emissions, BMOP conservatively assumes that the firewater pump engines will not operate more than 100 hours per year, operating at 100% load.

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[25] Per footnote c of AP-42 Table 3.3-1.

[26] Per 40 CFR §60.4205(c) for firewater pump engines with a displacement of less than 30 liters/cylinder between 225 kW and 450 kW. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC+NO_X emissions limit.

[27] Per 40 CFR §60.4204(b) and 40 CFR §1039.101, for 2014 model year or later combustion ignition internal combustion engines between 130 kW to 560 kW.

[28] Per footnote c of AP-42 Table 3.3-1.

3.2.6 Storage Tanks

The Project will operate a number of fuel and petroleum liquid storage tanks. Current design specifications for the Project predict that the following storage tanks will be located at each platform:

- Platform A
  - One (1) 3,000 gallon aviation fuel (estimated as jet kerosene) tank.
- Platform B
  - Two (2) 4,400 gallon diesel storage tanks associated with each platform crane.
  - One (1) 18,000 gallon primary diesel storage tank.
  - One (1) 42,000 gallon crude oil surge tank.

TankESP^{TM} software was utilized to estimate potential annual emissions consistent with the methodology of AP-42 Chapter 7.1 using the following dimensions and usage assumptions.

Table 3-5. Storage Tank Representation

Tank	**Tank Dimensions**				**Volume (gal)**	**Max. Filling Rate (gal/hr)**	**Annual Throughput (gal/yr)**	**Orientation**
	L (ft)	**W (ft)**	**H (ft)**	**Dia. (ft)**				
Aviation Fuel Tank	10	5	8	--	3,000	200	13,000	Horizontal
Crane Diesel Storage Tank #1	--	--	30	5	4,400	400	114,400	Vertical
Crane Diesel Storage Tank #2	--	--	30	5	4,400	400	114,400	Vertical
Primary Diesel Storage Tank	16	15	10	--	18,000	400	468,000	Horizontal
Crude Oil Surge Tank	47.5	--	--	12.67	42,000	80,000	42,000	Horizontal

The chemical characteristics for jet kerosene and diesel fuel were based on standard TankESP^{TM} defaults, while the chemical characteristics for crude oil were based on the same annual average values as described for loading emissions, provided in Table 2-3 above. It was assumed that all tanks will have fixed roofs and will be operated continuously.

3.2.7 Fugitive Emissions

Fugitive emissions were calculated based on the synthetic organic chemical manufacturing industry (SOCMI) average emission factor (in pounds per hour [lb/hr])[29], using the following equation.

$$E_{VOC} = F_A \times WF_{VOC} \times N$$

Where:

$E_{VOC} = Emission\ rate\ of\ VOC\ from\ all\ equipment\ in\ the\ stream, \frac{lb}{hr}$

$F_A = SOCMI\ average\ emission\ factor, \frac{lb}{hr}$

$WF_{VOC} = Weight\ fraction\ of\ VOC\ in\ the\ stream, \%$

$N = number\ of\ components\ in\ the\ stream$

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[29] As provided in EPA's Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017 https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf

This factor was chosen to ensure a conservative representation of the collection of piping components in various services (i.e. crude oil, diesel, etc) at the WC 509 DWP. It should be noted that no reduction from these average emissions factors has been applied for these estimates, to ensure a conservative representation. Actual emissions will be much lower, as piping components will be monitored and repaired, if found to be leaking, based on the applicable leak detection and monitoring requirements.

The total number of piping components for each applicable stream are based on current design estimates for the Project. The different streams are categorized as gas/vapor or light liquid service based on the contents of the stream. The total number of components are then multiplied by the appropriate SOCMI emission factor. For piping components servicing natural gas streams, it is assumed that the components are in gas/vapor service. For piping components servicing diesel fuel, crude oil, or aviation fuel (assumed to be equivalent to jet kerosene), it is assumed that the components are in light liquid service.

To determine the VOC emission rate, the stream is multiplied by the VOC wt% of the stream. For components in natural gas service, the total VOC composition of the stream is based on an April 13, 2020 sample at the DWP platform. For components in diesel fuel or jet kerosene service, the total VOC composition is consistent with the TankESP^{TM} defaults. For components in crude oil service, the total VOC composition is based on the maximum vapor wt% used for crude oil loading emissions calculations.

Similar to VOC emissions, HAP emissions for the fugitive components were calculated using the same approach as above. Fugitive emissions also consider H_2S emissions from components in crude oil service and GHG emissions from components in natural gas service, using the same methodology as above. Annual emissions for all fugitive components are based on continuous operation (i.e. 8,760 hours of operation).

3.2.8 Maintenance, Startup, and Shutdown

BMOP has evaluated potential emissions not already identified above that may occur during maintenance, startup, and shutdown (MSS).

The existing WC 509 platform complex includes a vent boom for natural gas blowdowns. Following the repurposing of the platform complex from natural gas service to dual purpose oil and gas service, the vent boom will remain, but for emergency natural gas blowdowns only. Normal maintenance blowdowns will not occur through the vent boom at the WC 509 platform complex. Accordingly, no MSS emissions are attributed to the Project from this source.

The Project includes pig launchers and receivers on WC 509B. During maintenance activities requiring pigging, BMOP will utilize marine vessels for collection of the liquid pushed by the pigs. BMOP will follow the same Best Management Practices (BMP) as marine vessel loading, and identify records as "maintenance." Because potential VOC and HAP emissions have been calculated based on continuous loading, emissions from loading losses as a result of pigging are already included in the potential emissions estimates above.

4. REGULATORY ANALYSIS

The Project is subject to certain federal and state air quality regulations. This section summarizes the air permitting requirements and key air quality regulations that would apply to the operation of the proposed DWP. Specifically, applicability to air permitting programs such as NSR, federal emissions standards such as NSPS and NESHAP, and applicable state air regulations are addressed.

4.1 Federal Permitting Programs

Federal permitting programs comprise requirements for construction of new sources or modification of existing sources (NSR) and for operation of major sources of air pollutants (Title V Air Operating Permit Program).

4.1.1 New Source Review

NSR requires that construction of new emission sources or modifications to existing emission sources be evaluated when significant net emission increases result. Two distinct NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant; nonattainment NSR permitting is required for facilities located in nonattainment areas, while PSD permitting is required for facilities located in attainment areas.

The DWP will be located approximately eighty-two (82) statute miles from the nearest point of the Louisiana coastline. The nearest Parish onshore is Cameron Parish, Louisiana. Cameron Parish is designated by the EPA as "attainment" or "unclassifiable" with NAAQS for all criteria pollutants.[30]

Therefore, the Project is not subject to offshore NNSR permitting requirements for any criteria pollutants. Under PSD permitting rules, the major source threshold is 250 tpy unless the facility is listed specifically in 40 CFR §52.21(b)(1)(i)(a) as having a lower 100 tpy threshold. The Project is not included on the list of operations subject to the more stringent 100 tpy threshold. As such, the Project will be subject to PSD permitting should emissions from the facility exceed the major source threshold of 250 tpy of any regulated NSR pollutant.

The following table presents the Project potential emissions in comparison to the major source thresholds.

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[30] 40 CFR §81.319.

Table 4-1. PSD Major Stationary Source Determination

Regulated NSR Pollutant	Potential Emissions (tpy)	PSD Major Source Threshold (tpy)	Major Source?
NO_X	26.02	250	No
CO	57.88	250	No
VOC	21,881	250	**YES**
SO_2	1.64	250	No
PM-filterable	0.16	250	No
PM_{10}	1.07	250	No
$PM_{2.5}$	1.07	250	No
H_2S	9.50	250	No
H_2SO_4	0.05	250	No

Based on the potential operating emissions calculations for stationary sources, the Project is a major stationary source as potential emissions of VOC will exceed 250 tpy. As a new major stationary source, BMOP calculated emissions increases from the project in accordance with 40 CFR §52.21(d).

> *A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit… from each emissions unit following completion of the project and the baseline actual emissions… of these units before the project equals or exceeds the significant amount for that pollutant…*

The baseline emissions are considered zero for this analysis, and the project emissions increase is equal to the Project potential emissions. The following summarizes the project emissions increase in comparison to the significant emission rates (SER) for relevant regulated NSR pollutants (per 40 CFR §52.21(b)(23)).

Table 4-2. Project Emissions Increase Evaluation

Regulated NSR Pollutant	Potential Emissions (tpy)	Significant Emissions Rate[a] (tpy)	Above SER?
NO_X	26.02	40	No
CO	57.88	100	No
VOC	21,881	40	**YES**
SO_2	1.64	40	No
PM-filterable	0.16	25	No
PM_{10}	1.07	15	No
$PM_{2.5}$	1.07	10	No
H_2S	9.50	10	No
H_2SO_4	0.05	7	No
GHG (CO_2e)	16,503	75,000	No

a. "Significant" for GHG is defined under 40 CFR §52.21(b)(49)(iii).

As identified in the table above, the Project exceeds the SER for VOC. Accordingly, PSD review is required for VOC only. BMOP has submitted an application for a PSD air permit under separate cover. The proposed requirements for the PSD permit, including BACT are summarized in Section 5 of this Title V application.

4.1.2 Title V Air Operating Permit Program

Title V air operating permits are required for major stationary sources of air pollutants on the OCS, beyond state's seaward boundaries, as defined in 40 CFR §71. Based on potential emission calculations provided in Table 3-1, the Project will be a Title V major source since potential emissions exceed the Title V major source threshold for VOC and HAP. Therefore, BMOP is submitting this application for a Title V Air Operating Permit. The following Part 71 forms have been completed and included in Appendix B of this application:

- Initial Compliance Plan and Compliance Certification (Form I-Comp),
- Fee Calculation Worksheet (Form FEE), and
- Certification of Truth, Accuracy, and Completeness (Form CTAC).

4.1.3 State Permitting Program

The DWPA identifies that the law of the nearest adjacent coastal state will apply to a DWP, such as the proposed Project.[31] The nearest adjacent coastal state is Louisiana.

4.1.3.1 Louisiana Permitting Program

Louisiana's State Implementation Plan (SIP) provides the requirements for state permitting of construction or modification of emissions sources and operation of emission sources in Louisiana Administrative Code (LAC) 33.III.Chapter 5 – Permit Procedures, regulated by the LDEQ.

The LDEQ permitting provisions of this Chapter apply to the owner and operator of any source which emits, or has the potential to emit any air contaminant.

Such sources include, but are not limited to:

- Any major source as defined LAC 33:III.502.A;
- Any nonmajor (area) source of hazardous air pollutants required to obtain an operating permit pursuant to regulations promulgated under Section 112 of the federal Clean Air Act; and
- Any nonmajor (minor) source that does not meet the exemptions specified in LAC 33:III.501.B and is thus required to obtain an air quality permit.

The Project will be subject to federal major source permitting under the Title V program, as discussed previously. As such, this application is submitted to EPA for review and a permitting determination by EPA Region 6, and will be subject to regulations under Louisiana's SIP, as applicable.

4.2 Air Quality Regulations

The Project is potentially subject to federal and state regulations for air quality control. This section describes the applicability, criteria and principal requirements of federal, state, and local regulations that result in permit conditions for the offshore components of the Project.

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[31] 33 USC §1518(b).

4.2.1 Federal Regulations

This section outlines the federal applicability analysis. Both NSPS and NESHAP are evaluated.

4.2.1.1 New Source Performance Standards (NSPS)

NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of Subpart A, except as noted. Following is a discussion of potentially applicable subparts for the Project.

4.2.1.1.1 NSPS Subpart Kb – Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, regulates storage vessels with a capacity greater than or equal to 75 cubic meters (m^3) (19,813 gallons) that are used to store volatile organic liquids for which construction, reconstruction, or modification commenced after July 23, 1984.

NSPS Subpart Kb has provisions in §60.110b(b) to exempt tanks based on size and the maximum TVP of the material stored. Specifically, NSPS Subpart Kb "does not apply to storage vessels with a capacity greater than or equal to 151 m^3 (39,890 gallons) storing a liquid with a maximum TVP less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 (19,813 gallons) but less than 151 m^3 (39,890 gallons) storing a liquid with a maximum TVP less than 15.0 kPa." Vessels permanently attached to mobile vehicles such as trucks, railcars, barges, or ships are not subject to this subpart. In addition, process vessels do not meet the definition of a storage vessel per 40 CFR §60.111b.

The offshore Project includes the following storage vessels with a capacity greater than 19,813 gallons:

- One (1) 42,000 gallon crude oil surge tank located at the DWP platform.

However, the surge tank is considered a process vessel and is therefore not subject to NSPS Subpart Kb. EPA provided additional guidance that process tanks are exempt from Subpart Kb and that vessels used for pipeline surge control (not storage) are considered to be process tanks.[32] As such, the Project is not subject to the requirements of NSPS Subpart Kb.

4.2.1.1.2 NSPS Subpart IIII – Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) that commenced construction, reconstruction or modification after July 11, 2005 and were manufactured after April 1, 2006 if not fire pump engines, and after July 1, 2006 if certified fire pump engines.

BMOP proposes the following CI ICE, located on the DWP platform, that are subject to the requirements of NSPS Subpart IIII:

- One (1) 1,500 kW (~2,012 hp) emergency diesel generator (40 CFR §60.4100(a)(2)(i));
- Two (2) 354 kW (~475 hp) non-emergency diesel crane engines (40 CFR §60.4100(a)(2)(i)); and
- Two (2) 485 kW (~650 hp) emergency diesel firewater pump engines (40 CFR §60.4100(a)(2)(ii)).

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[32] 68 FR 59329-59330, October 15, 2003.

The one (1) 1,500 kW (~2,012 hp) emergency diesel generator will be subject to 40 CFR §60.4205(b), which states that owners or operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with emission standards for new CI engines in 40 CFR §60.4202. Per 40 CFR §60.4202(a)(2), 2007 model year or later emergency CI ICE <3,000 hp and displacement <10 L/cylinder that are not fire pump engines, must meet standards in 40 CFR §89.112. Table 1 of 40 CFR §89.112 limits emissions standards to the following for engines >560 kW:

- Non-methane hydrocarbons (NMHC) + NO_X - 6.4 g/kW-hr
- CO - 3.5 g/kW-hr
- PM - 0.2 g/kW-hr

The two (2) 354 kW (~475 hp) non-emergency diesel crane engines at WC 509 will be subject to 40 CFR §60.4204(b), which states that owners or operators of 2007 model year or later non-emergency stationary CI ICE with a displacement of less than 30 liters/cylinder must comply with emission standards for new CI engines in 40 CFR §60.4201. Per 40 CFR §60.4201(a), 2007 model year or later non-emergency CI ICE <3,000 hp and displacement <10 liters/cylinder must meet standards in 40 CFR §89.112 or 40 CFR §1039.101 (as applicable). Per Table 1 of 40 CFR §1039.101, for engines that are model year 2014 or later, between 130 kW and 560 kW, emission standards are as follows. Per 40 CFR §1039.101(e), exhaust emissions from the engines may not exceed the applicable NTE standards, which for the applicable pollutants (NO_X, NMHC, and PM) is 1.5 times the standard. The following emissions standards have included the appropriate NTE multiplier for the engines.

- PM - 0.03 g/kW-hr
- NO_X - 0.6 g/kW-hr
- NMHC (VOC) - 0.29 g/kW-hr
- CO - 3.5 g/kW-hr

The two (2) 485 kW (~650 hp) emergency diesel firewater pumps will be subject to 40 CFR §60.4205(c), which states that owners or operators of fire pump engines with a displacement of <30 liters/cylinder must comply with emission standards in Table 4 of NSPS Subpart IIII. Per Table 4, model year 2009 or later engines with a maximum engine power greater than or equal to 450 kW and less than or equal to 560 kW must meet the following emission standards:

- NMHC + NO_X - 4.0 g/kW-hr (3.0 g/bhp-hr)
- CO - 3.5 g/kW-hr (2.60 g/bhp-hr)
- PM - 0.2 g/kW-hr (0.15 g/bhp-hr)

Per 40 CFR §60.4209(a) and §60.4214(b), owners of emergency stationary CI ICE that do not meet the standards applicable to non-emergency engines must install a non-resettable hour meter prior to startup of the engine and keep records of the operation of the engine in emergency and non-emergency service. For all the CI ICEs, the owner must purchase an engine certified to the emission standards and install and configure the engine according to manufacturer's specifications, per 40 CFR §60.4211(c).

4.2.1.1.3 NSPS Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

NSPS Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* applies to owners or operators of spark ignition ICE that commenced construction or were modified or reconstructed after June 12, 2006.

The two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators at the proposed DWP are considered spark ignition ICE and are subject to NSPS Subpart JJJJ per 40 CFR §60.4230(a)(4)(i). Per 40 CFR §60.4233(e), engines greater than 100 hp must comply with the emission standards in Table 1 of Subpart JJJJ.

Non-emergency lean burn engines greater than 1,350 hp manufactured after July 1, 2010 must meet the following emission standards, according to Table 1 of NSPS Subpart JJJJ:

- NO_X - 1.0 g/hp-hr or 1.36 g/kW-hr (82 ppmvd at 15% O_2)
- CO - 2.0 g/hp-hr or 2.72 g/kW-hr (270 ppmvd at 15% O_2)
- VOC - 0.7 g/hp-hr or 0.95 g/kW-hr (60 ppmvd at 15% O_2)

Per 40 CFR §60.4243(b), the owner must either purchase a certified engine, or if purchasing a non-certified engine, complete performance testing per 40 CFR §60.4244 to demonstrate compliance with emission limits. Initial performance testing is required within 180 days of startup (per Subpart A) and subsequent testing every 8,760 hours or 3 years, whichever comes first. Per 40 CFR §60.7(a)(3), initial notification is due within 15 days of startup.

4.2.1.1.4 NSPS Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution

NSPS Subpart OOOO establishes emission standards and compliance schedules for the control of VOC and SO_2 emissions from affected facilities that commence construction, modification, or reconstruction after August 23, 2011. Only onshore affected facilities are subject, which exclude all facilities located in the territorial seas or on the OCS.[33] Therefore, NSPS Subpart OOOO does not apply to the Project.

4.2.1.1.5 NSPS Subpart OOOOa – Crude Oil and Natural Gas Facilities

NSPS Subpart OOOOa establishes emission standards and compliance schedules for the control of GHG, VOC, and SO_2 emissions from affected facilities that commence construction, modification, or reconstruction after September 18, 2015. Similar to Subpart OOOO, above, affected facilities include only onshore operations. Therefore, NSPS Subpart OOOOa does not apply to the Project.

4.2.1.2 National Emission Standards for Hazardous Air Pollutants

NESHAP are emission standards for HAP and are applicable to major and area sources of HAP. A HAP major source is defined as having potential total HAP emissions in excess of 25 tpy and/or potential individual HAP emissions in excess of 10 tpy. An area source is a stationary source that is not a major source. Part 61 NESHAPs are chemical based NESHAPs, while Part 63 NESHAP allowable emission limits are established on the basis of a MACT determination for a particular source category. NESHAP apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. The Project is a major source of HAP, as potential individual and total HAP emissions are greater than 10 and 25 tpy, respectively.

Similar to NSPS, any source subject to a NESHAP is also subject to the general provisions of the respective NESHAP Subpart A, unless specifically excluded.

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[33] Definition of "onshore" at 40 CFR §60.5430.

4.2.1.2.1 40 CFR §61 Subpart V - Equipment Leaks (Fugitive Emission Sources)

NESHAP Subpart V, *NESHAP for Equipment Leaks (Fugitive Emission Sources)* applies to the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by the subpart.

A 'VHAP' and 'in VHAP' service are respectively defined in 40 CFR §61.241 as:

> *VHAP means a substance regulated under this part for which a standard for equipment leaks of the substance has been proposed and promulgated. Benzene is a VHAP. Vinyl chloride is a VHAP.*
>
> *In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of §61.245(d). The provisions of §61.245(d) also specify how to determine that a piece of equipment is not in VHAP service.*

The crude oil to be handled and loaded at the DWP will contain benzene at less than 10% by weight. As such, the pipeline components regulated by this subpart will not operate "in VHAP service", as defined in 40 CFR §61.241. Therefore, Subpart V does not apply to the Project.

4.2.1.2.2 40 CFR §63 Subpart B – Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections 112(g) and 112(j)

The proposed marine loading activity at the DWP is not regulated under another subpart of Part 63, as discussed below. Per 40 CFR §63.40(b), the use of CALM-buoys in exposed waters to load crude oil into VLCCs (and other crude oil carriers) for export to the global market is subject to Subpart B of Part 63.

> *The requirements of §63.40 through §63.44 of this subpart apply to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants after the effective date of section 112(g)(2)(B) (as defined in §63.41) and the effective date of a title V permit program in the State or local jurisdiction in which the major source is (or would be) located unless the major source in question has been specifically regulated or exempted from regulation under a standard issued pursuant to section 112(d), section 112(h), or section 112(j) and incorporated in another subpart of part 63, or the owner or operator of such major source has received all necessary air quality permits for such construction or reconstruction project before the effective date of section 112(g)(2)(B).*

BMOP is proposing to "construct a major source" per 40 CFR §63.41. Accordingly, a Case-by-Case MACT application has been prepared and submitted concurrently under separate cover. A summary of the proposed MACT requirements is presented in Section 5 of this application.

4.2.1.2.3 40 CFR §63 Subpart H – Equipment Leaks

NESHAP Subpart H, *NESHAP for Equipment Leaks* applies to pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or closed vent systems required by this subpart that are intended to operate in organic hazardous air pollutant service 300 hours or more during the calendar year within a source subject to the provisions of a specific subpart in 40 CFR §63 that references this subpart. No Part 63 subpart that applies to the Project references this Subpart H. Furthermore, "in organic HAP service" is defined in 40 CFR §63.161 as:

> *... a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP's as determined according to the provisions of §63.180(d) of this subpart. The provisions of §63.180(d) of this subpart also specify how to determine that a piece of equipment is not in organic HAP service.*

The Project will not operate pipeline components that are in organic HAP service; therefore, BMOP has determined that NESHAP Subpart H is not applicable to the Project.

4.2.1.2.4 40 CFR §63 Subpart Y – Marine Tank Loading Operations

NESHAP Subpart Y, NESHAP for Marine Tank Loading Operations, applies to marine tank loading operations located at major or area sources of HAP emissions. BMOP has determined that NESHAP Subpart Y is not applicable to the Project.

A detailed NESHAP Subpart Y non-applicability discussion is provided in the Case-by-Case MACT application submitted under separate cover.

4.2.1.2.5 40 CFR §63 Subpart HH – Oil and Natural Gas Production Facilities

NESHAP Subpart HH, *NESHAP from Oil and Natural Gas Production Facilities,* applies to owners and operators of affected sources at oil and natural gas production facilities at major or area sources of HAP emissions. The Project is not considered an oil and natural gas production facility per 40 CFR §63.760(a)(3), as it does not process, upgrade or store natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user. Therefore, the Project is not subject to Subpart HH.

4.2.1.2.6 40 CFR §63 Subpart VV – Oil-Water Separators and Organic-Water Separators

NESHAP Subpart VV, *NESHAP for Oil-Water Separators and Organic-Water Separators,* applies to the control of air emissions from oil-water separators and organic-water separators for which another subpart of 40 CFR Parts 60, 61, or 63 references the use of this subpart for such air emission control. No Part 63 subpart that applies to the Project references Subpart VV. Therefore, BMOP has determined that NESHAP Subpart VV is not applicable to the Project.

4.2.1.2.7 40 CFR §63 Subpart HHH – Natural Gas Transmission and Storage Facilities

Per 40 CFR §63.1270(a) and (b), Subpart HHH applies to glycol dehydration units at major sources of HAP. The Project does not involve any glycol dehydration units; therefore, Subpart HHH is not applicable.

4.2.1.2.8 40 CFR §63 Subpart EEEE – Organic Liquids Distribution (Non-Gasoline)

NESHAP Subpart EEEE, *NESHAP for Organic Liquids Distribution (Non-Gasoline),* applies to organic liquids distribution (OLD) operations at, or part of, a major source of HAP emissions. Subpart EEEE includes standards for the following sources (40 CFR §63.2338):

- Storage tanks storing organic liquids
- Transfer racks at which organic liquids are loaded into or unloaded out of transport vehicles and/or containers
- All equipment leak components in organic liquid service that are associated with:
  - Storage tanks
  - Transfer racks

- Pipelines between storage tanks and transfer racks
- Transport vehicles and containers.

The proposed 1,000 barrel surge vessel is not a storage tank, as explicitly excluded in the definition of "storage tank" at 40 CFR §63.2406. The other storage tanks proposed do not store an organic liquid (excludes diesel, and fuels used for refueling). In addition, the project will not include a transfer rack, as the delivery of crude is to marine vessels, not to a cargo tank or tank car.

As such, the Project is not subject to requirements under Subpart EEEE.

4.2.1.2.9 40 CFR §63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

NESHAP Subpart ZZZZ, *NESHAP for Stationary Reciprocating Internal Combustion Engines*, applies to reciprocating internal combustion engines (RICE) located at major or area sources of HAP emissions. A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. For engines located at a major source of HAP emissions, a stationary RICE is 'new' if the unit commenced construction or reconstruction on or after December 19, 2002 and if the engine has a site rating of more than 500 hp or on or after June 12, 2006 and if the engine has a site rating of less than or equal to 500 hp (40 CFR §63.6590(a)(2)(i) and (ii)). All the proposed engines associated with the WC 509 platform complex are considered 'new'.

Per 40 CFR §63.6590(c)(7), new CI stationary RICE with a site rating of less than or equal to 500 brake hp located at a major source of HAP emissions must meet the requirements of NESHAP ZZZZ by demonstrating compliance with NSPS Subpart JJJJ or IIII, respectively. This applies to the following RICE associated with the DWP project:

- Two (2) 354 kW (~475 hp) non-emergency diesel crane engines.

These engines have no further requirements under Subpart ZZZZ.

The two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators are four-stroke, lean burn spark ignition ICE and must comply with the emissions limitations in Table 2a and the operating limitations in Table 2b, per 40 CFR §63.6600(b), as provided below:

- Four-stroke lean burn engines must reduce CO emissions by 93% or more or limit the concentration of formaldehyde in the stationary RICE exhaust to 14 ppmvd or less at 15% O_2 [Table 2a];
- Maintain catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test [Table 2b]; and
  - Demonstrate initial compliance with CO reduction or formaldehyde limit in accordance with Table 5 [§63.6630(a)].
  - During the initial performance test, establish each operating limitation described above [§63.6630(b)].
  - Conduct initial performance testing per Table 4 of this subpart within 180 days of startup and in accordance with §63.7(a)(2) [§63.6610(a) and Table 4].
  - Submit a notification of compliance status containing the results of the initial compliance demonstration according to the requirements of §63.6645 [§63.6630(c)].
  - Conduct semi-annual performance tests for CO to demonstrate that the required CO percent reduction is achieved [§63.6615, §63.6640(a), Table 3 and Table 6].

- Maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450°F and less than or equal to 1350°F [Table 2b].
  - Install, operate, and maintain a temperature continuous parameter monitoring system (CPMS) that meets the requirements of §63.6625(b) [§63.6625(b)].
  - Continuously collect and reduce data to 4-hour averages [§63.6635, §63.6640(a) and Table 6];
- Per 40 CFR §63.6605, at all times you must be in compliance with the emission limitations, operating limitations, and operate and maintain the engine, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions;
- Per 40 CFR §63.6625(h), any new stationary engine must minimize engine idle time at startup and limit startup period to less than 30 minutes;
- Report each instance in which the engine did not meet the emission or operating limitations as deviations according to the requirements in §63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE. Deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations. [§63.6640(b) and (d)];
- Per 40 CFR §63.6650 and Table 7, submit compliance reports semi-annually according to the requirements of §63.6650(b)(1)-(5). These reports are due July 31 and January 31 for the periods of January 1 – June 30 and July 1 – December 31, respectively. These reports must contain the information included in §63.6650(c), (d), and (e), if applicable; and
- Maintain records as specified in §63.6655(a),(b)&(d) for 5 years [§63.6655 and §63.6660].

The one (1) 1,500 kW (~2,012 hp) emergency diesel generator and two (2) 485 kW (~650 hp) emergency diesel firewater pump engines do not need to comply with the emissions limitations or operating limitations of Tables 1a, 2a, 2c, and 2d, per 40 CFR §63.6600(c). However, the engines must comply with the following:

- Maintenance checks and readiness testing is limited to 100 hours per year (40 CFR §63.6640(f)(2));
- The engine may only be operated for 50 hours per year outside of emergency operation and maintenance and testing; however, these 50 hours are counted towards the 100 hours provided for maintenance and testing (40 CFR §63.6640(f)(3));
- Submit all applicable notifications described in 40 CFR §63.6645 by the appropriate dates specified (40 CFR §63.6645);
- Submit semiannual compliance reports that meet the requirements of 40 CFR §63.6650, if applicable (40 CFR §63.6640 and §63.6650);
- Maintain all applicable records described in §63.6655, including, but not limited to, all notifications, performance tests, and maintenance conducted on the engine (40 CFR §63.6655(a), (b), (d), and (e));
- Per 40 CFR §63.6605(b), at all times you must operate and maintain the engine, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions; and
- Per 40 CFR §63.6625(h), any new stationary engine must minimize engine idle time at startup and limit startup period to less than 30 minutes.

4.2.1.3 Compliance Assurance Monitoring

Compliance Assurance Monitoring (CAM) applies to a pollutant-specific emissions unit at a major source that is required to obtain a Part 70 or 71 permit, if the unit is not exempt by the limitations or standards specified in 40 CFR §64.2(b), and satisfies the following criteria as detailed in 40 CFR §64.2(a):

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof);

(2) The unit uses a control device to achieve compliance with any such limitation or standard; and

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits. For a subject unit using a control device whose post-controlled emissions exceed the major source threshold (referred to as large pollutant-specific emission units [PSEU] in the rule), a CAM plan is required to be submitted with the initial Title V air operating permit application. Additionally, these units must be subject to an emission limitation or standard and use control devices to achieve compliance with any such emission limit. For a subject unit whose post-control emissions are less than the major source threshold, a CAM plan does not have to be submitted until the first Title V air operating permit renewal application.

The only equipment associated with the Project that will utilize a control device to achieve compliance with an emission limit or standard are the two (2) proposed 1,736 kW (~2,328 hp) natural gas fired generators.[34] These generators will be equipped with an oxidation catalyst to achieve compliance with the VOC BACT requirements, as summarized in Section 5 from the analysis detailed in the PSD application (submitted under separate cover), such that CAM potentially applies to these units. However, the unit's potential pre-control device emissions of VOC are less than 100 tpy. Therefore, CAM does not apply to these units or this Project.

4.2.1.4 Risk Management Program

Requirements under 40 CFR §68, Chemical Accident Provisions, require submittal of a Risk Management Plan if the facility stores a regulated material above the applicable concentration and threshold values. Since BMOP will not store a regulated material above the applicable threshold limits, the Project is only subject to the General Duty Clause requirements and must review materials as purchased to verify if additional requirements must be met.

4.2.1.5 Greenhouse Gas Mandatory Reporting Rule

Under the Consolidated Appropriations Act of 2008 (P.L. 110–161), EPA authorized funding to develop a rule requiring mandatory reporting of GHG emissions above appropriate thresholds. EPA has authority under sections 114 and 208 of the Clean Air Act (42 USC §7414, 7542) to collect information about sources of air pollution and has issued regulations at 40 CFR §98.

The EPA has promulgated monitoring, reporting, and recordkeeping rules for GHGs. The proposed DWP is not a listed source category in either Table A-3 nor Table A-4 to Subpart A of Part 98. For source categories not delineated in Table A-3 nor Table A-4, the facility is required to report its GHG emissions if its aggregate maximum rated heat input from all combustion sources is greater than 30 million British thermal units per

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[34] Per 40 CFR §64.2(b)(i), CAM requirements do not apply to emission limits or standards proposed after November 15, 1990 pursuant to section 111 or 112 of the CAA.

hour (MMBtu/hr) and it emits more than 25,000 metric tpy of CO_2e.[35] The Project will include stationary combustion sources located on the WC 509 platform complex, but the aggregate total of all combustion sources that could be used at one time is less than 30 MMBtu/hr. There are no other proposed sources that are included as categories under Part 98. Accordingly, the Project will not be subject to the requirements of the GHG Mandatory Reporting Rule.

4.2.2 State Regulations

For Deepwater Port License Applications (DPLAs), EPA administers CAA requirements and reviews air permit applications using adjacent state's regulations. The nearest adjacent state to the DWP project's offshore location is Louisiana. Therefore, the LDEQ rules and regulations will apply to the offshore portion of the Project. Following is a discussion of potentially applicable LAC 33:III chapters for the Project.

4.2.2.1 Louisiana Air Quality Regulations

Following is a discussion of potentially applicable LAC 33:III chapters for the Project.

As discussed above, the Project is subject to Title V permitting under 40 CFR §71. For consistency with the applicable Louisiana SIP requirements, the LDEQ-required Title V Part 70 forms have been completed as part of the application.

The following LDEQ required application forms are provided in Appendix B of this application:

- The Application for Approval of Emissions of Air Pollutants from Part 70 Sources;
- Emissions Inventory Questionnaire (EIQ) Forms; and
- The Environmental Assessment Statement (EAS or "IT" Question Responses).

4.2.2.1.1 LAC 33:III Chapter 11 – Control of Emissions of Smoke

This regulation prohibits impairment of visibility due to emissions of smoke and provides an opacity limit of 20 percent from combustion smoke except during periods of maintenance. Also provided are restrictions for outdoor burning. The opacity standards set forth in LAC 33:III.1101 do not apply to combustion units when combusting only natural gas and combustion units subject to a federal standard promulgated pursuant to section 111 or 112 of the Clean Air Act that limits average opacity to less than or equal to 20 percent, except for one six-minute period or less per hour.

The diesel combustion sources located at the DWP platform will be subject to this Chapter. However, all of the combustion sources combusting only natural gas will be exempt from this rule as they meet the criteria of LAC 33:III.1107.B.1.

4.2.2.1.2 LAC 33:III Chapter 13 – Emission Standards for Particulate Matter

This regulation prohibits impairment of visibility due to emissions of PM. According to LAC 33:III.1311.C, this regulation provides an opacity limit of 20 percent from emissions of PM. This regulation applies to all combustion sources of the offshore project.

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[35] 40 CFR §98.2(a)(3).

4.2.2.1.3 LAC 33:III Chapter 15 – Emission Standards for Sulfur Dioxide

This regulation applies to new or existing sulfuric acid production units, sulfur recovery plants, and all other single point sources that emit or have the potential to emit 5 tpy or more of SO_2 into the atmosphere. Since no single point source for the Project emits or has the potential to emit 5 tpy or more of SO_2, this regulation does not apply.

4.2.2.1.4 LAC 33:III Chapter 21, Section 2103 – Storage of Volatile Organic Compounds

This regulation applies to storage tanks greater than 40,000 gallons which store VOC products with a maximum TVP of 1.5 psia or greater at storage conditions. The diesel storage tanks proposed as part of the Project are not subject to this regulation since the vapor pressure of diesel is less than 1.5 psia. The 42,000 gallon crude oil surge vessel located at the WC 509B platform is exempt from this regulation per LAC 33:III 2103.G.1, since the tank has a nominal storage capacity of less than 420,000 gallons and is not subject to NSPS.

4.2.2.1.5 LAC 33:III Chapter 21, Section 2108 – Marine Vapor Recovery

This regulation applies to any marine loading operation serving ships and/or barges loading crude oil, gasoline, or VOC with uncontrolled emissions of 25 tpy or more of VOC in the parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge, or 100 TPY or greater of VOC in any other parish of the State of Louisiana.

Since this is an offshore project and is not located onshore in any of the Louisiana parishes, BMOP has determined that this regulation is not applicable to the Project.

4.2.2.1.6 LAC 33:III Chapter 21, Section 2111 – Pumps and Compressors

Rotary pumps and compressors that handle VOCs having a TVP greater than or equal to 1.5 psia at handling conditions must be equipped with mechanical seals or other equivalent equipment or means as approved by the administrative authority. The WC 509 platform complex does not include crude oil pumps, nor natural gas compressors. The diesel equipment does not handle VOCs having a TVP greater than or equal to 1.5 psia. Only the condensate system for the existing natural gas lines, the surge vessel, and the sump system will have pumps that may be subject to this requirement.

4.2.2.1.7 LAC 33:III Chapter 21, Section 2113 – Housekeeping

This regulation defines the practices required to maintain the "best practical housekeeping and maintenance" for area VOC control. These practices include activities such as cleaning up spills, keeping containers closed, and properly storing waste. The Project is subject to this regulation.

4.2.2.1.8 LAC 33:III Chapter 21, Section 2121 – Fugitive Emission Control

This Section is applicable to each process unit at petroleum refineries, natural gas processing plants, synthetic organic chemical manufacturing industry facilities, methyl tertiary butyl ether manufacturing facilities, and polymer manufacturing facilities. The Project is not one of the listed facility types and is not subject to this regulation.

4.2.2.1.9 LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program

The provisions of the Comprehensive Toxic Air Pollutant (TAP) Program (LAC 33:III.Chapter 51) apply to owners and operators of any major source that emits, or has the potential to emit, 10 tpy or more of any individual TAP, or 25 tpy or more of any combination of TAPs, listed in Table 51.1 of LAC 33:III.5112. The Project will be subject to this chapter. An evaluation of the TAP program is included as part of the air quality impacts analysis in Volume 2 of the PSD application.

4.2.2.1.10 LAC 33:III Chapter 56 - Prevention of Air Pollution Emergency Episodes

This regulation is designed to prevent the buildup of excess concentrations of air contaminants during periods of high air pollution potential. The Project is subject to this regulation.

4.2.2.1.11 LAC 33:III Chapter 59 - Chemical Accident Prevention and Minimization of Consequences

This regulation does not apply to the Project since it does not produce, process, handle, or store any substance listed in LAC 33:III.5907 in greater than the threshold amounts.

5. PROPOSED CASE-BY-CASE REQUIREMENTS

BMOP is subject to following requirements, with standards and compliance determined on a case-by-case basis:

- BACT, as detailed in the PSD application, submitted under separate cover, and
- MACT, as detailed in the Case-by-Case MACT application, submitted under separate cover.

This section presents a summary of the proposed applicable requirements to BMOP for BACT and MACT.

5.1 BACT

For the PSD permit application, a BACT analysis was performed for VOC as the only pollutant with both a significant emissions increase and a significant net emissions increase from the proposed project. The BACT analysis follows the "top-down" approach suggested by EPA, as described in more detail in the PSD application submitted under separate cover.

The following emission units were considered in the BACT analysis, with a summary of proposed compliance requirements for each unit included in the following subsections.

- Marine Loading
- Combustion Sources
  - Natural Gas-Fired Engine-Driven Generators
  - Emergency Diesel-Fired Engine-Driven Generator
  - Diesel-Fired Crane Engines
  - Emergency Diesel-Fired Engine-Driven Firewater Pumps
- Fugitive Emissions
- Storage Vessels

Table 5-1 below delineates a summary of the BACT determination following a "top-down" approach, as suggested by EPA:

Table 5-1. Proposed VOC BACT Summary

Emission Source	Pollutant	Selected BACT	Emission / Operating Limit	Compliance Method
Marine Loading	VOC	Submerged fill; VOC BMP	Max TVP 10.99 psia; Max TVP 9.0 psia, annual avg.	Crude analyses; Monitor adherence to VOC BMP
Natural Gas-Fired Engine-Driven Generator	VOC	Oxidation catalysts	0.7 g/hp-hr, or 60 ppmvd @ 15% O_2	Performance Testing Per Table 2 of Subpart JJJJ
Emergency Diesel-Fired Engine-Driven Generator	VOC	Good combustion practices	6.4 g/kW-hr of NMHC + NO_X	Certified engine; Maintenance records
Diesel-Fired Crane Engines	VOC	Good combustion practices	0.29 g/kW-hr	Certified engine; Maintenance records
Emergency Diesel-Fired Engine-Driven Firewater Pumps	VOC	Good combustion practices	4.0 g/kW-hr of NMHC + NO_X	Certified engine; Maintenance records
Fugitive Emissions	VOC	Component design; Good operating practices	Leak monitoring program	Leak monitoring records
Storage Vessels	VOC	Submerged fill	Installation of conforming tanks	Fixed roof tanks with submerged fill pipes

5.1.1 Marine Loading Proposed Compliance Requirements

BMOP shall be required to load using submerged fill only, and in accordance with a VOC BMP, as presented in Section 5.2.3, below. BMOP shall be limited to loading only crude oil with a maximum TVP of 10.99 psia, at a maximum throughput of 80,000 bbl/hr.

Compliance assurance will be provided with the following monitoring and recordkeeping:

5.1.1.1 Monitoring

- BMOP will monitor adherence to the terminal VOC BMP, which includes the use of submerged fill loading of crude carrying vessels and communication with the vessel being loaded.
- BMOP will sample and analyze crude oil at the onshore Nederland Pump Station, at least once per year.
  - The sampling method will follow American Society for Testing and Methods (ASTM) D4057
  - The samples will be analyzed per D6377 to provide the true vapor pressure
- BMOP will monitor the crude oil loading operations
  - Monitoring the crude oil loading rate with a flow meter.
  - Compliance is demonstrated when:
    - The loading rate, averaged over each vessel's loading duration, is 80,000 bbl/hr or less.
    - The rolling 12-month total crude oil loaded is 700,800,000 bbls or less.
    - The rolling 12-month total vessels loaded is 365 vessels or less.
  - Start and end loading time, duration per vessel monitored

- Limited to 700,800,000 Bbl/yr, on a 12-month rolling total basis
- Limited to 365 vessels fully loaded on a 12-month rolling total basis.

5.1.1.2 Recordkeeping

- BMOP will maintain analytical results of each crude oil sample
  - The TVP of each sample, in psia
  - Comparison of TVP to the maximum allowed: 10.99 psia
- For each vessel loaded, BMOP will maintain the following records
  - The vessel IMO registry number
  - Confirmation that loading utilized submerged fill
  - Confirmation of adherence to the VOC BMP
  - The date and time loading of each vessel commences
  - The date and time loading of each vessel completes
  - The total crude oil loaded into each vessel (bbls)
  - The average hourly loading rate of crude oil (bbl/hr)

5.1.2 Natural Gas-Fired Engine-Driven Generators Proposed Compliance Requirements

BMOP proposes a VOC BACT emission limit consistent with the NSPS Subpart JJJJ VOC emission limit of 0.7 g/hp-hr (0.95 g/KW-hr) or 60 ppmvd at 15% O_2 for the natural-gas fired generators. BMOP will demonstrate compliance with the VOC BACT consistent with the testing requirements of 40 CFR §60.4244 and Table 2 to Subpart JJJJ of Part 60.

At all times, BMOP will maintain the generators and oxidation catalysts in a manner consistent with safety and good air pollution control practices for minimizing emissions per 40 CFR §63.6605. BMOP will ensure proper maintenance of the catalyst such that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test. In addition, BMOP will maintain the temperature of the engine’s exhaust so that the catalyst inlet temperature is greater than or equal to 450°F and less than or equal to 1,350°F, consistent with 40 CFR §63.6600(b) and Table 2b Subpart ZZZZ of Part 63. BMOP will install, operate, and maintain a temperature CPMS that meets the requirements of §63.6625(b) to continuously collect temperature data. In instances where the catalyst is changed, BMOP will reestablish the values of the operating parameters measured during the initial performance test and conduct a performance test to demonstrate that the engines are meeting the required emission limitations.

Because the oxidation catalyst is effective only at hot exhaust temperatures (>700°F), the use of Good Combustion Practices (GCP) and clean fuels will be the BACT work practice standards during startup to control VOC emissions.

5.1.3 Emergency Diesel-Fired Engine-Driven Generator Proposed Compliance Requirements

BMOP will operate the engine only when needed for intermittent purposes. Good combustion practices will allow the engine to meet the VOC emission limit in NSPS Subpart IIII of 6.4 g/kW-hr (4.71 g/bhp-hr) for NMHC + NO_X. BMOP will demonstrate compliance with the BACT standard by installing an engine that is certified to meet the emission limit, in accordance with 40 CFR §60.4211(c). BMOP will also install a non-resettable hour meter prior to startup of the engine and keep records of the operation of the engine in emergency and non-emergency service, in accordance with 40 CFR §60.4209(a) and 40 CFR §60.4214(b).

5.1.4 Diesel-Fired Crane Engines Proposed Compliance Requirements

BMOP will operate the engines only when needed for intermittent purposes, at less than 4,380 hours per year, per engine. Good combustion practices will allow the engines to meet the VOC emission limit in NSPS Subpart IIII of 0.29 g/kW-hr. BMOP will demonstrate compliance with the BACT standard by installing engines that are certified to meet the emission limit, in accordance with 40 CFR §60.4211(c). BMOP will also install a non-resettable hour meter prior to startup of each engine and keep records of the operation of the engines to confirm compliance with the operating restriction.

5.1.5 Emergency Diesel-Fired Engine-Driven Firewater Pumps Proposed Compliance Requirements

BMOP will operate the engines only when needed for intermittent purposes. Good combustion practices will allow the engines to meet the VOC emission limit in NSPS Subpart IIII of 4.0 g/kW-hr (3.0 g/bhp-hr) for NMHC + NO_X. BMOP will demonstrate compliance with the BACT standard by installing engines that are certified to meet the emission limit, in accordance with 40 CFR §60.4211(c). BMOP will also install a non-resettable hour meter prior to startup of each engine and keep records of the operation of each engine in emergency and non-emergency service, in accordance with 40 CFR §60.4209(a) and 40 CFR §60.4214(b).

5.1.6 Fugitive Emissions Proposed Compliance Requirements

BMOP proposes the use of AVO monitoring as VOC BACT for fugitive emissions. BMOP will comply with the AVO monitoring as follows:

- During loading, BMOP will conduct AVO checks for leaks once per day for the accessible crude oil components on the offshore platform.
  - As an alternative, BMOP may use an optical gas imaging instrument to identify leaks. If used as an alternative to AVO checks, the optical gas instrument must meet the requirements of 40 CFR §60.18(i)(1) and (2).
  - The date and time of each inspection shall be recorded.
- A repair will be attempted for identified leaks as soon as practicable. An initial repair attempt is required within five in-service days (for example, attempt to tighten a bolt or packing gland). If the initial repair attempt is not successful, additional repair attempts should be completed within fifteen in-service days.
  - The date(s) and time(s) of repairs conducted in response to an identified leak shall be recorded.
- Delay of repair of a leaking component is allowed for the following reasons: repair is technically infeasible without a DWP shutdown, a repair within fifteen days would result in emissions or impacts greater than fugitive emissions resulting from the delay of repair, or the unavailability of parts, resources, or repair conditions (i.e., weather) prevent repair within fifteen days. The component should be placed on a "Delay of Repair" list.
  - The component identification and explanation of why the component cannot be repaired immediately shall be recorded. An estimated date for repairing the component must be included in the facility records.
- BMOP will develop a list of difficult-to-monitor and unsafe-to-monitor components.
  - A difficult-to-monitor component is one that cannot be inspected without elevating personnel more than two meters above a permanent support structure, or requires a permit for confined space entry as defined in 29 CFR §1910.146, December 1, 1998.

- An unsafe-to-monitor component is one that BMOP determines is unsafe to monitor because personnel would be exposed to immediate danger as a consequence of conducting the monitoring.

In addition to AVO monitoring, BMOP will specify that the Project use low-emitting piping components, where available, including valves that meet the ISO 158-58-1 standard. As well, leak protection is inherent to some of the equipment design at the proposed DWP. For example, the floating hoses used for loading crude oil are designed with elastomeric linings to prevent leaks. The double carcass design of the floating hoses themselves provide a second barrier for possible leaks.

5.1.7 Storage Vessels Proposed Compliance Requirements

BMOP proposes the use of storage vessels designed with submerged fill loading as VOC BACT. Compliance will be based on the installation of tanks equipped with submerged fill pipes.

5.2 MACT

A Case-by-Case MACT analysis was performed in accordance with 40 CFR §63.40 for the use of CALM-buoys in exposed waters to load crude oil into VLCCs (and other crude oil carriers) for export to the global market. The case-by-case MACT analysis evaluated the "MACT Floor" and "Beyond-the-Floor" to determine the allowable HAP emissions resulting from marine loading as part of the proposed Project. Based on the review and analysis presented in the Case-by-Case MACT application, the following represents the MACT determination for HAP emissions from marine loading at the Project:

- Control technology:
  - Submerged fill loading
- Emission standard:
  - Maximum TVP of 10.99 psia and total HAP concentration of 5.60%, by weight in the vapor, for all crude oils loaded at the BMOP DWP
- Compliance assurance:
  - VOC Management Plan
  - Crude oil sampling and analysis at the Nederland Terminal
  - Monitoring of crude loading rate and number of vessels loaded

5.2.1 Proposed MACT Standard

BMOP shall be required to load using submerged fill only, and in accordance with a VOC BMP, as presented below. The maximum total HAP weight percent (liquid) of crude oil should be limited to 7.50% (corresponding to a total HAP concentration of 5.60%, by weight in the vapor).

BMOP shall be limited to pumping only crude oil with a maximum TVP of 10.99 psia, at a maximum throughput of 80,000 bbl/hr.

5.2.2 Proposed MACT Compliance Assurance

The following monitoring, recordkeeping, and reporting requirements are proposed to provide compliance assurance with the emission standard and control requirements for marine vessel loading of crude oil at the BMOP DWP.

5.2.2.1 Monitoring

- BMOP will monitor adherence to the terminal VOC BMP, which includes the use of submerged fill loading of crude carrying vessels and communication with the vessel being loaded.
- BMOP will sample and analyze crude oil at the onshore Nederland Pump Station, at least once per year.
  - The sampling method will follow ASTM D4057
  - The samples will be analyzed per D6377 to provide the true vapor pressure
  - The samples will be analyzed per D7900 to provide the weight percent in the liquid for HAP
  - The sum of the HAP (weight %, in liquid) will be compared to the emission standard to confirm compliance
- BMOP will monitor the crude oil loading operations
  - Monitoring the crude oil loading rate with a flow meter.
  - Compliance is demonstrated when:
    - The loading rate, averaged over each vessel's loading duration, is 80,000 bbl/hr or less.
    - The rolling 12-month total crude oil loaded is 700,800,000 bbls or less.
    - The rolling 12-month total vessels loaded is 365 vessels or less.
  - Start and end loading time, duration per vessel monitored
  - Limited to 700,800,000 Bbl/yr, on a 12-month rolling total basis
  - Limited to 365 vessels fully loaded on a 12-month rolling total basis.

5.2.2.2 Recordkeeping

- BMOP will maintain analytical results of each crude oil sample
  - The sum of all HAP identified in each sample, weight % in liquid
  - Comparison of the total HAP composition to the emission standard of 7.50%, weight % in liquid
- For each vessel loaded, BMOP will maintain the following records
  - The vessel IMO registry number
  - Confirmation that loading utilized submerged fill
  - Confirmation of adherence to the VOC BMP
  - The date and time loading of each vessel commences
  - The date and time loading of each vessel completes
  - The total crude oil loaded into each vessel (bbls)
  - The average hourly loading rate of crude oil (bbl/hr)
- BMOP will maintain the following calculation of emissions
  - HAP emissions from each loading operation, utilizing the most recent crude oil sample results and total volume loaded
  - 12-month rolling total HAP emissions, as the sum of the HAP emissions calculated for each vessel loaded in the prior 12-month rolling period

5.2.2.3 Reporting

- BMOP will submit a Notification of Compliance Status (NOCS) in accordance with 40 CFR §63.9(h)
- BMOP will submit a semiannual report in accordance with 40 CFR §63.10(e)(3)(vi)

5.2.3 Proposed VOC Best Management Plan

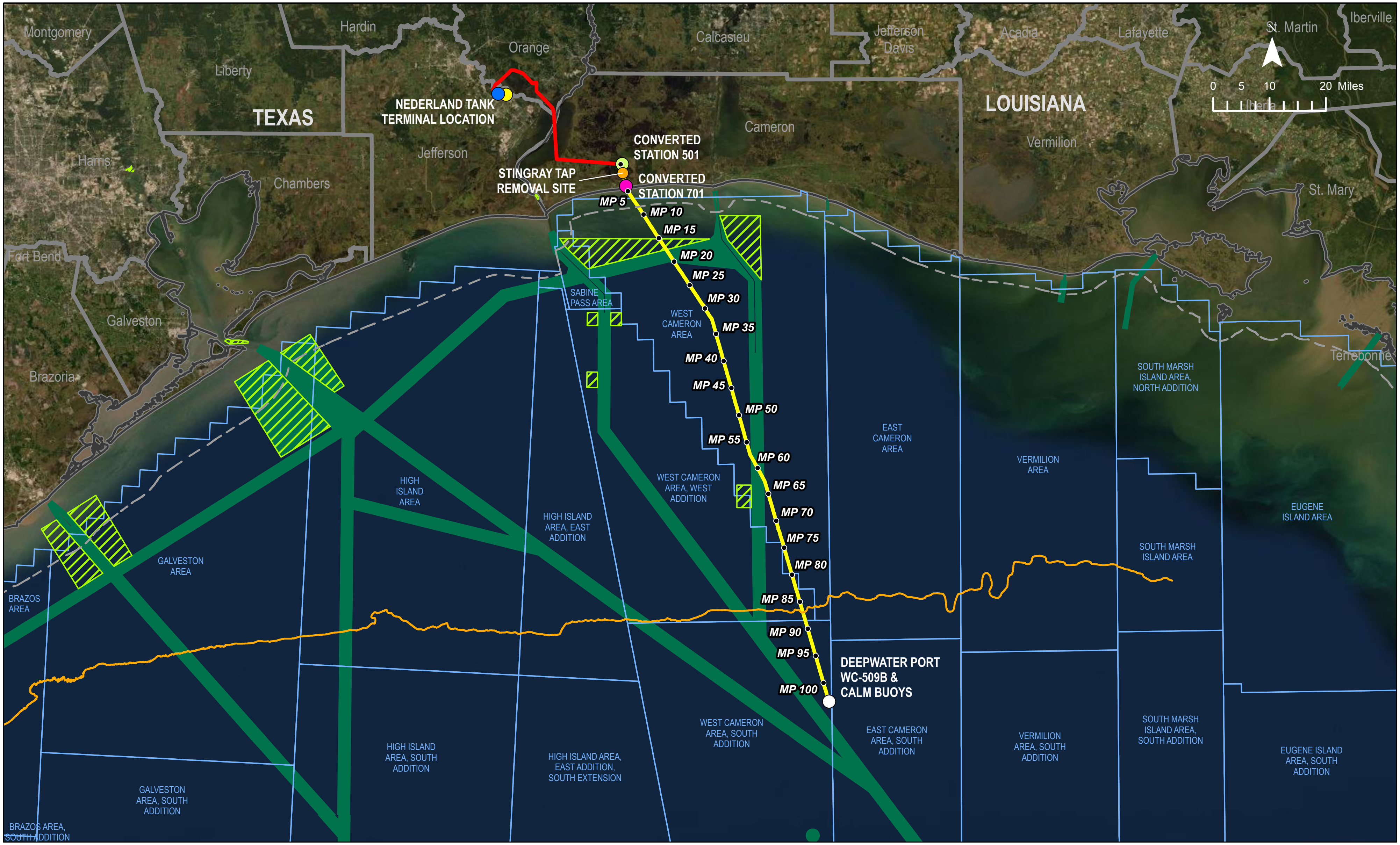
In order to ensure VOC air emissions are minimized from loading crude oil into VLCCs and other crude-carrying vessels, BMOP will implement the following VOC BMP. Vessel loading at a CALM buoy requires communication and coordination of activities with the vessel crew. Accordingly, this VOC BMP addresses BMOP's actions, and refers to a vessel-specific VOC Management Plan, as well.

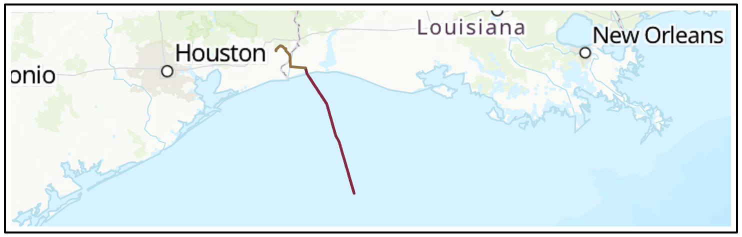
1. Prior to loading, BMOP will review and maintain a record of the following:
    a. Ensure the vessel follows a VOC Management Plan that conforms to the requirements of MEPC.185(59), to maintain positive pressure in an inert tank while minimizing releases.
    b. Ensure that submerged fill can and will be utilized, discuss vessel-specific plan, and BMOP BMPs. Confirm these BMPs are addressed at a minimum, document confirmation.
    c. Verify and record that the marine vessel has passed an annual vapor tightness test within the previous 12-months and properly operates an inert gas system.
    d. Have a completed Standard Tanker Chartering Questionnaire form (Q88), or equivalent.
    e. Discuss the allowable cargo tank pressure range.
    f. Discuss monitored parameters and accountability for communication during loading.
2. During Loading, BMOP will monitor and record the following parameters:
    a. Product loading rate (not to exceed 80,000 bbl/hr averaged over each vessel's loading duration)
    b. Hawser load
    c. Navigation aids
3. During loading, the marine vessel being loaded will monitor the following parameters:
    a. Cargo tank pressure within design constraints
        i. The pressure of an inerted marine vessel being loaded must be maintained such that the pressure in the vessel's cargo tanks do not go below 0.2 pounds per square inch gauge (psig) or exceed 80% of the lowest setting of any of the vessel's pressure relief valves. The lowest vessel cargo tank or vent header pressure relief valve setting for the vessel being loaded shall be recorded.
    b. Gas detector
    c. Loading hose connections checked

During maintenance activities requiring pigging, BMOP will utilize marine vessels for collection of the liquid pushed by the pigs. BMOP will follow the same VOC BMP outlined above and identify records as "maintenance." Because potential VOC and HAP emissions have been calculated based on continuous loading, emissions from loading losses as a result of pigging are included in the BMOP potential emissions.

APPENDIX A. SITE MAPS AND PLOT PLANS

BMOP PROJECT - APPENDIX A FIGURE 1 - PROJECT OVERVIEW MAP





LEGEND

- ● EXISTING OFFSHORE PIPELINE MILEPOSTS
- ● STINGRAY TAP REMOVAL SITE
- ● NEDERLAND TANK TERMINAL LOCATION
- ● NEDERLAND PUMP STATION
- ● CONVERTED STATION 701
- ● CONVERTED STATION 501
- ○ DEEPWATER PORT WC-509B AND CALM BUOYS
- ▬ PIPELINE PORTION CONVERTED TO OIL SERVICE
- ▬ PROPOSED ONSHORE PIPELINE (NEW BUILD)
- ▬ DEPTH CONTOUR -108'
- ▬ STATE WATERS BOUNDARY
- ▨ SAFETY ANCHORAGES
- ☐ PROTRACTION AREA
- 🟩 SHIPPING FAIRWAY
- ☐ COUNTY / PARISH
- ☐ STATE BOUNDARY

BLUE MARLIN OFFSHORE PORT PROJECT

PROJECT OVERVIEW MAP

COUNTY/PARISH:	VARIOUS	***DRAWN BY:***	JRA
STATE:	TX/LA	***CHECKED BY:***	CW

REV. NO.:	***REVISION***	***DATE***
A	ISSUE FOR REVIEW	2020/07/28

DATE:	2020/07/28	***PROJECTION:***	NAD 1983 UTM Zone 15N

PREPARED BY

EXP Energy Services Inc.
T: +1.850.385.5441
F: +1.850.385.5523
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT
APPENDIX A FIGURE 1

DWG:	0802-01-005	***SHEET:***	1 OF 1

REFERENCE DRAWINGS						
	0	ISSUED FOR PERMIT	BWC	08-06-20	JHE	TO
	REV	DESCRIPTION	BY	DATE	CHK'D	APP'D

FACILITY CODE OR ACCOUNT NO:		
CONSTRUCTION YEAR:		–
	BY	DATE
DRAWN	BWC	03-12-2020
CHECK		
APPROVED		–
SCALE: AS SHOWN		

PROJECT CONSULTING SERVICES, INC.
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
(504) 833-5321 Fax (504) 833-4940
www.projectconsulting.com

BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
FIELD SCHEMATIC

WBS NO.

OLD DRAWING NO.

DRAWING NO. BMOP-WC509.004

REV. NO. 0

FILENAME: P:\Workspaces\BCook\18220_STINGRAY OFFSHORE\18220_ET WC509.004_1.dwg PLOTTED: 8/7/2020 7:52:50 AM PLOTTED BY: ----

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APPENDIX B. LDEQ AND PART 71 FORMS

Application Forms

- Part 71 Forms
  - Certification of Truth, Accuracy, and Completeness (CTAC)
  - Fee Calculation Worksheet (FEE)
  - Initial Compliance Plan and Compliance Certification (I-COMP)
- LDEQ Forms
  - Application for Approval of Emissions of Air Pollutants from Part 70 Sources (AAE)

Part 71 Form

Certification of Truth, Accuracy, and Completeness (CTAC)

United States
Environmental Protection
Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS (CTAC)

This form must be completed, signed by the "Responsible Official" designated for the facility or emission unit, and sent with each submission of documents (i.e., application forms, updates to applications, reports, or any information required by a part 71 permit).

A. Responsible Official

Name: (Last) **Mcilwain** (First) **Gregory** (MI) ____

Title: **SVP – Operations**

Street or P.O. Box **1300 Main Street**

City **Houston** State **TX** ZIP **77002** - _____

Telephone **(713) 989-7120** Ext. ______ Facsimile (____) ____ - ________

B. Certification of Truth, Accuracy and Completeness (to be signed by the responsible official)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in these documents are true, accurate and complete.

Name (signed) ____________________

Name (typed) **Gregory Mcilwain** Date: 9 / 24 / 20

EPA Form 5900-02

Part 71 Form

Fee Calculation Worksheet (FEE)

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE CALCULATION WORKSHEET (FEE)

Use this form initially, or thereafter on an annual basis, to calculate part 71 fees.

A. General Information

Type of fee (Check one): _X_ Initial ___Annual

Deadline for submitting fee calculation worksheet ____/____/_______

For initial fees, emissions are based on (Check one):

_X_ Actual emissions for the preceding calendar year. (Required in most circumstances.)

___ Estimates of actual emissions for the current calendar year. (Required when operations commenced during the preceding calendar year.)

Date commenced operations ____/____/______

___ Estimates of actual emissions for the preceding calendar year. (Optional after a part 71 permit was issued to replace a part 70 permit, but only if initial fee payment is due between January 1 and March 31; otherwise use actual emissions for the preceding calendar year.)

For annual fee payment, you are required to use actual emissions for the preceding calendar year.

B. Source Information: Complete this section only if you are paying fees but not applying for a permit.

Source or facility name ________________________________

Mailing address: Street or P.O. Box ________________________________

City____________________ State______ ZIP__________ - ______

Contact person____________________ Title____________________

Telephone (_____) _____ - _________ Ext________ Part 71 permit no. ______________

C. Certification of Truth, Accuracy and Completeness: Only needed if not submitting a separate form CTAC.

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in this submittal (form and attachments) are true, accurate and complete.

Name (signed) ________________________________

Name (typed) ________________________________ Date:____ /____ /_______

D. Annual Emissions Report for Fee Calculation Purposes -- Non-HAP

You may use this to report actual emissions (tons per year) of regulated pollutants (for fee calculation) on a calendar-year basis for both initial and annual fee calculation purposes. Section E is designed to report HAP emissions. Quantify all actual emissions, including fugitives, but do not include insignificant emissions and certain regulated air pollutants that are not counted for fee purposes, such as CO and GHGs (see instructions). Sum the emissions in each column to calculate subtotals. Subtotals should be reported to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

This data is for **See Note 1 below** (year)

Emission Unit ID	NOx	VOC	SO2	PM10	Lead	Other
NGGEN1 (Natural Gas Generator #1)						
NGGEN2 (Natural Gas Generator #2)						
NGGEN CAP (Natural Gas Generators CAP)						
BCRANE1 (Platform B Crane #1 - Diesel)						
BCRANE2 (Platform B Crane #2 - Diesel)						
DGEN (Emergency Generator - Diesel)						
BFWP (Platform B Firewater Pump - Diesel)						
CFWP (Platform C Firewater Pump - Diesel)						
PDST (Primary Diesel Storage Tank)						
SRGT (Surge Tank)						
FUG (Facility Wide Fugitives)						
UNLD1 (Uncontrolled Loading at Buoy #1)						
UNLD2 (Uncontrolled Loading at Buoy #2)						
UNLD CAP (Uncontrolled Loading CAP)						
SUBTOTALS:						

Note 1- The project has not begun operations; therefore, there were no actual emissions.

E. Annual Emissions Report for Fee Calculation Purposes -- HAP

HAP Identification. Identify individual HAP emitted at the facility, identify the CAS number, and assign a unique identifier for use in the second table in this section. Whenever assigning identifier codes, use "HAP1” for the first, "HAP2" for the second, and so on.

Name of HAP	CAS No	Identifier
Acetaldehyde	75-07-0	HAP1
Acrolein	107-02-8	HAP2
Benzene	71-43-2	HAP3
Biphenyl	92-52-4	HAP4
Butadiene (1,3-)	106-99-0	HAP5
Carbon Tetrachloride	56-23-5	HAP6
Chlorobenzene	108-90-7	HAP7
Chloroform	67-66-3	HAP8
Cumene	98-82-8	HAP9
Cresols	1319-77-3	HAP10
Dichloropropene (1,3-)	542-75-6	HAP11
Ethylbenzene	100-41-4	HAP12
Ethylene Dibromide	106-93-4	HAP13
Formaldehyde	50-00-0	HAP14
Methanol	67-56-1	HAP15
Methylene Chloride	75-09-2	HAP16
n-Hexane	110-54-3	HAP17
Naphthalene	91-20-3	HAP18
PAH	-	HAP19
Phenol	108-95-2	HAP20
Styrene	100-42-5	HAP21
Toluene	108-88-3	HAP22
Tetrachloroethane (1,1,2,2-)	79-34-5	HAP23
Trichloroethane (1,1,2-)	79-00-5	HAP24
Trimethylpentane (2,2,4-)	540-84-1	HAP25
Vinyl Chloride	75-01-4	HAP26
Xylenes (mixed isomers)	1330-20-7	HAP27
Xylene (o-)	95-47-6	HAP28
Xylene (m-)	108-38-3	HAP29
Xylene (p-)	106-42-3	HAP30

HAP Emissions. Report the actual emissions of individual HAP identified above. Use the identifiers assigned in the table above. Include all emissions, including fugitives, and do not include insignificant emissions. Sum the emissions in each column to calculate subtotals. Report subtotals to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000.

This data is for **See Note 1 below** (year)

Emissions Unit ID	Actual Emissions (Tons/Year)							
	HAP___	HAP___	HAP___	HAP___	HAP___	HAP___	HAP___	HAP___
SUBTOTALS:								

Note 1- The project has not begun operations; therefore, there were no actual emissions.

F. Fee Calculation Worksheet

This worksheet is used to calculate the total fee owed (including the emissions-based fee and the GHG fee adjustment) for both initial and annual fee payment purposes. Reconciliation is only for cases where you are paying the annual fee and you used any type of estimate of actual emissions when you calculated the initial fee. If you do not need to reconcile fees, complete line 1-5 (emissions summary) and then skip down to line 21 (emission calculation). See instructions for more detailed explanation.

EMISSIONS SUMMARY

1. Sum the subtotals from section D of this form (non-HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	**0**
2. Sum the subtotals from section E of this form (HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	**0**
3. Sum lines 1 and 2.	**0**
4. Enter the emissions that were counted twice. If none, enter "0."	**0**
5. Subtract line 4 from line 3, round to the nearest ton, and enter the result here. This is the **total emissions** that count for fees purposes.	**0**

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "CURRENT" CALENDAR YEAR)

Only complete lines 6-10 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year in which you paid initial fees; otherwise skip to line 11 or to line 21.

6. Enter the total estimated actual emissions for the year the initial fee was paid (previously reported on line 5 of the initial fee form).	**NA**
7. If line 5 is greater than line 6, subtract line 6 from line 5, and enter the result. Otherwise enter "0."	
8. If line 6 is greater than line 5, subtract line 5 from line 6, and enter the result. Otherwise enter "0."	
9. If line 7 is greater than 0, multiply line 7 by last year's fee rate ($/ton) and enter the result here. This is the underpayment. Go to line 21.	
10. If line 8 is greater than 0, multiply line 8 by last year's fee rate ($/ton) and enter the result here. This is the overpayment. Go to line 21.	

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "PRECEDING" CALENDAR YEAR)

Only complete lines 11-20 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year preceding initial fee payment; otherwise skip to line 21. If completing this section, you will also need to complete sections D and E to report actual emissions for the calendar year preceding initial fee payment.

11. Sum the actual emissions from section D (non-HAP) for the calendar year preceding initial fee payment and enter the result here.	**NA**
12. Sum the actual emissions from section E (HAP) for the calendar year preceding initial fee payment and enter the result here.	
13. Add lines 11 and 12 and enter the total here. These are total actual emissions for the calendar year preceding initial fee payment.	
14. Enter double counted emission from line 13 here. If none, enter "0."	
15. Subtract line 14 from line 13, round to the nearest ton, and enter the result here.	
16. Enter the total estimated actual emissions previously reported on line 5 of the initial fee form. These are estimated actual emissions for the calendar year preceding initial fee payment.	
17. If line 15 is greater than line 16, subtract line 16 from line 15, and enter the result here. Otherwise enter "0."	
18. If line 16 is greater than line 15, subtract line 15 from line 16, and enter the result here. Otherwise enter "0."	
19. If line 17 is greater than 0, multiply line 17 by last year's fee rate ($/ton) and enter the result here. This is the underpayment.	
20. If line 18 is greater than 0, multiply line 18 by last year's fee rate ($/ton) and enter the result on this line. This is the overpayment.	

EMISSION FEE CALCULATION

21. Multiply line 5 (tons) by the current fee rate ($/ton) and enter the result here. This is the unadjusted emissions fee. Continue on to line 23.	**0**

GHG FEE ADJUSTMENT

22. If you are submitting an initial permit application and this is the first time you are paying fees, enter $2,236, otherwise enter "0". [Note that any updates to the initial application are covered under this one-time charge.]	**0**
23. Enter the number of permit modifications (or related permit actions) you have submitted to the permitting authority since you last paid fees. If none, skip to line 25.	**0**
24. Multiply the number in line 23 by $365 and enter the result.	**0**

25. If you have submitted a permit renewal application since the last time you paid fees enter $520, otherwise enter "0"	**0**
26. Sum line 22, 24, and 25 and enter the result. This is the GHG fee adjustment	**0**
OTHER ADJUSTMENTS	
27. Add the total on line 21 and the total on line 26 and enter the result.	**0**
28. Enter any underpayment from line 9 or 19 here. Otherwise enter "0."	**0**
29. Enter any overpayment from line 10 or 20 here. Otherwise enter "0."	**0**
30. If line 28 is greater than "0," add it to line 27 and enter the result here. If line 29 is greater than "0," subtract this from line 27 and enter the result here. Otherwise enter the amount on line 27 here. This is the fee adjusted for over/underpayment**.**	**0**
31. Enter any credit for fee assessment error here. Otherwise, enter "0."	**0**
32. Subtract line 31 from line 30 and enter the result here. Stop here. This is the **TOTAL FEE (AFTER ADJUSTMENTS)** that you must remit to EPA.	**0**

INSTRUCTIONS FOR FEE
FEE CALCULATION WORKSHEET

Information Collection Burden Estimates

The public reporting and recordkeeping burden for this collection of information is estimated to average 247 hours per respondent per year. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

DETAILED INSTRUCTIONS

Use this form to initially or annually calculate fees. This form is for paying fees to EPA or a delegate agency (such as a State or tribe) under a part 71 operating permit program. The requirements for paying fees under part 71 programs, as well as the forms and instructions contained herein, are based on the requirements of 40 CFR 71.9

There may be cases, under a part 71 program, when you are not required to complete this form or pay the EPA fee rate (where the part 71 program has been delegated and EPA's fee has been suspended because EPA incurs no administrative costs). In such cases, the delegate agency will instruct you on how to calculate fees and how to pay them. If in doubt, contact your permitting authority.

General Rules for Fee Calculation under Part 71:

- Use the fee rate in effect at the time you pay the fee regardless of the time period that the emissions data represents. For example, if the annual fee for the current year is due July 1, you would use the fee rate in effect for the current year and the actual emissions for the previous calendar year.
- Do not prorate initial or annual fees. Pay full fees for the entire calendar year regardless of how many days you operated or were subject to the program during the previous or current year.
- Do not hesitate to contact the permitting authority if you have any doubt about how to calculate fees, especially if you have an unusual set of circumstances not addressed specifically by these forms or whenever the permit requirements appear to conflict with these forms (however, always assume the permit requirements take precedence in such cases).

Section A. General Information

The deadline for submitting the fee form and paying the fee for initial fee payment purposes for most sources is the same deadline as for submitting all other forms required for the initial permit application. Other deadlines apply for initial fee payment in certain limited circumstances:

- When a source is subject to part 71 because of an unresolved EPA objection to a part 70 permit, fees are not due with the part 71 application, but are due 3 months following the date of the issuance of the part 71 permit.
- When EPA withdraws approval of a part 70 program and implements a part 71 programs, fees are submitted according to a schedule based on the source's SIC code (within 6 to 9 months of the effective date of the part 71 program).

The deadline for submitting the fee form and paying the fee for annual fee payment purposes is the anniversary date of initial fee payment. This is required whether or not a permit has been issued. If you were required to pay initial fees between January 1 and March 31, the regulations allow for submittal of annual fees no later than April 1.

Whether you are paying initial or annual fees see the instructions for sections D and E for more information on which calendar-year emission data to use (preceding or current year) and how to quantify such emissions (actual emissions or estimates of actual emissions).

Section B. Source Information

Complete this section only if you are preparing this form for submittal at a different time than for the other portions of an initial application or for annual fee purposes.

Section C. Certification of Truth, Accuracy and Completeness

This form and any other document required by a permit must be signed by a responsible official certifying truth, accuracy and completeness of the information. If you are submitting a separate **CTAC** form, there is no need to complete this section of the form. If you complete this section, there is no need to submit form **CTAC** separately.

Section D. Annual Emissions Report for Fee Calculation Purposes – Non-HAP

Calculate actual emissions of regulated pollutants (for fee calculation), except for HAP, on a calendar-year basis for the facility in this section. Section E is provided to report actual emissions of HAP. Note the phrase “regulated pollutant (for fee calculation)” is any “regulated air pollutant” except carbon monoxide (CO), and pollutants regulated solely because they are: 1) subject to regulation under section 112(r) of the Act, or 2) a class I or II substance under title VI of the Act. **Note that GHG emissions are not counted for fee purposes.**

If more than one year of data is being submitted with the fee calculation worksheet, copy this page and complete a separate table for each year. If you are submitting an initial application, you may use emissions data already reported on form **EMISS**, provided this is the same data you would otherwise report in sections D and E of this form. If using **EMISS** in this manner, please note this on the fee calculation form. Also, sources must submit attachments to this form to show (at a minimum) examples of the calculations used to determine these values.

Show actual emissions for each listed air pollutant for each emission unit. Values should be reported to the nearest tenth (0.1) of a ton.

The column for "other" is for other regulated pollutants (for fee calculation) not already listed on the form. Write in the name of the pollutant in the proximity of the "other" column. If more than one such pollutant, show the pollutants, and the totals on an attachment.

Actual emissions must be calculated using actual operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted over the preceding calendar year. Sources that have been issued title V permits are required to compute actual emissions using compliance methods required by the permits, such as monitoring or source testing data. If this is not possible, actual emissions should be determined using other federally recognized procedures.

For initial fee calculation purposes, most sources are required to use actual emissions for the preceding calendar year. However, there are certain exceptions where estimates of actual emissions are either required or allowed in place of actual emissions for the preceding calendar year (see table below):

Exception	Emission Data
When the source commenced operation during the preceding calendar year.	Estimates of actual emissions for the “current” calendar year are required
When EPA withdraws approval of a part 70 program and implements a part 71 program, and the source pays initial part 71 fees between January 1 and March	Either estimates of actual emissions for the “preceding” calendar year or actual emissions for the preceding calendar year may be used.
When a part 71 permit was issued following an unresolved objection to a part 70 permit, and the source is required to pay initial part 71 fees between January 1 and March 31.	Either estimates of actual emissions for the “preceding” calendar year or actual emissions for the preceding calendar year may be used.

For annual fee purposes, fee calculation should be based on actual emissions for the preceding calendar year in all cases.

In most cases you will only need to report one set of emission data using sections D and E of this form (the data that is the basis of the initial or annual fee being paid as explained above). This data is subsequently carried over to lines 1 and 2 of section F (Fee Calculation Worksheet) of the form.

However, there is one exception where you would be required to report two different sets of emissions data using sections D and E – when paying the first annual fee and reconciliation is required because the initial fee was based on estimated actual emissions for the “preceding” calendar year (the year preceding initial fee payment). In this case, the two data sets would be:

- actual emissions for the year initial fees paid (for annual fee purposes in lines 1-5 of section F of the form), and
- actual emissions for the year preceding initial fee payment (for reconciliation in lines 11-20 of the form)

Whenever reconciliation is required as part of annual fee payment, you will also need a copy of the fee forms you previously submitted with initial fee payment in order to obtain the value of estimated actual emissions.

Include all fugitive emissions in the calculation of actual emissions, including those that do not count for applicability. Do not include any insignificant emissions identified on form **IE**.

The subtotal line in section D of the form is provided at the bottom of each column to enter total emissions for each pollutant reported above. Each subtotal should be reported to the nearest tenth (0.1) of a ton. If any subtotal exceeds 4,000 tons, enter 4,000 tons for that column.

Any necessary adjustments for double counting of emissions will be performed later in section F.

Section E. Annual Emissions Report for Fee Calculation Purposes -- HAP

List the actual emissions of individual HAP from each emission unit. If you are initially applying for a permit, you may use the emissions of HAP reported on form **EMISS,** instead of completing this section of this form, provided these emissions are the same as you would otherwise report using this section of the form. If you are doing this, please note it on the form.

This section is composed of two tables. The first table is to identify individual HAP emitted at each emission unit. Assign a unique identifier for use in the second table. Please use "HAP1" for the first one, "HAP2" for the second one, and so on. The second table is to calculate the actual emission of individual HAP at each emission unit. Use the identifiers assigned in the first table to label the column headers for the second table. You may round and report these emissions to the nearest tenth (0.1) of a ton. Sum the values in each column and enter the subtotals at the bottom of the table. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

See instructions for section D for more information on reporting emissions data.

Section F. Fee Calculation Worksheet

This worksheet is used to sum the total tons of actual emissions subject to fees, adjust for double counting of emissions, perform certain reconciliations for underpayment and overpayment of fees and adjust for fee assessment errors, if needed, and ultimately to determine the total fee to be paid.

A detailed explanation of Section F follows (separated into six parts):

Emissions Summary

The subtotals for each pollutant listed in Sections D and E (or from form **EMISS**) are added together to calculate the total emissions (in tons per year) for the facility.

The emissions that are reported here will vary for initial fee payment purposes, depending on the specific circumstances, but will always be actual emissions for the preceding calendar year for annual fee purposes. See the instructions for section D for more on the emissions data you should use in the part of the form.

The total emissions are adjusted for double counting and are rounded to the nearest ton. For example, double counting may occur where a pollutant is defined as HAP and VOC. If you adjust for double counting, attach an explanation for this.

Reconciliation (When Initial Emission Fees Were Based on Estimates for the Current Calendar Year)

This section is only used by sources paying their first annual fee when their initial fee was based on estimates of calendar-year emissions for the “current” year (the same year that initial fees were paid). This reconciliation is done by comparing the actual emissions for the “current” year provided in sections D and E of this submittal with the estimate of those emissions previously provided with initial fee payment. There may have been overpayment or underpayment of the initial fee. The fee you are paying now will be adjusted for this difference later.

Reconciliation (When Initial Emission Fees Were Based on Estimates for the Preceding Calendar Year)

This section is only used by sources paying their first annual fee when their initial fee was based on estimates of calendar-year emissions for the year preceding initial fee payment, provided the source was required to pay its initial fee between January 1 and March 31, and EPA issued the Part 71permit to replace a Part 70 permit. This reconciliation is done by comparing the actual emissions for the “preceding” year provided in sections D and E of this submittal with the estimate of those emissions provided with initial fee payment. There may have been overpayment or underpayment of the initial fee. The fee you are paying now will be adjusted for this difference later.

Emission Fee Calculation

Calculate the emission-based fee using the emissions from line 5 (tons) multiplied by the fee rate ($/ton) in effect at the time the fee is paid.

GHG Fee Adjustment

The part 71 rule was amended in 2015 to require the fees to be increased by a GHG fee adjustment. The GHG adjustment must be calculated by each source that is required to pay fees. The adjustment is based on the burden for the permitting authority to conduct certain GHG evaluations or reviews related to the source, rather than on emissions. Set fees are charged for certain activities that have occurred at the source since the last time fees were paid. For an initial application, the set fee is a one-time charge that includes the costs of processing application updates. The term “permit modification” refers to any significant and minor modifications, but not to administrative amendments. The number of permit modifications must be multiplied by the set fee for modifications to determine the total GHG adjustment for modifications. The set fee for a permit renewal also includes any permit modifications that may be processed at the same time as the renewal. Note that you may need to check with the permitting authority to determine if they are holding any permit modification requests you have submitted for processing with an upcoming permit renewal.

Other Adjustments

The purpose of this section is to adjust the emissions-based to determine the total fee (after adjustments) that is due to the EPA. The emissions fee determined on line 21 is adjusted by the GHG fee adjustment, any amounts of overpayment or underpayment related to a previous fee submittal, and to correct for any fee assessment errors.

Fee assessment errors occur when the permitting authority determines that the source has calculated the fee incorrectly. If this occurs, you will be notified of the error. Any overpayment will be credited against the next fee owed. In the case of underpayment, you will be billed for the corrected fee and you will have 30 days to remit the amount. If you think the assessed fee is in error, you may submit a written explanation of the alleged error, but you must pay the fee. The permitting authority will provide a determination in 90 days. If the assessment of underpayment is in error, your account will be credited.

Fee Payment

See form **FF** (the Fee Filing form) for instructions on how to make fee payment to the EPA.

Penalties and Interest

The permitting authority will bill sources for appropriate penalties and interest for late payment or excessive underpayment of fees. Interest will be assessed on payments received later than the due date. Penalties shall be assessed if payment is not paid within 30 days of the due date. For sources issued with issued permits, penalties and interest shall be assessed for excessive underpayment of the annual fee amount.

END

Part 71 Form

Initial Compliance Plan and Compliance Certification (I-COMP)

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)

INITIAL COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION (I-COMP)

SECTION A - COMPLIANCE STATUS AND COMPLIANCE PLAN

Complete this section for each unique combination of applicable requirements and emissions units at the facility. List all compliance methods (monitoring, recordkeeping and reporting) you used to determine compliance with the applicable requirement described above. Indicate your compliance status at this time for this requirement and compliance methods and check "YES" or "NO" to the follow-up question.

Emission Unit ID(s): **NGGEN1 and NGGEN2**

Applicable Requirement (Describe and Cite):

(Excluding Formaldehyde) VOC Total <= 0.7 g/hp-hr (60 ppmdv at 15% O_2).	**40 CFR 60.4233(e)**
Carbon monoxide (CO) <= 2.0 g/hp-hr (270 ppmdv at 15% O_2).	**40 CFR 60.4233(e)**
Nitrogen oxides (NO_X) <= 1.0 g/hp-hr (82 ppmdv at 15% O_2).	**40 CFR 60.4233(e)**
Operate and maintain stationary SI ICE to achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engine.	**40 CFR 60.4234**
Purchase an engine certified according to procedures specified in this subpart, for the same model year and demonstrating compliance according to one of the methods specified in paragraph (a) of this section.	**40 CFR 60.4243(b)(1)**
Operate using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations. Keep records of such use. If propane is used for more than 100 hours per year and the engine is not certified to the emission standards when using propane, conduct a performance test to demonstrate compliance with the emission standards of 40 CFR 60.4233.	**40 CFR 60.4243(e)**

Compliance Methods for the Above (Description and Citation):

Keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	**40 CFR 60.4243(b)(2)(ii)**
Equipment/operational data recordkeeping by electronic or hard copy continuously. Keep records of the information in 40 CFR 60.4245(a)(1) through (a)(4).	**40 CFR 60.4245(a)**

Note: Final Requirements and Compliance Methods will be determined by PSD Permit.

Compliance Status:

___ In Compliance: Will you continue to comply up to permit issuance? ____Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? __**X**__Yes ____No

Emission Unit ID(s): **BCRANE1 and BCRANE2**

Applicable Requirement (Description and Citation):

Shall comply with the emission standards for new CI engines in 40 CFR 60.4201 for their 2007 model year and later stationary CI ICE, as applicable.	**40 CFR 60.4204(b)**
Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.	**40 CFR 60.4201(a)**
Shall operate and maintain stationary CI ICE that achieve the emission standards as required in 40 CFR 60.4204 over the entire life of this engine.	**40 CFR 60.4206**
Beginning October 1, 2010, shall use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.	**40 CFR 60.4207(b)**
May not import or install stationary CI ICE that do not meet the applicable requirements in 40 CFR 60.4208.	**40 CFR 60.4208**
In addition to the requirements specified in 40 CFR 60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.	**40 CFR 60.4208(h)**
Owner or operator that must comply with the emission standards in this subpart shall do the following: **- Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;** **- Change only those emission-related settings that are permitted by the manufacturer; and** **- Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply.**	**40 CFR 60.4211(a)(1) through (a)(3)**
As stated in 40 CFR 60.4218, comply with the applicable general provisions listed in Table 8.	**40 CFR 60.4218; Table 8**
Shall comply by purchasing an engine certified to the emission standards in 40 CFR 60.4204(b) for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph 60.4211(g).	**40 CFR 60.4211(c)**
If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	**40 CFR 60.4211(g)**

Compliance Methods for the Above (Description and Citation):

If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in 40 CFR 60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.	**40 CFR 60.4209(b)**
If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.	**40 CFR 60.4214(c)**
If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must keep a maintenance plan and records of conducted maintenance.	**40 CFR 60.4211(g)**
If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.	**40 CFR 60.4211(g)(2)**

Note: Final Requirements and Compliance Methods will be determined by PSD Permit.

Compliance Status:

___ In Compliance: Will you continue to comply up to permit issuance? ____Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? __X__Yes _____No

Emission Unit ID(s): **DGEN, BFWP, and CFWP**

Applicable Requirement (Describe and Cite):

For the emergency generators: comply with the NMHC + NO_X, CO, and PM emission limitations set forth in Table 1 for the highest tier of the appropriate sized engine. All emergency generators are subject to the following standards: • CO limit of 3.5 g/kW-hr • PM limit of 0.20 g/kW-hr Engines greater than 560 kilowatts (kW) are subject to the following standard: • NMHC + NO_X limit of 6.4 g/kW-hr Engines with a rated power between 225-560 kW are subject to the following standard: • NMHC + NO_X limit of 4.0 g/kW-hr	**40 C.F.R. § 60.4202(a)(2),40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.112(a) Table 1**
For the emergency generators: exhaust opacity from CI nonroad engines (excluding single-cylinder engines, propulsion marine diesel engines, and constant speed engines) may not exceed: • 20% during the acceleration mode; • 15% during the lugging mode; and • 50% during the peaks in either the acceleration or lugging modes.	**40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.113**
For the fire pumps: comply with the NMHC + NO_X and PM emission limitations set forth in 40 C.F.R. Part 60 Subpart IIII Table 4 for 600-750 hp engines, 2009 model year and later.	**40 C.F.R. § 60.4205(c), 40 C.F.R. Part 60 Subpart IIII Table 4**

Compliance Methods for the Above (Description and Citation):

Operate and maintain stationary CI ICE that achieve the emission standards as required in 40 C.F.R. 60.4204 and 40 C.F.R. 60.4205 over the entire life of the engine.	**40 C.F.R. § 60.4206**
Use diesel fuel with a maximum sulfur content of 15 ppm. Use diesel fuel with a minimum cetane index of 40 or a maximum aromatic content of 35 volume %.	**40 C.F.R. § 60.4207(b), 40 C.F.R. § 80.510(b)**
If the emergency stationary CI internal combustion engine does not meet the standards applicable to non-emergency engines, install a non-resettable hour meter prior to startup of the engine.	**40 C.F.R. § 60.4209(a)**
Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions, change only those emission related settings that are permitted by the manufacturer, and meet the requirements of 40 C.F.R. Part 89, 94, and/or 1068, as they apply.	**40 C.F.R. § 60.4211(a)**
Purchase an engine certified to the emission standards in 40 C.F.R. § 60.4204(b), § 60.4205(b), or § 60.4205(c), as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in 40 C.F.R. § 60.4211(g).	**40 C.F.R. § 60.4211(c)**

Operate according to the requirements in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3). In order for the engine to be considered an emergency stationary ICE under 40 C.F.R. 60 Subpart IIII, any operation other than as described in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3) is prohibited. If the engine is not operated according to these requirements, the engine will not be considered an emergency engine under 40 C.F.R. 60 Subpart IIII and must meet all requirements for non-emergency engines.	**40 C.F.R. § 60.4211(f)**
There is no time limit on the use of emergency stationary ICE in emergency situations.	**40 C.F.R. § 60.4211(f)(1)**
Operate for maintenance checks and readiness testing for a maximum of 100 hours per calendar year, provided that the tests are recommended by the federal, state or local government; the manufacturer; the vendor; the regional transmission organization or equivalent balancing authority and transmission operator; or the insurance company associated with the engine. The administrator may be petitioned for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if records are maintained indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.	**40 C.F.R. § 60.4211(f)(2)(i)**
Operate for up to 50 hours per calendar year in non-emergency situations. Count the 50 hours of operation in non-emergency situations as part of the 100 hours per calendar year for maintenance and testing provided in 40 C.F.R. 60.4211(f)(2)(i). Do not use the 50 hours per calendar year for non-emergency situations for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity, except as provided in 40 C.F.R. 60.4211(f)(3)(i).	**40 C.F.R. § 60.4211(f)(3)**
Operating time recordkeeping by electronic or hard copy upon occurrence of event. If the emergency engine meets the standards applicable to emergency engines in the applicable model year, keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. Record the time of operation of the engine and the reason the engine was in operation during that time.	**40 C.F.R. § 60.4214(b)**

Note: Final Requirements and Compliance Methods will be determined by PSD Permit.

Compliance Status:

___ In Compliance: Will you continue to comply up to permit issuance? ____Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? __**X**__Yes ____No

Emission Unit ID(s): **FUG**

Applicable Requirement (Describe and Cite)

Compliance Methods for the Above (Description and Citation):

Note: Final Requirements and Compliance Methods will be determined by PSD Permit.

Compliance Status:

___ In Compliance: Will you continue to comply up to permit issuance? ____Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? __**X**__Yes ____No

Emission Unit ID(s): **UNLD1 and UNLD2**

Applicable Requirement (Describe and Cite)

Case-by-Case MACT in accordance with 40 CFR §63.40
BMOP shall be required to load using submerged fill only, and in accordance with a VOC Best Management Plan (BMP), as presented below. The maximum total HAP weight percent (liquid) of crude oil should be limited to 7.50% (corresponding to a total HAP concentration of 5.60%, by weight in the vapor). BMOP shall be limited to loading only crude oil with a maximum true vapor pressure (TVP) of 10.99 psia, at a maximum throughput of 80,000 bbl/hr.

Compliance Methods for the Above (Description and Citation):

Monitoring

- **BMOP will monitor adherence to the terminal VOC BMP, which includes the use of submerged fill loading of crude carrying vessels and communication with the vessel being loaded.**
- **BMOP will sample and analyze crude oil at the onshore Nederland Pump Station, at least once per year.**
  - **The sampling method will follow American Society for Testing and Methods (ASTM) D4057**
  - **The samples will be analyzed per D6377 to provide the true vapor pressure**
  - **The samples will be analyzed per D7900 to provide the weight percent in the liquid for HAP**
  - **The sum of the HAP (weight %, in liquid) will be compared to the emission standard to confirm compliance**
- **BMOP will monitor the crude oil loading operations**
  - **Monitoring the crude oil loading rate with a flow meter.**
  - **Compliance is demonstrated when:**

- The loading rate, averaged over each vessel's loading duration, is 80,000 bbl/hr or less.
- The rolling 12-month total crude oil loaded is 700,800,000 bbls or less.
- The rolling 12-month total vessels loaded is 365 vessels or less.
- Start and end loading time, duration per vessel monitored
- Limited to 700,800,000 Bbl/yr, on a 12-month rolling total basis
- Limited to 365 vessels fully loaded on a 12-month rolling total basis.

Recordkeeping

- **BMOP will maintain analytical results of each crude oil sample**
  - **The sum of all HAP identified in each sample, weight % in liquid**
  - **Comparison of the total HAP composition to the emission standard of 7.50%, weight % in liquid**
- **For each vessel loaded, BMOP will maintain the following records**
  - **The vessel IMO registry number**
  - **Confirmation that loading utilized submerged fill**
  - **Confirmation of adherence to the VOC BMP**
  - **The date and time loading of each vessel commences**
  - **The date and time loading of each vessel completes**
  - **The total crude oil loaded into each vessel (bbls)**
  - **The average hourly loading rate of crude oil (bbl/hr)**
- **BMOP will maintain the following calculation of emissions**
  - **HAP emissions from each loading operation, utilizing the most recent crude oil sample results and total volume loaded**
  - **12-month rolling total HAP emissions, as the sum of the HAP emissions calculated for each vessel loaded in the prior 12-month rolling period**

Reporting

- **BMOP will submit a Notification of Compliance Status (NOCS) in accordance with 40 CFR §63.9(h)**
- **BMOP will submit a semiannual report in accordance with 40 CFR §63.10(e)(3)(vi)**

Note: Final Requirements and Compliance Methods will be determined by PSD Permit.

Compliance Status:

___ In Compliance: Will you continue to comply up to permit issuance? ____Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? __**X**__Yes ____No

B. SCHEDULE OF COMPLIANCE

Complete this section if you answered “NO” to any of the questions in section A. Also, complete this section if required to submit a schedule of compliance by an applicable requirement. Please attach copies of any judicial consent decrees or administrative orders for this requirement.

Unit(s)____________________ Requirement____

Reason for Noncompliance. Briefly explain reason for noncompliance at time of permit issuance or that future-effective requirement will not be met on a timely basis:

Narrative Description of how Source Compliance Will be Achieved. Briefly explain your plan for achieving compliance:

Schedule of Compliance. Provide a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance, including a date for final compliance.

Remedial Measure or Action	**Date to be Achieved**

C. SCHEDULE FOR SUBMISSION OF PROGRESS REPORTS

Only complete this section if you are required to submit one or more schedules of compliance in section B or if an applicable requirement requires submittal of a progress report. If a schedule of compliance is required, your progress report should start within 6 months of application submittal and subsequently, no less than every six months. One progress report may include information on multiple schedules of compliance.

Contents of Progress Report (describe):

First Report____/____/___ Frequency of Submittal_______________

Contents of Progress Report (describe):

First Report____/____/___ Frequency of Submittal_______________

D. SCHEDULE FOR SUBMISSION OF COMPLIANCE CERTIFICATIONS

This section must be completed once by every source. Indicate when you would prefer to submit compliance certifications during the term of your permit (at least once per year).

Frequency of submittal______________________ Beginning____/____/____

E. COMPLIANCE WITH ENHANCED MONITORING & COMPLIANCE CERTIFICATION REQUIREMENTS

This section must be completed once by every source. To certify compliance with these, you must be able to certify compliance for every applicable requirement related to monitoring and compliance certification at every unit.

Enhanced Monitoring Requirements: ____ In Compliance ____ Not In Compliance

Compliance Certification Requirements: ____ In Compliance ____ Not In Compliance

INSTRUCTIONS FOR I-COMP

INITIAL COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION

Section A (Compliance Status and Compliance Plan)

Description of Applicable Requirement: Complete Section A for each unique combination of applicable requirements (emission limitations, standards or other similar requirements of federal rules, SIP, TIP, FIP, or federally-enforceable permits) that apply to particular emissions units. You will likely have to complete this section numerous times to include all requirements at all emission units.

The emissions unit ID(s) should be the ones defined in section I of form GIS. If the requirement, including compliance method, applies in the same way to multiple emission units, you may list multiple units for a particular requirement.

The descriptions here should be detailed to the individual requirement level, rather than the standard level (if a MACT applies to you, describe each requirement of the MACT, rather than just a citation to the MACT as a whole). If the requirement imposes a particular numerical limit or range, include that in your description.

Citations to the requirements should unambiguously identify the requirement to the lowest level necessary.

Compliance Methods: List all compliance methods (monitoring, recordkeeping and reporting) you used to determine compliance with the applicable requirement described above. Such methods may be required by the applicable requirements or performed for other reasons. List all compliance methods required by applicable requirements, whether you used them to determine compliance or not.

To describe monitoring, indicate the monitoring device, the equipment, process, or pollutant monitored, averaging time, frequency, and a citation or cross-reference to the requirement. To describe recordkeeping, describe the records kept, the frequency of collection, and include a citation or cross-reference to the requirement. Please indicate whether monitoring data, results, or other records kept for compliance purposes may be kept on-site rather than reported. To describe reporting requirements, describe what is reported, when it is reported, and cite or cross-reference the requirement.

The citation or cross-reference here must unambiguously identify the requirement to the lowest level necessary.

Note that Compliance Assurance Monitoring (CAM) under part 64 is also an applicable requirement that may impose compliance methods for title V sources and require the submittal of a CAM plan with this application. Also note that periodic monitoring (which may be monitoring or recordkeeping designed to serve as monitoring) under part 71 may be required in certain limited circumstances: when there is no monitoring required, monitoring is required but there is no frequency specified, or only a one-time test is required. You may propose periodic monitoring in your application, but the permitting authority will make the final decision. If you wish to propose periodic monitoring, please do so in an attachment that clearly identifies the requirements, the units they apply to, and what you propose for periodic monitoring.

Compliance Status: For each requirement and associated compliance methods described above, indicate whether you are in compliance, not in compliance, or it is a future-effective requirement (only check one). This is with respect to your compliance status at the time of application submittal. You should consider all available information or knowledge that you have when evaluating your compliance status, including reference test methods and other compliance requirements that are required directly by a statute, regulation, or permit and “credible evidence” (e.g., non-reference test methods and other information “readily available” to you and already being utilized by you). For each compliance status indication, you must answer “YES” or “NO” as to your expectations for continuing (or future) compliance. If you answer “NO” to any of these questions, you will have to complete the schedule of compliance section (section B).

Section B (Schedule of Compliance)

Complete this section if you answered “NO” to any of the questions in section A. Regardless of how you answered the questions in section A, complete this section if required to have a schedule of compliance by an applicable requirement, or if a judicial consent decree or administrative order includes a schedule of compliance.

Identify the applicable requirement using the same information you used in section A. Provide a brief explanation of the reason for noncompliance (either now or in the future). [e.g., “do not have control device required as BACT.”] Next, provide a brief description of what the schedule of compliance is trying to achieve. Then in the table provided, include a detailed schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with the applicable requirement. This schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject. Any such schedule of compliance must be supplemental to, and not sanction noncompliance with, the applicable requirements on which it is based. For each remedial measure, provide the date by which the action will be completed. This schedule or one approved by the permitting authority will be included in the permit.

Lastly, attach a copy of any judicial consent decrees or administrative orders for which you are providing a schedule of compliance.

Section C (Schedule for Submission of Progress Reports)

If you must submit one or more schedules of compliance (specified in section B), or if an applicable requirement requires submittal of a progress report, complete this section. Progress reports describe your progress in meeting the milestone dates for the remedial measures required by the schedule of compliance. Progress reports must be submitted at least every 6 months, but specific applicable requirements may require them more frequently. One progress report may include information on one or more schedules of compliance. Describe the contents of the progress report, including the date that your facility will begin submitting them and the frequency they will be submitted.

Section D (Schedule for Submission of Compliance Certifications)

All applicants must complete this section. Compliance certifications must be submitted at least every year unless the applicable requirement or EPA requires them more frequently. Provide the date when the first compliance certification will be sent.

Section E (Compliance Status for Enhanced Monitoring and Compliance Certification)

All applicants must complete this section. The completion of this section does not satisfy the requirement for the responsible official to submit a certification of truth, accuracy, and completeness (instead, this is met by completing form CTAC and submitting it with the other forms you send to EPA).

To certify compliance with “Enhanced Monitoring,” you must be in compliance at all emission units with CAM and “Periodic Monitoring” [required by 40 CFR 71.6(a)(3)(i)(B)], if they apply. “Compliance Certification Requirements” include requirements for compliance certification in title V applications and permits, and possibly through applicable requirements (e.g., certain MACT standards). If you have fully completed sections A - E of this form, you will be in compliance with the compliance certification requirement for applications. If you do not have a title V permit at this time, you can assume you are in compliance with the compliance certification requirements for permits and with periodic monitoring requirements. If you indicate you are “not in compliance” with either of these requirements, attach an explanation.

END

LDEQ Form

Application for Approval of Emissions of Air Pollutants from Part 70 Sources (AAE)

Department of Environmental Quality
Office of Environmental Services
Air Permits Division
P.O. Box 4313
Baton Rouge, LA 70821-4313
(225) 219-3417

LOUISIANA

Application for Approval of Emissions of Air Pollutants from Part 70 Sources

PLEASE TYPE OR PRINT

1. Facility Information [LAC 33:III.517.D.1]

Facility Name or Process Unit Name (if any) Blue Marlin Offshore Port LLC – Deepwater Port (BMOP DWP)	☒ All Process Units ☐ Process Unit-specific Permit
Agency Interest Number (A.I. Number) N/A – New Facility	**Currently Effective Permit Number(s)** N/A – New Facility
Company - Name of Owner Blue Marlin Offshore Port LLC	
Company - Name of Operator (if different from Owner) N/A	
Parent Company (if Company – Name of Owner given above is a division) Energy Transfer LP	
Federal Tax-ID	

☒ corporation, partnership, or sole proprietorship
☐ regulated utility
☐ municipal government
☐ state government
☐ federal government
☐ other, specify ____________

2. Physical Location and Process Description [LAC 33:III.517.D.18, unless otherwise stated]

What does this facility produce? Add more rows as necessary.

The BMOP DWP will receive crude oil from existing production and storage facilities on the US mainland. The BMOP DWP will then be utilized to load crude oil onto very large crude carriers for export to the global market. Refer to section 1 of this application for detail description.

What modifications/changes are proposed in this application? Add more rows as necessary.

Refer to section 1 of this application.

Nearest town (in the same parish as the facility): Cameron

Parish(es) where facility is located: Offshore Facility – West Cameron area, lease block 509

Distance To (mi):	115 Texas	315 Arkansas	240 Mississippi	300 Alabama	
Latitude of Facility Front Gate:	28 Deg	26 Min	0.38 Sec	______ Hundredths	
Longitude of Facility Front Gate:	93 Deg	0 Min	16.06 Sec	______ Hundredths	
Distance from nearest Class I Area:	385	kilometers			

Add physical address and description of location of the facility below. If the facility has no address, provide driving directions. Add more rows as necessary.

The BMOP DWP will be located in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Block (WC) 509 and 508 and East Cameron Block 263. The BMOP DWP will be approximately eighty-two (82) nautical miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.

☒ Map attached (required per LAC 33:III.517.D.1)
☒ Description of processes and products attached (required per LAC 33:III.517.D.2)
☒ Introduction/Description of the proposed project attached (required per LAC 33:III.517.D.5)

3. Confidentiality [LAC 33.I.Chapter 5]

Are you requesting confidentiality for any information *<u>except air pollutant emission rates</u>?* ☒ Yes ☐ No

If "yes," list the sections for which confidentiality is requested below. Add rows as necessary. Confidentiality requests require a submittal that is separate from this application. Information for which confidentiality is requested should not be submitted with this application. Consult instructions.

Appendix D (BACT Supporting Documentation) of the Prevention of Significant Deterioration Air Construction Permit

Application Volume 1

4. Type of Application [LAC 33:III.517.D]

Check all that apply.

☐ Renewal
Select one, if applicable: ☒ Entirely new facility ☐ Significant modification of existing facility (may also include reconciliations) [LAC 33:III.527] ☐ Minor modification of existing facility (may also include reconciliations) [LAC 33:III.525] ☐ Reconciliation only
NSR Analysis: ☒ Prevention of Significant Deterioration (PSD) ☐ Nonattainment New Source Review (NNSR)

Does this submittal update or replace an application currently under review? ☐ Yes ☒ No

If yes, provide date that the prior application was submitted: __________

Select one if this application is for an existing facility that does not have an air quality permit:

☐ Previously Grandfathered (LAC 33:III.501.B.6)
☐ Previously Exempted (e.g., Small Source Exemption; LAC 33:III.501.B.2.d)
☐ Previously Unpermitted

5. Fee Information [LAC 33:III.517.D.17]

Fee Parameter: If the fee code is based on an operational parameter (such as number of employees or capital cost), enter that parameter here. ____

Industrial Category: Enter the Standard Industrial Classification (SIC) and North American Industry Classification (NAICS) Codes that apply to the facility.

Primary SICC: 4612 **NAICS Code:** 486110

Secondary SICC(s): ____

Project Fee Calculation: Enter fee code, permit type, production capacity/throughput, and fee amount pursuant to LAC 33:III.Chapter 2. Add rows to this table as needed. Include with the application the amount in the Grand Total blank as the permit application fee.

FEE CODE	TYPE	EXISTING CAPACITY	INCREMENTAL CAPACITY INCREASE	*SURCHARGES*				
				MULTIPLIER	NSPS	PSD	AIR TOXICS	TOTAL AMOUNT
					☐	☐	☐	$
					☐	☐	☐	$
					GRAND TOTAL			$

Optional **Fee Explanation:** Use the space provided to give an explanation of the fee determination displayed above. Using this area will help to avoid confusion.

Electronic Fund Transfer (EFT): If paying the permit application fee using an Electronic Fund Transfer (EFT), please include the EFT Transaction Number, the Date that the EFT was made, and the total dollar amount submitted in the EFT. If not paying the permit application fee using EFT, leave blank.

EFT Transaction Number	**Date of Submittal**	**Total Dollar Amount**
		$

6. Key Dates

Estimated date construction will commence: May 2021 *Estimated date operation will commence:* August 2023

7. Pending Permit Applications – For Process Unit-Specific Permits Only [LAC 33:III.517.D.18]

List all other process units at this facility for which Part 70 permit applications have been submitted, but have not been acted upon by LDEQ as of the date of submittal of this application. If none, state "none" in the table. *****It is not necessary to update this table during the permit review process, unless requested by LDEQ.*****

Process Unit Name	Permit Number	Date Submitted

8. LAC 33:I.1701 Requirements – Answer all below for new sources and permit renewals - ☒ Yes ☐ No

Does the company or owner have federal or state environmental permits identical to, or of a similar nature to, the permit for which you are applying in Louisiana or other states? (This requirement applies to all individuals, partnerships, corporations, or other entities who own a controlling interest of 50% or more in your company, or who participate in the environmental management of the facility for an entity applying for the permit or an ownership interest in the permit.)
☐ **Yes** ☒ **No**

If yes, list States: ____________________

Do you owe any outstanding fees or final penalties to the Department? ☐ **Yes** ☒ **No**
If yes, explain below. Add rows if necessary.

Is your company a corporation or limited liability company? ☒ **Yes** ☐ **No**
If yes, attach a copy of your company's Certificate of Registration and/or Certificate of Good Standing from the Secretary of State. The appropriate certificate(s) should be attached to the end of this application as an appendix.

9. Permit Shield Request [LAC 33:III.517.E.7] - ☒ Yes ☐ No

See Section 1 of the Title V Air Operating Permit Application for the Permit Shield Request

If yes, check the appropriate boxes to indicate the type of permit shield being sought. Include the specific regulatory citation(s) for which the shield is being requested. Give an explanation of the circumstances that will justify the permit shield request. Attach additional pages if necessary. If additional pages are used, attach them directly behind this page and enter "See Attached Pages" into the Explanation field.

Type of Permit Shield request (check all that apply):

Non-applicability determination for:	Specific Citation(s)	Explanation
☐ 40 CFR 60		
☐ 40 CFR 61		
☐ 40 CFR 63		
☐ Prevention of Significant Deterioration		
☐ Nonattainment New Source Review		

Interpretation of monitoring, recordkeeping, and/or reporting requirements, and/or means of compliance for:	Specific Citation(s)	Explanation
☐ 40 CFR 60		
☐ 40 CFR 61		
☐ 40 CFR 63		
☐ Prevention of Significant Deterioration		
☐ Nonattainment New Source Review		
☐ State Implementation Plan (SIP) Regulation(s) referenced in 40 CFR 52 Subpart T		

10. Certification of Compliance With Applicable Requirements

Statement for Applicable Requirements for Which the Company and Facility Referenced In This Application Is In Compliance

Based on information and belief, formed after reasonable inquiry, the company and facility referenced in this application is in compliance with and will continue to comply with all applicable requirements pertaining to the sources covered by the permit application, as outlined in Tables 1 and 2 in the permit application. For requirements promulgated as of the date of this certification with compliance dates effective during the permit term, I further certify that the company and facility referenced in this application will comply with such requirements on a timely basis and will continue to comply with such requirements.

For corporations only: By signing this form, I certify that, in accordance with the definition of Responsible Official found in LAC 33:III.502, **(1)** I am a president, secretary, treasurer, or vice-president in charge of a principal business function, or other person who performs similar policy or decision-making functions; or **(2)** I am a duly authorized representative of such person; am responsible for the overall operation of one or more manufacturing, production, or operating facilities addressed in this permit application; and either the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars); or the delegation of authority has been approved by LDEQ prior to this certification.*

CERTIFICATION: I certify, under provisions in Louisiana and United States law which provide criminal penalties for false statements, that based on information and belief formed after reasonable inquiry, the statements and information contained in this Application for Approval of Emissions of Air Pollutants from Part 70 Sources, including all attachments thereto and the compliance statement above, are true, accurate, and complete.

a. Responsible Official		
Name Gregory Mcilwain		
Title SVP - Operations		
Company Energy Transfer Partners, LLC		
Suite, mail drop, or division		
Street or P.O. Box 1300 Main Street		
City Houston	State TX	Zip 77002
Business phone (713) 989-7120		
Email Address Gregory.Mcilwain@energytransfer.com		

Signature of responsible official (See 40 CFR 70.2):

Date: 9/24/20

*Approval of a delegation of authority can be requested by completing a Duly Authorized Representative Designation Form (Form_7218) available on LDEQ's website at http://deq.louisiana.gov/page/air-permit-applications

CERTIFICATION: I certify that the engineering calculations, drawings, and design are true and accurate to the best of my knowledge.

b. Professional Engineer		
Name Jeanne-Marie Heintz, P.E.		
Title Senior Consultant		
Company Trinity Consultants Inc.		
Suite, mail drop, or division 900		
Street or P.O. Box 301 Main Street		
City Baton Rouge	State LA	Zip 70825
Business phone (225) 346-4003		
Email Address jheintz@trinityconsultants.com		

Signature of Professional Engineer: JeanneMarie Heintz

Date: 09/23/2020

Louisiana Registration No. 35141

JEANNE-MARIE HEINTZ
License No. 35141

11. Personnel [LAC 33:III.517.D.1]

a. Manager of Facility who is located at plant site*		
Name	☐Primary contact	
Title		
Company		
Suite, mail drop, or division		
Street or P.O. Box		
City	**State**	**Zip**
Business phone		
Email address		

*No “on-site” person will be present on the offshore platform.

b. On-site contact regarding air pollution control*		
Name	☐Primary contact	
Title		
Company		
Suite, mail drop, or division		
Street or P.O. Box		
City	**State**	**Zip**
Business phone		
Email address		

*No “on-site” person will be present on the offshore platform.

c. Person to contact with written correspondence		
Name Weston Threeton	☐Primary contact	
Title Sr. Engineer		
Company Energy Transfer		
Suite, mail drop, or division		
Street or P.O. Box 1300 Main Street		
City Houston	**State** TX	**Zip** 77002
Business phone (713) 989-7120		
Email address Gregory.mcilwain@energytransfer.com		

d. Person who prepared this report		
Name Michael Ballenger, P.E.	☐Primary contact	
Title Manager of Consulting Services		
Company Trinity Consultants Inc.		
Suite, mail drop, or division B		
Street or P.O. Box 919 Lake Baldwin Ln		
City Orlando	**State** FL	**Zip** 32814
Business phone (407) 982-2891 Ext.1901		
Email address mballenger@trinityconsultants.com		

e. Person to contact about Annual Maintenance Fees		☐ a ☐ b ☐ c ☐ d ☐ other (specify below)		
Name	☐Primary contact	**Suite, mail drop, or division**		
Title		**Street or P.O. Box**		
Company		**City**	**State**	**Zip**
Business Phone		**Email Address**		

12. Proposed Project Emissions [LAC 33:III.517.D.3]

List the total emissions following the proposed project for this facility or process unit (for process unit-specific permits). Speciate all criteria pollutants, TAP, and HAP for the proposed project.

Pollutant	Proposed Emission Rate (tons/yr)
Particulate matter (PM_{10})	1.07
Particulate matter ($PM_{2.5}$)	1.07
Nitrogen oxides	26.02
Carbon monoxide	57.88
Sulfur dioxide	1.64
Total VOC (including those listed below)	21,881
CO_2e	16,510
Sulfuric Acid	0.05
Hydrogen sulfide	9.50
Total HAPs*	1,230

* Please see Appendix B for detailed list of HAPs and TAPs.

13. History of Permitted Emissions [LAC 33:III.517.D.18]

List each of the following in chronological order:

- The Permit Number and Date Action Issued for each air quality permit that has been issued to this facility or process unit (for process unit-specific permits) within the last ten (10) years.
- All small source exemptions, authorizations to construct, administrative amendments, case-by-case insignificant activities, and changes of tank service that have been approved since the currently effective Title V Operating Permit or State Operating Permit was issued to this facility or process unit (for process unit-specific permits). It is not necessary to list any such activities issued prior to the issuance of the currently effective Title V Operating Permit or State Operating Permit, if one exists.

Permit Number	Date Action Issued
N/A – New Facility	

14.a. Enforcement Actions [LAC 33:III.517.D.18] - ☐ Yes ☒ No

If yes, list all federal and state air quality enforcement actions, settlement agreements, and consent decrees received for this facility and/or process unit (for process unit-specific permits) since the issuance of the currently effective Title V Operating Permit or State Operating Permit. For each action, list the type of action (or its tracking number), the regulatory authority or authorities that issued the action, and the date that the action was issued. Summarize the conditions imposed by the enforcement action, settlement agreement, and consent decree in Section 22, Table 2. It is not necessary to submit a copy of the referenced action. Add rows to table as necessary.

Type of Action or Tracking Number	Issuing Authority	Date Action Issued	Summary of Conditions Included?
			☐ Yes ☐ No
			☐ Yes ☐ No

14.b. Schedule for Compliance [LAC 33:III.517.E.4] ☐ Yes ☒ No

If the facility or process unit for which application is being made is not in full compliance with all applicable regulations, give a description of how compliance will be achieved, including a schedule for compliance below. Add rows as necessary. See instructions.

15. Letters of Approval for Alternate Methods of Compliance - ☐ Yes ☒ No

If yes, list all correspondence with LDEQ, EPA, or other regulatory bodies that provides for or supports a request for alternate methods of compliance with any applicable regulations for this facility or process unit (for process unit-specific permits). List the date of issuance of the letter and the regulation referenced by the letter. **Attach as an appendix a copy of all documents referenced in this table.** Letters that are not included may not be incorporated into a final permit. Add rows to table as necessary.

Date Letter Issued	Issuing Authority	Referenced Regulation(s)	Copy of Letter Attached?
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

16. Initial Notifications and Performance Tests [LAC 33:III.517.D.18] - ☐ Yes ☒ No

If yes, list any initial notifications that have been submitted or one-time performance tests that have been performed for this facility or process unit (for process unit-specific permits) since the issuance of the currently effective Title V Operating Permit or State Operating Permit in order to satisfy regulatory requirements. Any initial notification or one-time performance test requirements that have not been satisfied should be listed in Section 22, Table 2 of this application. Any notifications or performance tests that recur periodically should also be properly noted in Section 22, Table 2 of this application. Add rows to table as necessary.

Initial Notification or One-time Performance Test?	Regulatory Citation Satisfied	Applicable Source(s)	Date Completed/Approved

17. Existing Prevention of Significant Deterioration or Nonattainment New Source Review Limitations [LAC 33:III.517.D.18]

Do one or more emissions sources represented in this permit application currently operate under one or more NSR permits?
☐ **Yes** ☒ **No**

If "yes," summarize the limitations from such permit(s) in the following table. Add rows to table as necessary. Be sure to note any annual emissions limitations from such permit(s) in Section 13 of this application.

Permit Number	Date Issued	Emission Point ID No.	Pollutant	BACT/LAER Limit[1]	Averaging Period	Description of Control Technology/Work Practice Standards

[1] For example, lb/MM Btu, ppmvd @ 15% O_2, lb/ton, lb/hr

18. Air Quality Dispersion Modeling [LAC 33:III.517.D.15]

Was Air Quality Dispersion Modeling as required by LAC 33:III performed in support of this permit application? (Air Quality Dispersion Modeling is only required when applying for PSD permits and as requested by LDEQ.)
☒ **Yes** ☐ **No**

Has Air Quality Dispersion Modeling completed in accordance with LAC 33:III ever been performed for this facility in support of an air permit application previously submitted for this facility or process unit (for process unit-specific permits) or as required by other regulations ***AND*** *approved by LDEQ?*
☐ **Yes** ☒ **No**

If yes, enter the date the most recent Air Quality Dispersion Modeling results as required by LAC 33:III were submitted:

____

If the answer to either question above is "yes," enter a summary of the most recent results in the following table. If the answer to both questions is "no," enter "none" in the table. Add rows to table as necessary.

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Toxic Air Pollutant Ambient Air Standard or (National Ambient Air Quality Standard {NAAQS})
Refer to the PSD Air Construction Permit Application Volume 2			

19. General Condition XVII Activities- ☐ Yes ☒ No

Enter all activities that qualify as Louisiana Air Emissions Permit General Condition XVII Activities.

- Expand this table as necessary to include all such activities.
- See instructions to determine what qualifies as a General Condition XVII Activity.
- Do not include emissions from General Condition XVII Activities in the proposed emissions totals for the permit application.

		Emission Rates – TPY					
Work Activity	**Schedule**	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**	**Other**

20. Insignificant Activities [LAC 33:III.501.B.5] - ☒ Yes ☐ No

Enter all activities that qualify as Insignificant Activities.

- Expand this table as necessary to include all such activities.
- For sources claimed to be insignificant based on size or emission rate (LAC 33:III.501.B.5.A), information must be supplied to verify each claim. This may include but is not limited to operating hours, volumes, and heat input ratings.
- If aggregate emissions from all similar pieces of equipment claimed to be insignificant are greater than 5 tons per year for any pollutant, then the activities can not be claimed as insignificant and must be represented as permitted emission sources. Aggregate emissions shall mean the total emissions from a particular insignificant activity or group of similar insignificant activities (e.g., A.1, A.2, etc.) within a permit per year.

Emission Point ID No.	**Description**	**Physical/Operating Data**	**Citation**
AFST	Aviation Fuel Storage Tank	3,000 Gallons	LAC 33:III.501.B.5.A.3
CDT1	Crane Diesel Tank No. 1	3,000 Gallons	LAC 33:III.501.B.5.A.3
CDT2	Crane Diesel Tank No. 2	3,000 Gallons	LAC 33:III.501.B.5.A.3

21. Regulatory Applicability for Commonly Applicable Regulations – Answer all below [LAC 33:III.517.D.10]

Does this facility contain asbestos or asbestos containing materials? ☐ **Yes** ☒ **No**
If "yes," the facility or any portion thereof may be subject to 40 CFR 61, Subpart M, LAC 33:III.Chapter 27, and/or LAC 33:III.5151, and this application must address compliance as stated in Section 22 of this application

Is the facility or process unit represented in this permit subject to 40 CFR 68, or is any other process unit located at the same facility as the process unit represented in this application subject to 40 CFR 68? ☐ **Yes** ☒ **No**
If "yes," the entire facility is subject to 40 CFR 68 and LAC 33:III.Chapter 59, and this application must address compliance as stated in Section 22 of this application.

Is the facility listed in LAC 33:III.5611?

Table 5 ☐ **Yes** ☒ **No**

Table 6 ☐ **Yes** ☒ **No**

Table 7 ☐ **Yes** ☒ **No**

Does the applicant own or operate commercial refrigeration equipment normally containing more than 50 pounds of refrigerant at this facility or process unit? ☐ **Yes** ☒ **No**
If "yes," the entire facility is subject to 40 CFR 82, Subpart F, and this application must address compliance as stated in Section 22 of this application.

22. Applicable Regulations, Air Pollution Control Measures, Monitoring, and Recordkeeping

Important points for Table 1 [LAC 33:III.517.D.10]:

- List in Table 1, by Emission Point ID Number and Descriptive Name of the Equipment, state and federal pollution abatement programs and note the applicability or non-applicability of the regulations to each source.
- Adjust the headings for the columns in Table 1 as necessary to reflect all applicable regulations, in addition to any regulations that do not apply but require an explanation to substantiate this fact.
- For each piece of equipment, enter "1" for each regulation that applies. Enter "2" for each regulation that applies to this type of source, but from which this source of emissions is exempt. Enter "3" for equipment that is subject to a regulation, but does not have any applicable requirements. Also, enter "3" for each regulation that has applicable requirements that apply to the particular emission source, but the regulations currently do not apply due to meeting a specific criterion, such as it has not been constructed, modified, or reconstructed since the regulations have been in place.
- Leave the spaces blank when the regulations clearly would not apply under any circumstances to the source. For example, LAC 33:III.2103 – Storage of Volatile Organic Compounds would never apply to a steam generating boiler, no matter the circumstances.
- Consult instructions.

Important points for Table 2 [LAC 33:III.517.D.4; LAC 33:III.517.D.7; LAC 33:III.517.D.10]:

- For each piece of equipment listed in Table 2, include all applicable limitations, recordkeeping, reporting, monitoring, and testing requirements. Also, include any one-time notification or one-time performance test requirements that have not been fulfilled.
- Each of these regulatory aspects (limitations, recordkeeping, reporting, etc.) should be addressed for each regulation that is applicable to each emissions source or emissions point.
- For each regulation that provides a choice regarding the method of compliance, indicate the method of compliance that will be employed. It is not sufficient to state that all compliance options will be employed, though multiple compliance options may be approved as alternative operating scenarios.
- Consult instructions.

Important points for Table 3 [LAC 33:III.517.D.16]:

- Each time a 2 or a 3 is used to describe applicability of a source in Table 1, an entry should be made in Table 3 that explains the exemption or non-applicability status of the regulation to that source.
- Fill in all requested information in the table.
- The exact regulatory citation that provides for the specific exemption or non-applicability determination should be entered into the "Citation Providing for Exemption or Non-applicability" column.
- Consult Instructions.

Important points for Table 4 [LAC 33:III.517.D.18]

- List any single emission source that routes its emissions to another point where these emissions are commingled with the emissions of other sources before being released to the atmosphere. Do not list any single emission source in this table that does not route its emissions in this manner.
- List any and all emission sources that are routed as described above. This includes emission sources that do not otherwise appear in this permit application.
- Consult instructions.

TABLE 1: APPLICABLE LOUISIANA AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point	Description	LAC 33.III							LAC 33.III.Chapter								
		509	2103	2108*	2111	2113	2115	2121	2	5	9	11	13	15	51	56	59
BMOP DWP Facility	BMOP DWP Facility	1				1		3	1	1	1	1	1	3	1	1	3
NGGEN1	Natural Gas Generator #1											2	1	3			
NGGEN2	Natural Gas Generator #2											2	1	3			
BCRANE1	Platform B Crane #1 (Diesel)											1	1	3	3		
BCRANE2	Platform B Crane #2 (Diesel)											1	1	3	3		
DGEN	Emergency Generator (Diesel)											1	1	3	3		
BFWP	Platform B Firewater Pump (Diesel)											1	1	3	3		
CFWP	Platform C Firewater Pump (Diesel)											1	1	3	3		
PDST	Primary Diesel Storage Tank		3														
SRGT	Surge Tank		2														
FUG	Facility Wide Fugitives				1			3							1		
UNLD1	Uncontrolled Loading at Buoy #1																
UNLD2	Uncontrolled Loading at Buoy #2																
UNLD CAP	Uncontrolled Loading CAP																
NGGEN CAP	Natural Gas Generators CAP																

*BMOP has determined the non-feasibilty of the requirements under this subpart, please refer to Case-by-Case MACT Application for detail discussion.

KEY TO MATRIX

1 (Applicable) The regulations have applicable requirements that apply to this particular emissions source. This includes any monitoring, recordkeeping, or reporting requirements.
2 (Exempt) The regulations apply to this general type of emission source (i.e. vents, furnaces, towers, and fugitives) but do not apply to this particular emission source.
3 (Does Not Apply) The regulations do not apply to this emissions source. The regulations may have applicable requirements that could apply to this emissions source but the requirements do not currently apply to the source due to meeting a specific criterion, such as it has not been constructed, modified or reconstructed since the regulations have been in place.

Blank – The regulations clearly do not apply to this type of emission source.

TABLE 1: APPLICABLE LOUISIANA AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point	Description	40 C.F.R. Part 60 NSPS							40 C.F.R. Part 61 NESHAP	40 C.F.R. Part 63 NESHAP							40 C.F.R. Part			
		A	**K**	**Ka**	**Kb**	**IIII**	**JJJJ**	**OOOOa**	**V**	**A**	**H**	**Y***	**HH**	**VV**	**EEEE**	**ZZZZ**	**64**	**68**	**72**	**82**
BMOP DWP Facility	BMOP DWP Facility	1						3	3	1	3		3	3	3			3	3	1
NGGEN1	Natural Gas Generator #1						1									1				
NGGEN2	Natural Gas Generator #2						1									1				
BCRANE1	Platform B Crane #1 (Diesel)	1				1										1				
BCRANE2	Platform B Crane #2 (Diesel)	1				1										1				
DGEN	Emergency Generator (Diesel)	1				1				1						1				
BFWP	Platform B Firewater Pump (Diesel)	1				1				1						1				
CFWP	Platform C Firewater Pump (Diesel)	1				1				1						1				
PDST	Primary Diesel Storage Tank		3	3	3															
SRGT	Surge Tank		3	3	3															
FUG	Facility Wide Fugitives																			
UNLD1	Uncontrolled Loading at Buoy #1																			
UNLD2	Uncontrolled Loading at Buoy #2																			
UNLD CAP	Uncontrolled Loading CAP																			
NGGEN CAP	Natural Gas Generators CAP																			

*BMOP has determined the non-feasibilty of the requirements under this subpart, please refer to Case-by-Case MACT Application for detail discussion.

KEY TO MATRIX

1 (Applicable) The regulations have applicable requirements that apply to this particular emissions source. This includes any monitoring, recordkeeping, or reporting requirements.
2 (Exempt) The regulations apply to this general type of emission source (i.e. vents, furnaces, towers, and fugitives) but do not apply to this particular emission source.
3 (Does Not Apply) The regulations do not apply to this emissions source. The regulations may have applicable requirements that could apply to this emissions source but the requirements do not currently apply to the source due to meeting a specific criterion, such as it has not been constructed, modified or reconstructed since the regulations have been in place.

Blank – The regulations clearly do not apply to this type of emission source.

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 C.F.R. Part 63 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.6 and § 63.11	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.8	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.10	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.9 and § 63.10	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 63.7.	40 C.F.R. § 63.7	N/A	No
	40 C.F.R. Part 82 - Stratospheric Ozone Provisions	**Requirements that limit emissions or operations-**			
		Comply with the standards for recycling and emissions reduction pursuant to 40 C.F.R. Part 82, Subpart F, except as provided for Motor Vehicle Air Conditioners (MVACs) in Subpart B.	40 C.F.R. 82 Subpart B, E, and F	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility (continued)	LAC 33:III Chapter 2 - Rules and Regulations for the Fee System of the Air Quality Control Programs	**Requirements that limit emissions or operations-**			
		Shall pay the prescribed application fee or annual fee, as determined by LAC 33:III.223, within 90 days after the due date.	LAC 33:III.219	90 Days After Application Due Date	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 9 - General Regulations on Control of Emissions and Emission Standards	**Requirements that limit emissions or operations-**			
		No person or group of persons shall allow particulate matter or gases to become airborne in amounts which cause the ambient air quality standards to be exceeded. The limits stated include normal background levels of particulates and gases.	LAC 33:III.929.A	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		Submit Emission Inventory (EI)/Annual Emissions Statement: Due annually, by the 30th of April to the Office of Environmental Services, for the reporting period of the previous calendar year that coincides with period of ownership or operatorship, until released from reporting, in writing, by DEQ. Submit both an emissions inventory and the certification statement required by LAC 33:III.919.F.1.c, separately for each AI, in a format specified by DEQ. To request a release from reporting, submit a completed Request for Release from Emissions Inventory Reporting form (form# 7365) to the Office of Environmental Services.	LAC 33:III.919	Annually	No
		Shall report the unauthorized discharge of any air pollutant into the atmosphere in accordance with LAC 33:I.Chapter 39. Submit written reports to the department pursuant to LAC 33:I.3925. Submit timely and appropriate follow-up reports detailing methods to be used to prevent similar atmospheric releases.	LAC 33:III.927	Upon Occurrence of an Unauthorized Discharge	No
		Requirements that specify performance testing-			
		New sources shall provide necessary sampling ports in stacks or ducts and such other safe and proper sampling and testing facilities, exclusive of instruments and sensing devices as may be necessary for proper determination of the emission of air contaminants.	LAC 33:III.913	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BMOP DWP Facility (continued)	LAC 33:III Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations-**			
		Emissions of smoke which pass onto or across a public road and create a traffic hazard by impairing visibility as defined in LAC 33:III.111 or intensifying an existing traffic hazard condition are prohibited.	LAC 33:III.1103	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Emissions of particulate matter which pass onto or across a public road and create a traffic hazard by impairment of visibility or intensify an existing traffic hazard condition are prohibited.	LAC 33:III.1303.B	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
BMOP DWP Facility (continued)	LAC 33:III Chapter 21 - Control of Emission of Organic Compounds	**Requirements that limit emissions or operations-**			
		Maintain best practical housekeeping and maintenance practices at the highest possible standards to reduce the quantity of organic compounds emissions. Good housekeeping shall include, but not be limited to, the practices listed in LAC 33:III.2113.A.1-5.	LAC 33:III.2113.A	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 56 - Prevention of Air Pollution Emergency Episodes	**Requirements that limit emissions or operations-**			
		During an Air Pollution Alert, Air Pollution Warning or Air Pollution Emergency, make the standby plan available on the premises to any person authorized by DEQ to enforce these regulations.	LAC 33:III.5611.B.1	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		Submit standby plan for the reduction or elimination of emissions during an Air Pollution Alert, Air Pollution Warning, or Air Pollution Emergency: Due within 30 days after requested by DEQ.	LAC 33:III.5611.A	N/A	No
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
NGGEN1 - Natural Gas Generator #1 (2,328 hp) NGGEN2 - Natural Gas Generator #2 (2,328 hp)	40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		(Excluding Formaldehyde) VOC Total <= 0.7 g/hp-hr (60 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Carbon monoxide (CO) <= 2.0 g/hp-hr (270 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Nitrogen oxides (NO_X) <= 1.0 g/hp-hr (82 ppmdv at 15% O_2).	40 CFR 60.4233(e)	N/A	No
		Operate and maintain stationary SI ICE to achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engine.	40 CFR 60.4234	N/A	No
		Purchase a non-certified engine and demonstrate compliance with the emission standards specified in § 60.4233 (e) and according to the requirements specified in § 60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.	40 CFR 60.4243(b)(2)	N/A	No
		Operate using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations. Keep records of such use. If propane is used for more than 100 hours per year and the engine is not certified to the emission standards when using propane, conduct a performance test to demonstrate compliance with the emission standards of 40 CFR 60.4233.	40 CFR 60.4243(e)	N/A	No
		Requirements that specify monitoring -			
		It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.	40 CFR 60.4243(g)	Continuously	No
		Requirements that specify records to be kept and requirements that specify record retention time -			
		Keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	40 CF 60.4243(b)(2)(ii)	N/A	No
		Equipment/operational data recordkeeping by electronic or hard copy continuously. Keep records of the information in 40 CFR 60.4245(a)(1) through (a)(4).	40 CFR 60.4245(a)	N/A	No
		Requirements that specify reports to be submitted			
		Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in 40 CFR 60.4231 must submit an initial notification as required in 40 CFR 60.7(a)(1). The notification must include the information in 40 CFR 60.4245(c)(1)-(5).	40 CFR 60.4245(c)	N/A	No
		Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in 40 CFR 60.4244 within 60 days after the test has been completed.	40 CFR 60.4245(d)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
NGGEN1 - Natural Gas Generator #1 (2,328 hp) NGGEN2 - Natural Gas Generator #2 (2,328 hp) (continued)	40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	**Requirements that specify performance testing -**			
		If the certified stationary SI internal combustion engine and control device is operated and maintained according to the manufacturer's emission-related written instructions, keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. Meet the requirements as specified in 40 CFR part 1068, subparts A through D, as they apply.	40 CFR 60.4243(a)(1)	N/A	No
		If the certified stationary SI internal combustion engine and control device are not maintained according to the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine, and you must demonstrate compliance according to (a)(2)(i) through (iii) of this section, as appropriate.	40 CFR 60.4243(a)(2)	N/A	No
		Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.	41 CFR 60.4243(b)(2)	N/A	No
		If purchasing a non-certified engine, conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. Conduct performance tests by following the procedures in 40 CFR 60.4244(a) through (g).	40 CFR 60.4243(b)(2)(ii); 40 CFR 60.4244	Every 8,760 hours or 3 years	No
	40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		A new stationary RICE located at an area source meets the requirements of this part (i.e., 40 CFR Part 63 Subpart ZZZZ) by meeting the requirements of 40 CFR Part 60, Subpart JJJJ. No further requirements apply under 40 CFR Part 63 Subpart ZZZZ.	40 CFR 63.6590(c)(1)	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III.Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent; except emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes. (Complies by using sweet natural gas as fuel)	LAC 33:III.1311.C	Six-minute	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel)	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		Shall comply with the emission standards for new CI engines in 40 CFR 60.4201 for their 2007 model year and later stationary CI ICE, as applicable.	40 CFR 60.4204(b)	N/A	No
		Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.	40 CFR 60.4201(a)	N/A	No
		Shall operate and maintain stationary CI ICE that achieve the emission standards as required in 40 CFR 60.4204 over the entire life of this engine.	40 CFR 60.4206	Entire life of the engine	No
		Beginning October 1, 2010, shall use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.	40 CFR 60.4207(b)	N/A	No
		May not import or install stationary CI ICE that do not meet the applicable requirements in 40 CFR 60.4208.	40 CFR 60.4208	N/A	No
		In addition to the requirements specified in 40 CFR 60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.	40 CFR 60.4208(h)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Owner or operator that must comply with the emission standards in this subpart shall do the following: - Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions; - Change only those emission-related settings that are permitted by the manufacturer; and - Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply.	40 CFR 60.4211(a)(1) through (a)(3)	N/A	No
		As stated in 40 CFR 60.4218, comply with the applicable general provisions listed in Table 8.	40 CFR 60.4218; Table 8	N/A	No
		Shall comply by purchasing an engine certified to the emission standards in 40 CFR 60.4204(b) for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph 60.4211(g).	40 CFR 60.4211(c)	N/A	No
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.	40 CFR 60.4211(g)	N/A	No
		Requirements that specify monitoring-			
		If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in 40 CFR 60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.	40 CFR 60.4209(b)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	**Requirements that specify records to be kept and requirements that specify record retention time-**			
		If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.	40 CFR 60.4214(c)	N/A	No
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must keep a maintenance plan and records of conducted maintenance.	40 CFR 60.4211(g)	N/A	No
		Requirements that specify reports to be submitted-			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing-			
		If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.	40 CFR 60.4211(g)(2)	N/A	No
		If performance test is required: conduct performance tests by following the procedures in 40 CFR 60.4212(a) through (e).	40 CFR 60.4212	N/A	No
	40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations -**			
		Meet the requirements of 40 CFR 63 by meeting the requirements of 40 CFR 60 Subpart IIII. No further requirements apply to such engines under 40 CFR 63.	40 CFR 63.6590(c)(7)	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
BCRANE1 - Platform B Crane #1 (475 hp, diesel) BCRANE2 - Platform B Crane #2 (475 hp, diesel) (continued)	LAC 33:III.Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations -**			
		Shall control the emission of smoke generated by the burning of fuel or combustion of waste material in a combustion unit, including the incineration of industrial, commercial, institutional and municipal wastes so that the shade or appearance of the emission is not darker than 20 percent average opacity, except that such emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1101.B	One six-minute period in any 60 consecutive minutes.	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III.Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations -**			
		Emissions of particulate matter shall be controlled so that the shade or appearance of the emission is not denser than 20 percent average opacity, except the emissions may have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1311.C	6 minutes in any 60 consecutive minutes	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel)	40 C.F.R. Part 60 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.11 and § 60.18	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.13	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 60 Subpart A.	40 C.F.R. § 60.7 and § 60.19	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 60.8.	40 C.F.R. § 60.8	N/A	No
	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		For the emergency generators: comply with the NMHC + NO_X, CO, and PM emission limitations set forth in Table 1 for the highest tier of the appropriate sized engine. All emergency generators are subject to the following standards: • CO limit of 3.5 g/kW-hr • PM limit of 0.20 g/kW-hr Engines greater than 560 kilowatts (kW) are subject to the following standard: • NMHC + NO_X limit of 6.4 g/kW-hr Engines with a rated power between 225-560 kW are subject to the following standard: • NMHC + NO_X limit of 4.0 g/kW-hr	40 C.F.R. § 60.4202(a)(2),40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.112(a) Table 1	Per underlying Test Method	No
		For the emergency generators: exhaust opacity from CI nonroad engines (excluding single-cylinder engines, propulsion marine diesel engines, and constant speed engines) may not exceed: • 20% during the acceleration mode; • 15% during the lugging mode; and • 50% during the peaks in either the acceleration or lugging modes.	40 C.F.R. § 60.4202(b)(2), 40 C.F.R. § 89.113	Per 40 C.F.R.§ 89.113	No
		For the fire pumps: comply with the NMHC + NO_X and PM emission limitations set forth in 40 C.F.R. Part 60 Subpart IIII Table 4 for 600-750 hp engines, 2009 model year and later.	40 C.F.R. § 60.4205(c), 40 C.F.R. Part 60 Subpart IIII Table 4	Per underlying Test Method	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Operate and maintain stationary CI ICE that achieve the emission standards as required in 40 C.F.R. 60.4204 and 40 C.F.R. 60.4205 over the entire life of the engine.	40 C.F.R. § 60.4206	N/A	No
		Use diesel fuel with a maximum sulfur content of 15 ppm. Use diesel fuel with a minimum cetane index of 40 or a maximum aromatic content of 35 volume %.	40 C.F.R. § 60.4207(b), 40 C.F.R. § 80.510(b)	Continuously	No
		If the emergency stationary CI internal combustion engine does not meet the standards applicable to non-emergency engines, install a non-resettable hour meter prior to startup of the engine.	40 C.F.R. § 60.4209(a)	N/A	No
		Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions, change only those emission related settings that are permitted by the manufacturer, and meet the requirements of 40 C.F.R. Part 89, 94, and/or 1068, as they apply.	40 C.F.R. § 60.4211(a)	N/A	No
		Purchase an engine certified to the emission standards in 40 C.F.R. § 60.4204(b), § 60.4205(b), or § 60.4205(c), as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in 40 C.F.R. § 60.4211(g).	40 C.F.R. § 60.4211(c)	N/A	No
		Operate according to the requirements in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3). In order for the engine to be considered an emergency stationary ICE under 40 C.F.R. 60 Subpart IIII, any operation other than as described in 40 C.F.R. 60.4211(f)(1), (f)(2)(i), and (f)(3) is prohibited. If the engine is not operated according to these requirements, the engine will not be considered an emergency engine under 40 C.F.R. 60 Subpart IIII and must meet all requirements for non-emergency engines.	40 C.F.R. § 60.4211(f)	N/A	No
		There is no time limit on the use of emergency stationary ICE in emergency situations.	40 C.F.R. § 60.4211(f)(1)	N/A	No
		Operate for maintenance checks and readiness testing for a maximum of 100 hours per calendar year, provided that the tests are recommended by the federal, state or local government; the manufacturer; the vendor; the regional transmission organization or equivalent balancing authority and transmission operator; or the insurance company associated with the engine. LDEQ may be petitioned for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if records are maintained indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.	40 C.F.R. § 60.4211(f)(2)(i)	N/A	No

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (continued)	Operate for up to 50 hours per calendar year in non-emergency situations. Count the 50 hours of operation in non-emergency situations as part of the 100 hours per calendar year for maintenance and testing provided in 40 C.F.R. 60.4211(f)(2)(i). Do not use the 50 hours per calendar year for non-emergency situations for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity, except as provided in 40 C.F.R. 60.4211(f)(3)(i).	40 C.F.R. § 60.4211(f)(3)	N/A	No
		Comply with applicable requirements in Table 8 to Subpart IIII of Part 60.	40 C.F.R. § 60.4218, Table 8 to Subpart IIII of Part 60	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Operating time recordkeeping by electronic or hard copy upon occurrence of event. If the emergency engine meets the standards applicable to emergency engines in the applicable model year, keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. Record the time of operation of the engine and the reason the engine was in operation during that time.	40 C.F.R. § 60.4214(b)	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	40 C.F.R. Part 63 Subpart A - General Provisions	**Requirements that limit emissions or operations-**			
		Comply with all applicable requirements to limit emissions or operations specified in 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.6 and § 63.11 as per 63.6665	N/A	No
		Requirements that specify monitoring-			
		Comply with all applicable monitoring requirements of 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.8 as per 63.6665	N/A	No
		Requirements that specify records to be kept and requirements that specify record retention time-			
		Maintain all applicable records as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.10 as per 63.6665	N/A	No
		Requirements that specify reports to be submitted-			
		Submit all applicable reports as required by 40 C.F.R. Part 63 Subpart A.	40 C.F.R. § 63.9 and § 63.10 as per 63.6665	N/A	No
		Requirements that specify performance testing-			
		Conduct applicable tests according to 40 C.F.R. § 63.7.	40 C.F.R. § 63.7 as per 63.6665	N/A	No
	40 C.F.R. Part 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	**Requirements that limit emissions or operations-**			
		N/A	N/A	N/A	N/A
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted-			
		<u>RICE with Capacities Greater Than 500 Horsepower:</u> Per 40 C.F.R. § 63.6590(b)(1)(i), new emergency stationary RICE with a site rating of more than 500 brake horsepower located at a major HAP source that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in 40 C.F.R. § 63.6640(f)(2)(ii) and (iii) do not have to meet the requirements of Subpart ZZZZ and Subpart A except for the initial notification requirements of 40 C.F.R. § 63.6645(f).	40 C.F.R. § 63.6590(b)(1)(i), 40 C.F.R. § 63.6645(f)	N/A	No
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 11 - Control of Emissions of Smoke	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent, except for emissions that have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes. Determine opacity by using Method 9 of 40 C.F.R. Part 60, Appendix A or by using a continuous opacity monitoring system (COMS) meeting the requirements outlined in 40 C.F.R. 60.13(c) and (d).	LAC 33:III.1101.B	6 Minutes in any 60 Minute Consecutive Period	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 2. STATE AND FEDERAL AIR QUALITY REQUIREMENTS

Emission Point ID No.:	Applicable Requirement	Compliance Method/Provision	Compliance Citation	Averaging Period/Frequency	State Only Requirement
DGEN - Emergency Generator (2,012 hp, diesel) BFWP - Platform B Firewater Pump (650 hp, diesel) CFWP - Platform C Firewater Pump (650 hp, diesel) (continued)	LAC 33:III Chapter 13 - Emission Standards for Particulate Matter	**Requirements that limit emissions or operations-**			
		Opacity <= 20 percent, except for emissions that have an average opacity in excess of 20 percent for not more than one six-minute period in any 60 consecutive minutes.	LAC 33:III.1311.C	6 Minutes in any 60 Minute Consecutive Period	No
		Emissions of particulate matter from any fuel burning equipment cannot exceed 0.6 lbs/MMBTU of heat input.	LAC 33:III.1313.C	3-hour Average	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
FUG - Facility Wide Fugitives	LAC 33:III Chapter 2111 - Pumps And Compressors	**Requirements that limit emissions or operations-**			
		Equip all rotary pumps and compressors handling volatile organic compounds having a true vapor pressure of 1.5 psia or greater at handling conditions with mechanical seals or other equivalent equipment.	LAC 33:III.2111	N/A	No
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		N/A	N/A	N/A	N/A
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A
	LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program	**Requirements that limit emissions or operations-**			
		N/A	N/A	N/A	N/A
		Requirements that specify monitoring -			
		N/A	N/A	N/A	N/A
		Requirements that specify records to be kept and requirements that specify record retention time -			
		N/A	N/A	N/A	N/A
		Requirements that specify reports to be submitted -			
		Emissions to be reported in facility-wide report.	LAC 33:III.5107.A	N/A	Yes
		Requirements that specify performance testing -			
		N/A	N/A	N/A	N/A

TABLE 3. EXPLANATION FOR EXEMPTION STATUS OR NON-APPLICABILITY OF A SOURCE

Emission Point ID No:	Requirement	Exempt or Does Not Apply	Explanation	Citation Providing for Exemption or Non-applicability
BMOP DWP Facility	NSPS Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution [40 C.F.R. Part 60 Subpart OOOOa]	Does Not Apply	The facility is an offshore platform.	40 C.F.R. § 60.5365a
	NESHAP Subpart V - National Emission Standards for Hazardous Air Pollutants for Equipment Leaks (Fugitive Emission Sources) [40 C.F.R. Part 61 Subpart V]	Does Not Apply	Project components will not operate in volatile hazardous air pollutant (VHAP) service.	40 C.F.R. § 61.240(a)
	NESHAP Subpart H - National Emission Standards for Hazardous Air Pollutants for Equipment Leaks [40 C.F.R. Part 63 Subpart H]	Does Not Apply	No Part 63 subpart that applies to the Project references Subpart H.	40 C.F.R. § 63.160(a)
	NESHAP Subpart HH - National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities [40 C.F.R. Part 63 Subpart HH]	Does Not Apply	The facility is not a production facility of oil and natural gas.	40 C.F.R. § 63.760
	NESHAP Subpart VV - National Emission Standards for Hazardous Air Pollutants for Oil-Water Separators and Organic-Water Separators [40 C.F.R. Part 63 Subpart VV]	Does Not Apply	No Part 63 subpart that applies to the Project references Subpart VV.	40 C.F.R. § 63.1040
	NESHAP Subpart EEEE - National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline) [40 C.F.R. Part 63 Subpart EEEE]	Does Not Apply	The definition storage vessel specifically excludes surge control vessels. The other storage tanks proposed do not store an organic liquid as defined in the rule (excludes diesel, and fuels used for refueling). The project will not include a transfer rack, as the delivery of crude is to marine vessel, not to a cargo tank or tank car. Thus this subpart does not apply.	40 C.F.R. 63.2406
	Chemical Accident Prevention Provisions [40 C.F.R. Part 68]	Does Not Apply	Facility does not produce, process, handle, or store any substance listed greater than the threshold amounts.	40 C.F.R. § 68
	Acid Rain Program General Provisions [40 C.F.R. Part 72]	Does Not Apply	The units at the facility are non-utility units, and non-utility units are not subject to the Acid Rain Program.	40 C.F.R. § 72.6(b)(8)
	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does Not Apply	No single point source emits or has the potential to emit 5 tons per year or more of SO_2.	LAC 33:III.1502.A.3
	Fugitive Emission Control [LAC 33:III.Chapter 2121]	Exempt	Facility is not one of the facility types subject to this regulation; the definition of natural gas processing plant excludes compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units, and field gas gathering systems.	LAC 33:III.2121.A
	Chemical Accident Prevention and Minimization of Consequences [LAC 33:III.Chapter 59]	Does Not Apply	Facility does not produce, process, handle, or store any substance listed greater than the threshold amounts.	LAC 33:III.5907

TABLE 3. EXPLANATION FOR EXEMPTION STATUS OR NON-APPLICABILITY OF A SOURCE

Emission Point ID No:	Requirement	Exempt or Does Not Apply	Explanation	Citation Providing for Exemption or Non-applicability
NGGEN1 NGGEN2	Control of Emissions of Smoke [LAC 33:III.Chapter 11]	Exempt	The units will burn only natural gas and are exempt from the requirements of LAC 33:III.1101.	LAC 33:III.1107.B.1
	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does not apply	The units will not emit 5 tons per year or more of SO_2 to the atmosphere.	LAC 33:III.1502.A.3
	Control of Emissions of Nitrogen Oxides (NO_X) [LAC 33:III. Chapter 22]	Does not apply	The facility is not located in a non-attainment area or the region of influence.	LAC 33:III.2201.A
BCRANE1 BCRANE2 DGEN BFWP CFWP	Emission Standards for Sulfur Dioxide [LAC 33:III.Chapter 15]	Does Not Apply	Each unit emits less than 5 tons per year of sulfur dioxide. Shall record and retain data to show annual potential emissions from each unit.	LAC 33:III.1502.A.3 and 1513.C
	LAC 33:III Chapter 51 - Comprehensive Toxic Air Pollutant Emission Control Program [LAC 33:III.Chapter 51]	Exempt	TAP emissions are from the combustion of Group 1 virgin fossil fuels.	LAC 33:III.5105.B.3.a
PDST SRGT	NSPS Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978 [40 C.F.R. Part 63 Subpart K]	Does Not Apply	Storage Tank constructed after May 19, 1978.	40 C.F.R. § 60.110(c)(1).
	NSPS Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984 [40 C.F.R. Part 63 Subpart Ka]	Does Not Apply	Storage Tank constructed after July 23, 1984.	40 C.F.R. § 60.110a
PDST	NSPS Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 [40 C.F.R. Part 63 Subpart Kb]	Does Not Apply	The storage capacity for each of the tank is less than 75 m.^{3}	40 C.F.R. § 60.110b(a).
	Control of Emissions of Organic Compounds - Storage of Volatile Organic Compounds [LAC 33:III:2103]	Does Not Apply	Tank will store diesel which has a vapor pressure of lower than 1.5 psia; therefore, the requirements of LAC 33:III.2103 are not applicable.	LAC 33:III 2103.B
SRGT	NSPS Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 [40 C.F.R. Part 63 Subpart Kb]	Does Not Apply	The surge tank is potentially subject to NSPS Subpart Kb. However, the surge tank is considered a process tanks. The definition storage vessel specifically excludes process tanks. Thus subpart Kb does not apply.	40 C.F.R. § 60.111b
	LAC 33:III Chapter 2103 - Storage of Volatile Organic Compounds	Exempt	Storage tank is used for crude oil or condensate and having a nominal storage capacity of less than 420,000 gallons and storage tank is NOT subject to New Source Performance Standards;	LAC 33:III 2103.G.1
FUG	Fugitive Emission Control [LAC 33:III.Chapter 2121]	Exempt	Facility is not one of the facility types subject to this regulation; the definition of natural gas processing plant excludes compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units, and field gas gathering systems.	LAC 33:III.2121.A

TABLE 4. EQUIPMENT LIST

Emission Point ID No:	Description	Construction Date	Routes to:	Operating Rate/Volume	Applicable Requirement(s)?
NGGEN1	Natural Gas Generator #1	Proposed	NGGEN CAP	158,316 scf/hr	Yes
NGGEN2	Natural Gas Generator #2	Proposed	NGGEN CAP	158,316 scf/hr	Yes
UNLD1	Uncontrolled Loading at Buoy #1	Proposed	UNLD CAP	80,000 bbl/hr	No
UNLD2	Uncontrolled Loading at Buoy #2	Proposed	UNLD CAP	80,000 bbl/hr	No

23. Emissions Inventory Questionnaire (EIQ) Forms [LAC 33:III.517.D.3; 517.D.6]

Complete one (1) EIQ for:

- Each emission source. If two emission sources have a common stack, the applicant may submit one EIQ sheet for the common emissions point. Note any emissions sources that route to this common point in Table 4 of the application.
- Each emissions CAP that is proposed, including each source that is part of the CAP.
- Each alternate operating scenario that a source may operate under. Some common scenarios are:
    1. Sources that combust multiple fuels
    2. Sources that have startup/shutdown max lb/hr emission rates higher than the max lb/hr for normal operating conditions would need a separate EIQ addressing the startup/shutdown emission rates
- Fugitive emissions releases. One (1) EIQ should be completed for each of the following types of fugitive emissions sources or emissions points:
    1. Equipment leaks.
    2. Non-equipment leaks (i.e., road dust, settling ponds, etc).

For each EIQ:

- Fill in all requested information.
- Speciate all Toxic Air Pollutants and Hazardous Air Pollutants emitted by the source.
- Use appropriate significant figures.
- Consult instructions.

The EIQ is in Microsoft Word Excel. Visit the following website to get to the EIQ form.
http://deq.louisiana.gov/page/air-permit-applications

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal: Aug 2020

Emission Point ID No. (Designation) UNLD CAP	**Descriptive Name of the Emissions Source (Alt. Name)** Uncontrolled Loading CAP	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method ______ Datum ______
UTM Zone ______ Horizontal ______ mE Vertical ______ mN
Latitude ______ ° ______ ' ______ " ______ hundredths
Longitude ______ ° ______ ' ______ " ______ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	**Apr-Jun**	**Jul-Sep**	**Oct-Dec**
yes	N/A ft N/A ft^2	N/A ft	N/A ft/sec	N/A ft^3/min	N/A °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a		
	b		
	c		

Notes

This emissions CAP includes emissions from Uncontrolled Loading Buoy 1 (UNLD1) and Uncontrolled Loading Buoy 2 (UNLD2). See individual EIQs for max hourly emissions and stack information.

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	700,800,000	bbl/yr
Maximum Operating Rate/Throughput	700,800,000	bbl/yr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered ______ Engine Model Year ______

Date Engine Was Built by Manufacturer ______

SI Engines: ☑ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) UNLD CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				5422.48	--	21840.28	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	70.15	--	9.49	--	A		ppm by vol
n-Hexane			00110-54-3	221.77	--	893.22	--	A		ppm by vol
Benzene			00071-43-2	43.40	--	174.81	--	A		ppm by vol
Toluene			00108-88-3	19.27	--	77.61	--	A		ppm by vol
Ethyl benzene			00100-41-4	2.69	--	10.85	--	A		ppm by vol
1,2,4 - Trimethylbenzene				0.58	--	2.33	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				2.58	--	10.41	--	A		ppm by vol
1,4-dimethylbenzene				1.80	--	7.25	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	11.26	--	45.36	--	A		ppm by vol
Cumene			00098-82-8	0.32	--	1.28	--	A		ppm by vol
Biphenyl			00092-52-4	0.001	--	<0.01	--	A		ppm by vol
Cresol			01319-77-3	0.04	--	0.16	--	A		ppm by vol
Naphthalene			00091-20-3	0.03	--	0.14	--	A		ppm by vol
Phenol			00108-95-2	0.08	--	0.33	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal: Aug | 2020

Emission Point ID No. (Designation) UNLD1	**Descriptive Name of the Emissions Source (Alt. Name)** Uncontrolled Loading at Buoy #1	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499627.30 mE Vertical 3147270.30 mN Latitude ° ' " hundredths Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	2.17 ft ft^2	36.09 ft	33.74 ft/sec	7,486.11 ft^3/min	90 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Notes

Average hourly and annual emissions permitted under Uncontrolled Loading CAP.

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	80,000	bbl/hr
Maximum Operating Rate/Throughput	80,000	bbl/hr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year |

Date Engine Was Built by Manufacturer |

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) UNLD1	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Total VOC (including those listed below)				--	5422.48	--	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	--	70.15	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	221.77	--	--	A		ppm by vol
Benzene			00071-43-2	--	43.40	--	--	A		ppm by vol
Toluene			00108-88-3	--	19.27	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	2.69	--	--	A		ppm by vol
1,2,4 - Trimethylbenzene				--	0.58	--	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				--	2.58	--	--	A		ppm by vol
1,4-dimethylbenzene				--	1.80	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	11.26	--	--	A		ppm by vol
Cumene			00098-82-8	--	0.32	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.001	--	--	A		ppm by vol
Cresol			01319-77-3	--	0.04	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.03	--	--	A		ppm by vol
Phenol			00108-95-2	--	0.08	--	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation)	**Descriptive Name of the Emissions Source (Alt. Name)**	**Approximate Location of Stack or Vent (see instructions)**
UNLD2	Uncontrolled Loading at Buoy #2	Method 18,"Interpolation - Map" Datum WGS84
Tempo Subject Item ID No.		UTM Zone 15 Horizontal 501099.00 mE Vertical 3146871.60 mN
		Latitude ° ' " hundredths
		Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	2.17 ft ft^2	36.09 ft	33.74 ft/sec	7,486.11 ft^3/min	90 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Notes

Average hourly and annual emissions permitted under Uncontrolled Loading CAP.

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	80,000	bbl/hr
Maximum Operating Rate/Throughput	80,000	bbl/hr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) UNLD2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				--	5422.48	--	--	A		ppm by vol
Hydrogen sulfide			07783-06-4	--	70.15	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	221.77	--	--	A		ppm by vol
Benzene			00071-43-2	--	43.40	--	--	A		ppm by vol
Toluene			00108-88-3	--	19.27	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	2.69	--	--	A		ppm by vol
1,2,4 - Trimethylbenzene				--	0.58	--	--	A		ppm by vol

Emission Point ID No. (Designation) UNLD2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
1,3-dimethylbenzene				--	2.58	--	--	A		ppm by vol
1,4-dimethylbenzene				--	1.80	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	11.26	--	--	A		ppm by vol
Cumene			00098-82-8	--	0.32	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.001	--	--	A		ppm by vol
Cresol			01319-77-3	--	0.04	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.03	--	--	A		ppm by vol
Phenol			00108-95-2	--	0.08	--	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal	
Aug	2020

Emission Point ID No. (Designation)	**Descriptive Name of the Emissions Source (Alt. Name)**
NGGEN CAP	**Natural Gas Generator CAP**
Tempo Subject Item ID No.	

Approximate Location of Stack or Vent (see instructions)

Method ______ Datum ______
UTM Zone ______ Horizontal ______ mE Vertical ______ mN
Latitude ______ ° ______ ' ______ " ______ hundredths
Longitude ______ ° ______ ' ______ " ______ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**
yes	N/A ft N/A ft^2	N/A ft	N/A ft/sec	N/A ft^3/min	N/A °F	8,760 hr/yr	proposed

Percent of Annual Throughput Through This Emission Point			
Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	**Type of Fuel**	**Heat Input (MMBTU/hr)**
a		
b		
c		

Notes

This emissions CAP includes emissions from NG Generator No1 (NGGEN1) and NG Generator No2 (NGGEN2). See individual EIQs for max hourly emissions and stack information.

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	156	MMscf/yr
Maximum Operating Rate/Throughput	156	MMscf/yr
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered ______ Engine Model Year ______

Date Engine Was Built by Manufacturer ______

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) NGGEN CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.18	--	0.80	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.18	--	0.80	--	A		gr/std ft^3
Sulfur dioxide				0.01	--	0.05	--	A		ppm by vol
Nitrogen oxides				5.13	--	22.48	--	A		ppm by vol
Carbon monoxide				10.26	--	44.96	--	A		ppm by vol
Total VOC (including those listed below)				3.59	--	15.74	--	A		ppm by vol
Sulfuric Acid			07664-93-9	0.001	--	<0.01	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN CAP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	0.15	--	0.67	--	A		ppm by vol
Acrolein			00107-02-8	0.093	--	0.409	--	A		ppm by vol
Benzene			00071-43-2	0.01	--	0.04	--	A		ppm by vol
Biphenyl			00092-52-4	0.004	--	0.02	--	A		ppm by vol
1,3-Butadiene			00106-99-0	0.005	--	0.021	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	<0.001	--	<0.01	--	A		ppm by vol
Chlorobenzene			00108-90-7	<0.001	--	0.002	--	A		ppm by vol
Chloroform			00067-66-3	<0.001	--	<0.01	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	<0.001	--	<0.01	--	A		ppm by vol
Ethyl benzene			00100-41-4	<0.001	--	<0.01	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	<0.001	--	0.004	--	A		ppm by vol
Formaldehyde			00050-00-0	0.61	--	2.67	--	A		ppm by vol
Methanol			00067-56-1	0.05	--	0.20	--	A		ppm by vol
Dichloromethane			00075-09-2	<0.001	--	<0.01	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	<0.001	--	<0.01	--	A		ppm by vol
n-Hexane			00110-54-3	0.02	--	0.09	--	A		ppm by vol
Naphthalene			00091-20-3	0.001	--	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	--	<0.01	--	A		ppm by vol
Phenanthrene				<0.001	--	<0.01	--	A		ppm by vol
Phenol			00108-95-2	<0.001	--	<0.01	--	A		ppm by vol
Styrene			00100-42-5	<0.001	--	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.01	--	0.03	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	<0.001	--	<0.01	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	<0.001	--	<0.01	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	0.00	--	0.02	--	A		ppm by vol
Vinyl chloride			00075-01-4	<0.001	--	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.003	--	0.01	--	A		ppm by vol
CO2e				2,940	--	12,878	--	A		ppm by vol

State of Louisiana

Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal: Aug | 2020

Emission Point ID No. (Designation) NGGEN1	**Descriptive Name of the Emissions Source (Alt. Name)** **Natural Gas Generator #1**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499558.50 mE Vertical 3145263.24 mN Latitude ° ' " hundredths Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ft^2	104.40 ft	125.98 ft/sec	2,638.61 ft^3/min	924 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	18.18
b		
c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	158,316	scf/hr
Maximum Operating Rate/Throughput	158,316	scf/hr
Design Capacity/Volume/Cylinder Displacement	2,328	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☑ **Lean Burn** ☐ **2 Stroke** ☑ **4 Stroke**

Emission Point ID No. (Designation) NGGEN1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				--	0.18	--	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				--	0.18	--	--	A		gr/std ft^3
Sulfur dioxide				--	0.01	--	--	A		ppm by vol
Nitrogen oxides				--	5.13	--	--	A		ppm by vol
Carbon monoxide				--	10.26	--	--	A		ppm by vol
Total VOC (including those listed below)				--	3.59	--	--	A		ppm by vol
Sulfuric Acid			07664-93-9	--	0.001	--	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	--	0.15	--	--	A		ppm by vol
Acrolein			00107-02-8	--	0.09	--	--	A		ppm by vol
Benzene			00071-43-2	--	0.01	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.004	--	--	A		ppm by vol
1,3-Butadiene			00106-99-0	--	0.005	--	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	--	<0.001	--	--	A		ppm by vol
Chlorobenzene			00108-90-7	--	<0.001	--	--	A		ppm by vol
Chloroform			00067-66-3	--	<0.001	--	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	--	<0.001	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	<0.001	--	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	--	<0.001	--	--	A		ppm by vol
Formaldehyde			00050-00-0	--	0.61	--	--	A		ppm by vol
Methanol			00067-56-1	--	0.05	--	--	A		ppm by vol
Dichloromethane			00075-09-2	--	<0.001	--	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	--	<0.001	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	0.02	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.001	--	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				--	<0.001	--	--	A		ppm by vol
Phenanthrene				--	<0.001	--	--	A		ppm by vol
Phenol			00108-95-2	--	<0.001	--	--	A		ppm by vol
Styrene			00100-42-5	--	<0.001	--	--	A		ppm by vol
Toluene			00108-88-3	--	0.01	--	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	--	<0.001	--	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	--	<0.001	--	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	--	0.005	--	--	A		ppm by vol
Vinyl chloride			00075-01-4	--	<0.001	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	0.003	--	--	A		ppm by vol
CO2e				--	2,940	--	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
NGGEN2	**Natural Gas Generator #2**	Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499563.03 mE Vertical 3145259.16 mN Latitude ____ ° ____ ' ____ " ____ hundredths Longitude ____ ° ____ ' ____ " ____ hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ____ ft^2	104.40 ft	125.98 ft/sec	2,638.61 ft^3/min	924 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel	Type of Fuel	Heat Input (MMBTU/hr)
a	Natural Gas	18.18
b		
c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	158,316	scf/hr
Maximum Operating Rate/Throughput	158,316	scf/hr
Design Capacity/Volume/Cylinder Displacement	2,328	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ **Rich Burn** ☑ **Lean Burn** ☐ **2 Stroke** ☑ **4 Stroke**

Emission Point ID No. (Designation) NGGEN2	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Particulate matter (PM_{10})				--	0.18	--	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				--	0.18	--	--	A		gr/std ft^3
Sulfur dioxide				--	0.01	--	--	A		ppm by vol
Nitrogen oxides				--	5.13	--	--	A		ppm by vol
Carbon monoxide				--	10.26	--	--	A		ppm by vol
Total VOC (including those listed below)				--	3.59	--	--	A		ppm by vol
Sulfuric Acid			07664-93-9	--	0.001	--	--	A		ppm by vol

Emission Point ID No. (Designation) NGGEN2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Acetaldehyde			00075-07-0	--	0.15	--	--	A		ppm by vol
Acrolein			00107-02-8	--	0.09	--	--	A		ppm by vol
Benzene			00071-43-2	--	0.01	--	--	A		ppm by vol
Biphenyl			00092-52-4	--	0.004	--	--	A		ppm by vol
1,3-Butadiene			00106-99-0	--	0.005	--	--	A		ppm by vol
Carbon tetrachloride			00056-23-5	--	<0.001	--	--	A		ppm by vol
Chlorobenzene			00108-90-7	--	<0.001	--	--	A		ppm by vol
Chloroform			00067-66-3	--	<0.001	--	--	A		ppm by vol
1,3-Dichloropropene			00542-75-6	--	<0.001	--	--	A		ppm by vol
Ethyl benzene			00100-41-4	--	<0.001	--	--	A		ppm by vol
1,2-Dibromoethane			00106-93-4	--	<0.001	--	--	A		ppm by vol
Formaldehyde			00050-00-0	--	0.61	--	--	A		ppm by vol
Methanol			00067-56-1	--	0.05	--	--	A		ppm by vol
Dichloromethane			00075-09-2	--	<0.001	--	--	A		ppm by vol
2-Methylnaphthalene			00091-57-6	--	<0.001	--	--	A		ppm by vol
n-Hexane			00110-54-3	--	0.02	--	--	A		ppm by vol
Naphthalene			00091-20-3	--	0.001	--	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				--	<0.001	--	--	A		ppm by vol
Phenanthrene				--	<0.001	--	--	A		ppm by vol
Phenol			00108-95-2	--	<0.001	--	--	A		ppm by vol
Styrene			00100-42-5	--	<0.001	--	--	A		ppm by vol
Toluene			00108-88-3	--	0.01	--	--	A		ppm by vol
1,1,2,2-Tetrachloroethane			00079-34-5	--	<0.001	--	--	A		ppm by vol
1,1,2-Trichloroethane			00079-00-5	--	<0.001	--	--	A		ppm by vol
2,2,4-Trimethylpentane			00540-84-1	--	0.005	--	--	A		ppm by vol
Vinyl chloride			00075-01-4	--	<0.001	--	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	--	0.003	--	--	A		ppm by vol
CO2e				--	2,940	--	--	A		ppm by vol

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Emission Point ID No. (Designation) DGEN	**Descriptive Name of the Emissions Source (Alt. Name)** **Emergency Diesel Generator**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499567.56 mE Vertical 3145255.08 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.67 ft ft^2	104.40 ft	103.00 ft/sec	2,157.20 ft^3/min	757 °F	100 hr/yr	proposed	25%	25%	25%	25%

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a	Diesel	14.08
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	1,408	MMBtu/yr
Maximum Operating Rate/Throughput	14.08	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	2,012	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered Engine Model Year
Date Engine Was Built by Manufacturer
SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) DGEN	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM$_{10}$)				0.77	0.77	0.04	--	A		gr/std ft^3
Particulate matter (PM$_{2.5}$)				0.77	0.77	0.04	--	A		gr/std ft^3
Sulfur dioxide				1.43	1.43	0.07	--	A		ppm by vol
Nitrogen oxides				21.17	21.17	1.06	--	A		ppm by vol
Carbon monoxide				11.58	11.58	0.58	--	A		ppm by vol
Total VOC (including those listed below)				21.17	21.17	1.06	--	A		ppm by vol

Emission Point ID No. (Designation) DGEN	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.04	0.04	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	<0.001	<0.001	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.01	0.01	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.001	0.001	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.004	0.004	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.003	0.003	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				0.003	0.003	<0.01	--	A		ppm by vol
CO2e				2,304	-	115	--	A		ppm by vol

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Emission Point ID No. (Designation)	Descriptive Name of the Emissions Source (Alt. Name)	Approximate Location of Stack or Vent (see instructions)
BCRANE1	**Platform B Crane #1**	Method 18,"Interpolation - Map" Datum WGS84
Tempo Subject Item ID No.		UTM Zone 15 Horizontal 499573.09 mE Vertical 3145256.67 mN
		Latitude ° ' " hundredths
		Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	Diameter (ft) or Stack Discharge Area (ft^2)	Height of Stack Above Grade (ft)	Stack Gas Exit Velocity	Stack Gas Flow at Conditions, not at Standard (ft^3/min)	Stack Gas Exit Temperature (°F)	Normal Operating Time (hours per year)	Date of Construction or Modification	Percent of Annual Throughput Through This Emission Point			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	154.67 ft	97.27 ft/sec	509.28 ft^3/min	980 °F	4,380 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a	Diesel	3.33
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	14,564	MMBtu/yr
Maximum Operating Rate/Throughput	3.33	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	475	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BCRANE1	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				Average (lb/hr)	Maximum (lbs/hr)	Annual (tons/yr)	Annual (tons/yr)			
Particulate matter (PM$_{10}$)				0.05	0.05	0.11	--	A		gr/std ft^3
Particulate matter (PM$_{2.5}$)				0.05	0.05	0.11	--	A		gr/std ft^3
Sulfur dioxide				0.34	0.34	0.74	--	A		ppm by vol
Nitrogen oxides				0.47	0.47	1.03	--	A		ppm by vol
Carbon monoxide				2.73	2.73	5.99	--	A		ppm by vol
Total VOC (including those listed below)				0.22	0.22	0.49	--	A		ppm by vol

Emission Point ID No. (Designation) BCRANE1	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	0.02	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.003	0.003	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.004	0.004	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.001	0.001	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	<0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				544	--	1,191	--	A		ppm by vol

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Emission Point ID No. (Designation)	**Descriptive Name of the Emissions Source (Alt. Name)**	**Approximate Location of Stack or Vent (see instructions)**
BCRANE2	**Platform B Crane #2**	Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499528.13 mE Vertical 3145242.60 mN Latitude ° ' " hundredths Longitude ° ' " hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (^oF)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	154.67 ft	97.27 ft/sec	509.28 ft^3/min	980 °F	4,380 hr/yr	proposed	25%	25%	25%	25%

Fuel

Type of Fuel Used and Heat Input (see instructions)

	Type of Fuel	**Heat Input (MMBTU/hr)**
a	Diesel	3.33
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	14,564	MMBtu/yr
Maximum Operating Rate/Throughput	3.33	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	475	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year

Date Engine Was Built by Manufacturer

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BCRANE2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.05	0.05	0.11	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.05	0.05	0.11	--	A		gr/std ft^3
Sulfur dioxide				0.34	0.34	0.74	--	A		ppm by vol
Nitrogen oxides				0.47	0.47	1.03	--	A		ppm by vol
Carbon monoxide				2.73	2.73	5.99	--	A		ppm by vol
Total VOC (including those listed below)				0.22	0.22	0.49	--	A		ppm by vol

Emission Point ID No. (Designation) BCRANE2	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	0.02	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.003	0.003	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.004	0.004	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.001	0.001	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	<0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				544	--	1,191	--	A		ppm by vol

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Emission Point ID No. (Designation) BFWP	**Descriptive Name of the Emissions Source (Alt. Name)** **Platform B Firewater Pump**	**Approximate Location of Stack or Vent (see instructions)** Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499552.80 mE Vertical 3145247.80 mN Latitude ° ' " hundredths Longitude ° ' " hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, <u>not</u> at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	56.16 ft	133.10 ft/sec	696.91 ft^3/min	980 °F	100 hr/yr	proposed	25%	25%	25%	25%

Fuel	**Type of Fuel Used and Heat Input (see instructions)**	
	Type of Fuel	**Heat Input (MMBTU/hr)**
a	Diesel	4.55
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	455	MMBtu/yr
Maximum Operating Rate/Throughput	4.55	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	650	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered			Engine Model Year	
Date Engine Was Built by Manufacturer				

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) BFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.25	0.25	0.01	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Sulfur dioxide				0.46	0.46	0.02	--	A		ppm by vol
Nitrogen oxides				4.30	4.30	0.21	--	A		ppm by vol
Carbon monoxide				3.73	3.73	0.19	--	A		ppm by vol
Total VOC (including those listed below)				4.30	4.30	0.21	--	A		ppm by vol

Emission Point ID No. (Designation) BFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.003	0.003	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.004	0.004	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.01	0.01	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.002	0.002	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.001	0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				744	--	37	--	A		ppm by vol

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Emission Point ID No. (Designation) CFWP	**Descriptive Name of the Emissions Source (Alt. Name)** **Platform C Firewater Pump**	**Approximate Location of Stack or Vent (see instructions)** Method 18,"Interpolation - Map" Datum WGS84 UTM Zone 15 Horizontal 499507.67 mE Vertical 3145358.27 mN Latitude ° ' " hundredths Longitude ° ' " hundredths
Tempo Subject Item ID No.		

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.33 ft ft^2	56.06 ft	133.10 ft/sec	696.91 ft^3/min	980 °F	100 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a	Diesel	4.55
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	455	MMBtu/yr
Maximum Operating Rate/Throughput	4.55	MMBtu/hr
Design Capacity/Volume/Cylinder Displacement	650	hp
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered | | Engine Model Year |

Date Engine Was Built by Manufacturer |

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) CFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Particulate matter (PM_{10})				0.25	0.25	0.01	--	A		gr/std ft^3
Particulate matter ($PM_{2.5}$)				0.25	0.25	0.01	--	A		gr/std ft^3
Sulfur dioxide				0.46	0.46	0.02	--	A		ppm by vol
Nitrogen oxides				4.30	4.30	0.21	--	A		ppm by vol
Carbon monoxide				3.73	3.73	0.19	--	A		ppm by vol
Total VOC (including those listed below)				4.30	4.30	0.21	--	A		ppm by vol

Emission Point ID No. (Designation) CFWP	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Sulfuric Acid			07664-93-9	0.01	0.01	<0.01	--	A		ppm by vol
Acetaldehyde			00075-07-0	0.00	0.00	<0.01	--	A		ppm by vol
Acrolein			00107-02-8	<0.001	<0.001	<0.001	--	A		ppm by vol
Benzene			00071-43-2	0.004	0.004	<0.01	--	A		ppm by vol
Formaldehyde			00050-00-0	0.01	0.01	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.002	0.002	<0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.001	0.001	<0.01	--	A		ppm by vol
Polynuclear Aromatic Hydrocarbons				<0.001	<0.001	<0.01	--	A		ppm by vol
CO2e				744	--	37	--	A		ppm by vol

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Emission Point ID No. (Designation) PDST	**Descriptive Name of the Emissions Source (Alt. Name)** **Primary Diesel Storage Tank**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499557.40 mE Vertical 3145253.30 mN
Latitude ° ' " hundredths
Longitude ° ' " hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.50 ft ft^2	102.40 ft	3.28 ft/sec	38.65 ft^3/min	77 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		Type of Fuel	Heat Input (MMBTU/hr)
	a		
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	Description
Normal Operating Rate/Throughput	468,000	gal/yr
Maximum Operating Rate/Throughput	400	gal/hr
Design Capacity/Volume/Cylinder Displacement	18,000	gal
Shell Height (ft)	10.00	ft
Tank Diameter (ft)	17.76	ft

Tanks: ☑ Fixed Roof Floating Roof ☐ External ☐ Internal
Date Engine Ordered Engine Model Year
Date Engine Was Built by Manufacturer
SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) PDST	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				0.002	--	0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	--	<0.01	--	A		ppm by vol

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Emission Point ID No. (Designation) ST	**Descriptive Name of the Emissions Source (Alt. Name)** **Surge Tank**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		Method 18,"Interpolation - Map" Datum WGS84
		UTM Zone 15 Horizontal 499536.88 mE Vertical 3145247.78 mN
		Latitude ___° ___' ___" ___ hundredths
		Longitude ___° ___' ___" ___ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	0.50 ft ___ ft^2	105.06 ft	3.28 ft/sec	38.65 ft^3/min	150 °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Type of Fuel Used and Heat Input (see instructions)

Fuel		**Type of Fuel**	**Heat Input (MMBTU/hr)**
	a		
	b		
	c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput	42,000	gal/yr
Maximum Operating Rate/Throughput	80,000	gal/hr
Design Capacity/Volume/Cylinder Displacement	42,000	gal
Shell Height (ft)	47.50	ft
Tank Diameter (ft)	12.67	ft

Tanks: ☑ Fixed Roof | Floating Roof ☐ External ☐ Internal

Date Engine Ordered ___ Engine Model Year ___

Date Engine Was Built by Manufacturer ___

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) ST	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				0.85	--	3.73	--	A		ppm by vol
Benzo(g,h,i)perylene				0.004	--	0.02	--	A		ppm by vol
Cyclohexane				0.005	--	0.02	--	A		ppm by vol
Ethylcyclohexane				0.001	--	<0.01	--	A		ppm by vol

Emission Point ID No. (Designation) ST	Control Equipment Code	Control Equipment Efficiency	HAP / TAP CAS Number	Proposed Emission Rates			Permitted Emission Rate (Current)	Add, Change, Delete, or Unchanged	Continuous Compliance Method	Concentration in Gases Exiting at Stack
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Hexanol				0.004	--	0.02	--	A		ppm by vol
Toluene diisocyanate				0.002	--	0.01	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	<0.001	--	<0.01	--	A		ppm by vol

State of Louisiana
Emissions Inventory Questionnaire (EIQ) for Air Pollutants

Date of submittal
Aug | 2020

Emission Point ID No. (Designation) FUG0001	**Descriptive Name of the Emissions Source (Alt. Name)** **Facility Wide Fugitives**	**Approximate Location of Stack or Vent (see instructions)**
Tempo Subject Item ID No.		

Method 18,"Interpolation - Map" Datum WGS84
UTM Zone 15 Horizontal 499554.70 mE Vertical 3145251.00 mN
Latitude ____ ° ____ ' ____ " ____ hundredths
Longitude ____ ° ____ ' ____ " ____ hundredths

Stack and Discharge Physical Characteristics Change? (yes or no)	**Diameter (ft) or Stack Discharge Area (ft^2)**	**Height of Stack Above Grade (ft)**	**Stack Gas Exit Velocity**	**Stack Gas Flow at Conditions, not at Standard (ft^3/min)**	**Stack Gas Exit Temperature (°F)**	**Normal Operating Time (hours per year)**	**Date of Construction or Modification**	**Percent of Annual Throughput Through This Emission Point**			
								Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
yes	N/A ft ____ ft^2	N/A ft	N/A ft/sec	ft^3/min	N/A °F	8,760 hr/yr	proposed	25%	25%	25%	25%

Fuel	**Type of Fuel Used and Heat Input (see instructions)**	
	Type of Fuel	**Heat Input (MMBTU/hr)**
a		
b		
c		

Notes

Operating Parameters (include units)

	Parameter	**Description**
Normal Operating Rate/Throughput		
Maximum Operating Rate/Throughput		
Design Capacity/Volume/Cylinder Displacement		
Shell Height (ft)		
Tank Diameter (ft)		

Tanks: ☐ Fixed Roof Floating Roof ☐ External ☐ Internal

Date Engine Ordered ____ Engine Model Year ____

Date Engine Was Built by Manufacturer ____

SI Engines: ☐ **Rich Burn** ☐ **Lean Burn** ☐ **2 Stroke** ☐ **4 Stroke**

Emission Point ID No. (Designation) FUG0001	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Total VOC (including those listed below)				4.26	4.26	18.65	--	A		ppm by vol
Benzene			00071-43-2	0.03	0.03	0.12	--	A		ppm by vol
Cumene			00098-82-8	<0.001	<0.001	<0.01	--	A		ppm by vol
Ethyl benzene			00100-41-4	0.02	0.02	0.08	--	A		ppm by vol
n-Hexane			00110-54-3	0.21	0.21	0.91	--	A		ppm by vol
Naphthalene			00091-20-3	<0.001	<0.001	<0.01	--	A		ppm by vol
Toluene			00108-88-3	0.07	0.07	0.32	--	A		ppm by vol

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Emission Point ID No. (Designation) FUG0001	**Control Equipment Code**	**Control Equipment Efficiency**	**HAP / TAP CAS Number**	**Proposed Emission Rates**			Permitted Emission Rate (Current)	**Add, Change, Delete, or Unchanged**	**Continuous Compliance Method**	**Concentration in Gases Exiting at Stack**
Pollutant				**Average (lb/hr)**	**Maximum (lbs/hr)**	**Annual (tons/yr)**	**Annual (tons/yr)**			
Trimethylbenzene (1,2,4)				0.03	0.03	0.14	--	A		ppm by vol
Xylene (mixed isomers)			01330-20-7	0.08	0.08	0.33	--	A		ppm by vol
1,3-dimethylbenzene				0.001	0.001	0.01	--	A		ppm by vol
1,4-dimethylbenzene				0.001	0.001	<0.01	--	A		ppm by vol
CO2e				242	242	1,060		A		ppm by vol

24. NSR Applicability Summary [LAC 33:III.504 and LAC 33:III.509] ☐ N/A

Refer to Sections 4 the Prevention of Significant Deterioration Air Construction Permit Application Volume 1 for the NSR Applicability Summary.

This section consists of seven subsections, A-G, and is applicable only to new and existing major stationary sources (as defined in LAC 33:III.504 or in LAC 33:III.509) proposing to permit a physical change or change in the method of operation. It would also apply to existing minor stationary sources proposing a physical change or change in the method of operation where the change would be a major source in and of itself. Add rows to each table as necessary. Provide a written explanation of the information summarized in these tables. Consult instructions.

24.A. Project Summary

		A	B	C	D	E	F
Emission Point ID	**Description**	**New, Modified, Affected, or Unaffected***	**Pre-Project Allowables (TPY)**	**Baseline Actual Emissions (over 24-month period)**	**Projected Actual Emissions (TPY)**	**Post-Project Potential to Emit (TPY)**	**Change**
$PM_{2.5}$	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						$PM_{2.5}$ Change:	
PM_{10}	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						PM_{10} Change:	
SO_2	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						SO_2 Change:	
NO_X	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						NO_X Change:	

CO	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						CO Change:	

VOC	**24-Month Period:** N/A – NEW FACILTY						
	Marine Uncontrolled Loading	NEW	N/A	N/A	N/A	21,840.28	21,840.28
	Natural Gas Generators (x2)	NEW	N/A	N/A	N/A	15.74	15.74
	Emergency Diesel Generator	NEW	N/A	N/A	N/A	1.06	1.06
	Platform B Cranes (x2)	NEW	N/A	N/A	N/A	0.97	0.97
	Firewater Pump Engine (Platform B)	NEW	N/A	N/A	N/A	0.21	0.21
	Primary Diesel Tank	NEW	N/A	N/A	N/A	0.01	0.01
	Surge Tank #1	NEW	N/A	N/A	N/A	3.73	3.73
	Firewater Pump Engine (Platform C)	NEW	N/A	N/A	N/A	0.21	0.21
	Total Fugitive Emissions	NEW	N/A	N/A	N/A	18.65	18.65
						21,880.87	**21,880.87**
						VOC Change:	**21,880.87**

CO_2e	**24-Month Period:** MM/DD/YYYY – MM/DD/YYYY						
						CO_2e Change:	

* Unaffected emissions units are not required to be listed individually. By choosing not to list unaffected emissions units, the applicant asserts that all emissions units not listed in Table 24.A will <u>not</u> be modified or experience an increase in actual annual emissions as part of the proposed project.

24.B. Creditable Contemporaneous Changes

Contemporaneous Period: MM/DD/YYYY – MM/DD/YYYY

		A	B	C	D	E	F
Emission Point ID	**Description**	**Date of Modification**	**Pre-Project Allowables (TPY)**	**Baseline Actual Emissions (over 24-month period)**	**24-Month Period**	**Post-Project Potential to Emit (TPY)**	**Change**
$PM_{2.5}$							
						$PM_{2.5}$ Change:	
PM_{10}							
						PM_{10} Change:	
SO_2							
						SO_2 Change:	
NO_X							
						NO_X Change:	

24.B. Creditable Contemporaneous Changes

CO							
						CO Change:	

VOC							
						VOC Change:	

CO_2e							
						CO_2e Change:	

For each source identified as “New” or “Modified” in Section 24.A, complete the following table for each pollutant that will trigger NSR. If LAER is not required per LAC 33:III.504.D.3, indicate such.

24.C. BACT/LAER Summary

Refer to Section 5 of the Prevention of Significant Deterioration Air Construction Permit Application Volume 1 for the BACT analysis.

Emission Point ID	Pollutant	BACT/LAER	Limitation	Averaging Period	Description of Control Technology/Work Practice Standard(s)

24.D. PSD Air Quality Analyses Summary

		A	B	C	D	E	F	G	H	I
Pollutant	Averaging Period	Preliminary Screening Concentration (μg/m^3)	Level of Significant Impact (μg/m^3)	Significant Monitoring Concentration (μg/m^3)	Background (μg/m^3)	Maximum Modeled Concentration (μg/m^3)	Modeled + Background Concentration (μg/m^3)	NAAQS (μg/m^3)	Modeled PSD Increment Consumption (μg/m^3)	Allowable Class II PSD Increment (μg/m^3)
PM$_{2.5}$	24-hour		-	-				35		9
	Annual		-	-				12		4
PM$_{10}$	24-hour		5	10				150		30
	Annual		1	-				-		17
SO$_2$	1-hour		7.8	-				195		-
	3-hour		25	-				1300		512
	24-hour		5	13				365		91
	Annual		1	-				80		20
NO$_X$	1-hour		7.5	-				189		-
	Annual		1	14				100		25
CO	1-hour		2000	-				40,000	-	-
	8-hour		500	575				10,000	-	-
Lead	3-month		-	0.1				1.5	-	-

24.E Nonattainment New Source Review Offsets [LAC 33:III.517.D.16, LAC 33:III.504.D.4 & 5] ☒ N/A

Complete this section only if the proposed project triggers Nonattainment New Source Review (NNSR).
This project triggers NNSR review for: ☐ **NO_X** ☐ **VOC** ☐ **SO_2**

NO_X:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

VOC:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

SO_2:

Is the applicant proposing to use internal offsets? ☐ **Yes** ☐ **No**

If not, identify the source of the offsets. **Company:** _____
Facility/Unit: _____
Permit No.: _____

Is an ERC Bank Application included with this application, or has an application already been submitted to LDEQ?
☐ **Yes** ☐ **No**

If the ERC application has already been submitted, give the date: _____

Identify the emissions units from which the offsets will be obtained (reference specific Emission Point ID numbers).

In order to expedite processing, please be sure the ERC Bank Application is completed properly. In the case of NO_X, the document should clearly differentiate between ozone season and non-ozone season actual emissions during the baseline period. Be sure to indicate if a portion of the reductions are no longer surplus (e.g., due to new or revised federal or state regulations, use in a netting analysis, etc.).

24.F. Economic Impact

Answer the following questions.

How many temporary jobs will be added as a result of this project? 1393

How many permanent jobs will be added as a result of this project? 28

24.G Notification of Federal Land Manager [LAC 33:III.504.E.1, LAC 33:III.509.P.1]

Complete this section only if the proposed project triggers NNSR or PSD.

a. Is the proposed facility or modification located within 100 kilometers of a Class I Area? ☐ **Yes** ☒ **No**

If Yes, determination of Q/d is not required; skip to the next question. If No, complete the Q/d equation below:

$$Q/d = \frac{PM_{10\,(NEI)} + SO_{2\,(NEI)} + NO_{X\,(NEI)} + H_2SO_{4\,(NEI)}}{\text{Class I km}}$$

where:

$PM_{10\,(NEI)}$ = net emissions increase of PM_{10}[1,2]

$SO_{2\,(NEI)}$ = net emissions increase of SO_2[1,2]

$NO_{X\,(NEI)}$ = net emissions increase of NO_X[1,2]

$H_2SO_{4\,(NEI)}$ = net emissions increase of H_2SO_4[1,2]

Class I km = distance to nearest Class I Area[3]

$$Q/d = \frac{\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_}{\_\_\_\_\_} = \_\_\_\_\_$$

Per Federal Land Manager guidance, Q values should reflect annual emissions (in tons per year, based on 24-hour maximum allowable emissions). If Q/d < 10, proceed to Section 25. If Q/d ≥ 10, complete the remainder of this Section.

b. Has the applicant provided a copy of the application to the Federal Land Manager? ☐ **Yes** ☒ **No**

c. Does the application contain modeling that demonstrates no adverse impact on Air Quality Related Values (AQRVs) in the Class I Area? ☐ **Yes** ☒ **No**

d. If Yes, indicate the model used: ☐ **VISCREEN** ☐ **PLUVUE II** ☐ **CALPUFF** ☐ **Other:**[4] __________

e. Has the Federal Land Manager concurred that the proposed project will not adversely impact any AQRVs?
☐ **Yes** ☒ **No** If Yes, please attach correspondence.

---

[1] If the net emissions increase of any pollutant is negative, enter "0."

[2] If the project did not trigger a netting analysis, use the project increase. In this case, the value will be less than the pollutant's significance level.

[3] In kilometers.

[4] Model must be approved by LDEQ and the Federal Land Manager.

25. Environmental Assessment Statement (EAS or "IT" Question Responses)

[La. R.S. 30:2018] ☒ **Yes** ☐ **No**

*** This section is required when applying for new Part 70 operating permits and/or major modifications. Any applications for these permit types that do not include answers to these questions will not be considered to be administratively complete. ***

For new Part 70 operating permits and/or major modifications, answers to these questions must be provided by the applicant to the local governmental authority and the designated public library at no additional costs to these entities. Consult instructions to determine what is considered to be a "local governmental authority" and a "designated public library." Indicate the name and address of the local governmental authority and the designated public library to which the answers to these questions were sent:

Name of Local Governing Authority			**Name of Designated Public Library**		
Street or P.O. Box			**Street or P.O. Box**		
City	**State**	**ZIP**	**City**	**State**	**ZIP**

Answer the following five questions on separate pages using full and complete answers. Include as many pages as necessary in order to provide full and complete answers. This information is required per Louisiana Revised Statutes 30:2018 (La. R.S. 30:2018).

Question 1: **Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?**

Yes, Blue Marlin Offshore Port, LLC (BMOP) will avoid adverse environmental effects to the maximum extent possible as described below.

As described in the Title V Application for this facility, all new source emissions of air pollutants will be in compliance with applicable Federal and State regulations. A detailed Best Available Control Technology (BACT) analysis has been conducted, and control technologies will be implemented for Facility operation. Details (including Potential to Emit [PTE] calculations, Prevention of Significant Deterioration [PSD] analysis, and air dispersion modeling) for air emission sources can be found within this application.

Question 2: **Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?**

The proposed project will provide the United States (U.S.) essential crude oil transportation and loading services for crude oil produced in the continental U.S. The proposed Project will enhance the country's global competitiveness, operational efficiency, and long-term economic viability.

Significant impacts to the environment are not expected due to the proposed Project. Additionally, as the part of the proposed project PSD permit application, BMOP has evaluated and proposed BACT (40 CFR 52 and LAC 33:III.509.J) limits for applicable emission units; thereby, further reducing any impacts to the environment.

Question 3: **Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits?**

There are no viable alternative projects identified that would offer more environmental protection. With the appropriate BACT implemented, this facility and project will be protective of the environment.

Question 4: **Are there alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?**

The DWP will be located approximately eighty two (82) statute miles from the nearest point on the Louisiana coastline (99 statute miles of offshore pipe). This location was specifically chosen to meet the purpose of the project and have the capability to fully load Very Large Crude Carriers (VLCCs) with minimal total impacts, as both the offshore pipeline and the offshore facility at WC 509 are existing. There are no identified alternative sites which would offer more protection to the environment.

Question 5: **Are there mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits?**

For the proposed Project, BACT controls will be implemented. The BACT control level cannot be less stringent than the controls required under any applicable federal New Source Performance Standard (NSPS) or National Emission Standard for Hazardous Air Pollutants (NESHAP). Furthermore, BMOP has completed a detailed evaluation of additional control technologies, and have selected the top performing feasible control as BACT. No other feasible control option offer more protection to the environment.

PART 70 OPERATING PERMIT APPLICATION COMPLETENESS CHECKLIST

Instructions: Complete this checklist and submit with the completed air permit application.

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
517.A Timely Submittal	Was a Copy of the Application Also Submitted to EPA?	X			
517.B.1,2 Certification	Does the Application include a Certification by a Responsible Official?	X			AAE – Section 10
517.B.3 Certification	Does the Application Include Certification by a Professional Engineer or their Designee:	X			AAE – Section 10
517.D.1 Identifying Information	Does the Application Include:				
	1. Company Name, Physical and Mailing Address of Facility?	X			AAE – Section 1, 2
	2. Map showing Location of the Facility?	X			Appendix A
	3. Owner and Operator Names and Agent?	X			AAE – Section 1
	4. Name and Telephone Number of Plant Manager or Contact?	X			AAE – Section 11
517.D.2 SIC Codes, Source Categories	Does the Application Include a Description of the Source's Processes and Products?	X			Introduction
	Does the Application Include the Source’s SIC Code?	X			AAE – Section 5
	Does the Application Include EPA Source Category of HAPs if applicable?			X	
517.D.3,6 EIQ Sheets	Has an EIQ Sheet been Completed for each Emission Point whether an Area or Point Source?	X			AAE – Section 23
517.D.4 Monitoring Devices	Does the Application Include Identification and Description of Compliance Monitoring Devices or Activities?	X			AAE – Section 22
517.D.5 Revisions and Modifications Only	For Revisions or Modifications, Does the Application include a Description of the Proposed Change and any Resulting Change in Emissions?			X	
517.D.7 General Information	Does the Application Include Information Regarding Fuels, Fuel Use, Raw Materials, Production Rates, and Operating Schedules as necessary to substantiate emission rates?	X			AAE Section 23 & Appendix B
517 D.8 Operating Limitations	Has Information Regarding any Limitations on Source Operation or any Applicable Work Practice Standards been Identified?	X			AAE Section 23
517.D.9 Calculations	Are Emission Calculations Provided?	X			Appendix B
517.D.10 Regulatory Review	Does the Application Include a Citation and Description of Applicable Louisiana and Federal Air Quality Requirements and Standards?	X			AAE – Section 22

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
517.D.11 Test Methods	Has a Description of or a Reference to Applicable Test Methods Used to Determine Compliance with Standards been Provided?			X	
517.D.12 Major Sources of TAPs	Does the Application include Information Regarding the Compliance History of Sources Owned or Operated by the Applicant (per LAC 33.III.5111)?			X	
517.D.13 Major Sources of TAPs	Does the Application include a Demonstration to show that the Source Meets all Applicable MACT and Ambient Air Standard Requirements?	X			See PSD Air Construction Permit Application Volume 2
517.D.14 PSD Sources Only	If Required by DEQ, Does the Application Include Information Regarding the Ambient Air Impact for Criteria Pollutants as Required for the Source Impact Analysis per LAC 33:III.509.K, L, and M?	X			See PSD Air Construction Permit Application Volume 2
517 D.15 PSD Sources Only	If Required by DEQ, Does the Application Include a Detailed Ambient Air Analysis?	X			See PSD Air Construction Permit Application Volume 2
517.D.16, 18	Has any Additional Information been Provided?	X			Introduction
517.D.17 Fees	Has the Fee Code been Identified?	X			AAE – Section 5
	Is the Applicable Fee Included with the Application?	X			See Cover Letter
517.E.1 Additional Part 70 Requirements	Does the Certification Statement Include a Description of the Compliance Status of Each Emission Point in the Source with All Applicable Requirements?	X			AAE – Section 10
517E.2 Additional Part 70 Requirements	Does the Certification Statement Include a Statement that the Source will continue to Comply with All Applicable Requirements with which the Source is in Compliance?	X			AAE – Section 10
517.E.3 Additional Part 70 Requirements	Does the Certification Statement Include a Statement that the Source will, on a timely basis, meet All Applicable Requirements that will Become Effective During the Permit Term?	X			AAE – Section 10
517.E.4 Additional Part 70 Requirements	Are there Applicable Requirements for which the Source is not in Compliance at the Time of Submittal?		X		
	Does the Application include a Compliance Plan Schedule?			X	
	Does the Schedule Include Milestone Dates for which Significant Actions will occur?			X	
	Does the Schedule Include Submittal Dates for Certified Progress Reports?			X	
517.E.5 Additional Part 70 Requirements Acid Rain	Is this Source Covered by the Federal Acid Rain Program?		X		

LAC 33:III.	Completeness Questions Relative to the Part 70 Permit Application	Yes	No	NA	Location Within the Permit Application
	Are the Requirements of LAC 33.III.517.E 1-4 included in the Acid Rain Portion of the Compliance Plan?			X	
517.E.6 Additional Part 70 Requirements	Have any Exemptions from any Applicable Requirements been Requested?	X			AAE – Section 22
	Is the List and explanations Provided?	X			AAE – Section 22
517.E.7 Additional Part 70 Requirements	Does the Application Include a Request for a Permit Shield?		X		
	Does the Request List those Federally Applicable Requirements for which the Shield is Requested along with the Corresponding Draft Permit Terms and conditions which are Proposed to Maintain Compliance?			X	
517.E.8 Additional Part 70 Requirements	Does the Application Identify and Reasonably Anticipated Alternative Operating Scenarios?			X	
	Does the Application include Sufficient Information to Develop permit Terms and Conditions for Each Scenario, Including Source Process and Emissions Data?			X	
517.F Confidentiality	Does the Application Include a Request for Non-Disclosure (Confidentiality)?	X			AAE – Section 3
525.B. Minor Permit Modifications	Does the Application Include a Listing of New Requirements Resulting for the Change?			X	
	Does the Application Include Certification by the Responsible Official that the Proposed Action Fits the Definition of a Minor Modification as per LAC 33:III.525.A.			X	
	Does the Certification also Request that Minor Modification Procedures be Used?			X	
	Does the Application, for Part 70 Sources, Include the Owner's Suggested Draft Permit and Completed Forms for the Permitting Authority to Use to Notify Affected States?			X	
La. R.S. 30:2018 – PSD/NNSR only	Has a copy of the answers to the questions posed in the Environmental Assessment Statement (Section 25) been sent to the local governing authority at no cost to the local governing authority?	X			
	Has a copy of the answers to the questions posed in the Environmental Assessment Statement (Section 25) been sent to the designated public library at no cost to the designated public library?	X			

APPENDIX C. DETAILED EMISSION CALCULATIONS

WC509 Potential Emissions Calculations

- WC509 Platform Summary
- Platform Natural Gas Generators
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform Diesel Generators
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform B Cranes
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Platform Firewater Pumps
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions
  - Greenhouse Gases Emissions
- Stationary Tank Emissions
  - Total VOC and Total HAP Losses
  - Individual HAP Losses
- Fugitive Emissions
- Loading Operations
  - Criteria Pollutant Emissions
  - Hazardous Air Pollutants Emissions

BMOP - Deepwater Port WC509 platform

WC509 Platform Summary

	NO_X (tpy)	CO (tpy)	VOC (tpy)	SO_2 (tpy)	PM Filterable (tpy)	PM_{10}[1] (tpy)	$PM_{2.5}$[1] (tpy)	H_2S (tpy)	H_2SO_4 (tpy)	HAPs (tpy)	CO_2e (tpy)
Marine Loading											
Crude Oil Loading	--	--	21,840	--	--	--	--	9.49	--	1,224	--
Platform A Sources											
Aviation Fuel Tank	--	--	5.12E-04	--	--	--	--	--	--	7.65E-05	--
Platform B Sources											
Natural Gas Generators (x2)	22.48	44.96	15.74	0.05	6.14E-03	0.80	0.80	--	2.34E-03	4.22	12,871
Emergency Diesel Generator	1.06	0.58	1.06	0.07	0.03	0.04	0.04	--	2.23E-03	1.11E-03	115.2
Platform B Cranes (x2)	2.05	11.97	0.97	1.48	0.10	0.21	0.21	--	0.05	0.06	2,383
Platform B Cranes Diesel Tank #1	--	--	1.93E-03	--	--	--	--	--	--	2.65E-04	--
Platform B Cranes Diesel Tank #2	--	--	1.93E-03	--	--	--	--	--	--	2.65E-04	--
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	0.01	--	7.22E-04	3.58E-04	37.22
Primary Diesel Tank	--	--	8.51E-03	--	--	--	--	--	--	1.17E-03	--
Surge Tank #1	--	--	3.73	--	--	--	--	--	--	0.07	--
Platform C Sources											
Firewater Pump Engine	0.21	0.19	0.21	0.02	0.01	0.01	0.01	--	7.22E-04	3.58E-04	37.22
Fugitive Sources											
Total Fugitive Emissions	--	--	18.65	--	--	--	--	4.89E-03	--	1.91	1,060
Total	26.02	57.88	21,881	1.64	0.16	1.07	1.07	9.50	0.05	1,230	16,503

[1] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emission

BMOP - Deepwater Port WC509 platform

Platform Natural Gas Generators

Engine Rating [1]	=	1,736	kW
	=	2,328	HP
Total Operating Time [1]	=	8,760	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1 engine at any one time	
Fuel Type [1]	=	Natural Gas, 4-Stroke Lean Burn	
Average Brake-Specific Fuel Consumption [2]	=	17,820	scf/hr
Average Higher Heating Value (HHV) [4]	=	1,020	Btu/scf
Average Heat Input Rate	=	18.18	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
$PM_{10,\text{ Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
$PM_{2.5,\text{ Filterable}}$	AP-42	[4]	7.71E-05	lb/MMBtu	1.40E-03	6.14E-03
PM $_{\text{Condensable}}$	AP-42	[4]	9.91E-03	lb/MMBtu	0.18	0.79
NO_x	EPA	[3]	1.00	g/HP-hr	5.13	22.48
SO_2	AP-42	[4]	5.88E-04	lb/MMBtu	0.01	0.05
CO	EPA	[3]	2.00	g/HP-hr	10.26	44.96
VOC	EPA	[3]	0.70	g/HP-hr	3.59	15.74
H_2SO_4	Conversion	[5]	5.00	% of SO_2	5.34E-04	2.34E-03

[1] Based on current project design specifications, provided by BMOP. The BMOP Platform complex will operate 2 engines, however, only one will be operating at any given time.

[2] Per Manufacturer Specification sheet for a Caterpillar G3516C (based on 100% load).

[3] Per Table 1 of NSPS Subpart JJJJ

[4] Emission factors are based on AP-42 Chapter 3, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines (July 2000). Assume filterable PM = PM_{10} = $PM_{2.5}$.

[5] Assumes 5% of SO_2 emissions are converted to H_2SO_4.

BMOP - Deepwater Port WC509 platform

Platform Natural Gas Generators

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
Acenaphthene	AP-42	[6]	1.25E-06	lb/MMBtu	2.27E-05	9.95E-05
Acenaphthylene	AP-42	[6]	5.53E-06	lb/MMBtu	1.01E-04	4.40E-04
Acetaldehyde	AP-42	[6]	8.36E-03	lb/MMBtu	0.15	0.67
Acrolein	AP-42	[6]	5.14E-03	lb/MMBtu	0.09	0.41
Benzene	AP-42	[6]	4.40E-04	lb/MMBtu	8.00E-03	0.04
Benzo(b)fluoranthene	AP-42	[6]	1.66E-07	lb/MMBtu	3.02E-06	1.32E-05
Benzo(e)pyrene	AP-42	[6]	4.15E-07	lb/MMBtu	7.54E-06	3.30E-05
Beno(g,h,i)perylene	AP-42	[6]	4.14E-07	lb/MMBtu	7.53E-06	3.30E-05
Biphenyl	AP-42	[6]	2.12E-04	lb/MMBtu	3.85E-03	0.02
Butadiene (1,3-)	AP-42	[6]	2.67E-04	lb/MMBtu	4.85E-03	0.02
Carbon Tetrachloride	AP-42	[6]	3.67E-05	lb/MMBtu	6.67E-04	2.92E-03
Chlorobenzene	AP-42	[6]	3.04E-05	lb/MMBtu	5.53E-04	2.42E-03
Chloroform	AP-42	[6]	2.85E-05	lb/MMBtu	5.18E-04	2.27E-03
Chrysene	AP-42	[6]	6.93E-07	lb/MMBtu	1.26E-05	5.52E-05
Dichloropropene (1,3-)	AP-42	[6]	2.64E-05	lb/MMBtu	4.80E-04	2.10E-03
Ethylbenzene	AP-42	[6]	3.97E-05	lb/MMBtu	7.22E-04	3.16E-03
Ethylene Dibromide	AP-42	[6]	4.43E-05	lb/MMBtu	8.05E-04	3.53E-03
Fluoranthene	AP-42	[6]	1.11E-06	lb/MMBtu	2.02E-05	8.84E-05
Fluorene	AP-42	[6]	5.67E-06	lb/MMBtu	1.03E-04	4.51E-04
Formaldehyde	ZZZZ	[7]	14	ppmvd	0.61	2.67
Methanol	AP-42	[6]	2.50E-03	lb/MMBtu	0.05	0.20
Methylene Chloride	AP-42	[6]	2.00E-05	lb/MMBtu	3.64E-04	1.59E-03
Methylnaphthalene (2-)	AP-42	[6]	3.32E-05	lb/MMBtu	6.03E-04	2.64E-03
n-Hexane	AP-42	[6]	1.11E-03	lb/MMBtu	0.02	0.09
Naphthalene	AP-42	[6]	7.44E-05	lb/MMBtu	1.35E-03	5.92E-03
PAH	AP-42	[6]	2.69E-05	lb/MMBtu	4.89E-04	2.14E-03
Phenanthrene	AP-42	[6]	1.04E-05	lb/MMBtu	1.89E-04	8.28E-04
Phenol	AP-42	[6]	2.40E-05	lb/MMBtu	4.36E-04	1.91E-03
Pyrene	AP-42	[6]	1.36E-06	lb/MMBtu	2.47E-05	1.08E-04
Styrene	AP-42	[6]	2.36E-05	lb/MMBtu	4.29E-04	1.88E-03
Tetrachloroethane	AP-42	[6]	2.48E-06	lb/MMBtu	4.51E-05	1.97E-04
Toluene	AP-42	[6]	4.08E-04	lb/MMBtu	7.42E-03	0.03
Tetrachloroethane (1,1,2,2-)	AP-42	[6]	4.00E-05	lb/MMBtu	7.27E-04	3.18E-03
Trichloroethane (1,1,2-)	AP-42	[6]	3.18E-05	lb/MMBtu	5.78E-04	2.53E-03
Trimethylpentane (2,2,4-)	AP-42	[6]	2.50E-04	lb/MMBtu	4.54E-03	0.02
Vinyl Chloride	AP-42	[6]	1.49E-05	lb/MMBtu	2.71E-04	1.19E-03
Xylene	AP-42	[6]	1.84E-04	lb/MMBtu	3.34E-03	0.01
Total VOC HAPs					**0.96**	**4.22**

[6] Emission factors are based on AP-42 Chapter 3, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines (July 2000).

[7] Per Table 2a of 40 CFR 63 Subpart ZZZZ, subject 4SLB engines may comply with 14 ppmvd HCHO at 15% O2.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
CO_2	Manuf. Spec.	[8]	617	g/kW-hr	2,361	10,343
CH_4	Manuf. Spec.	[8]	6.02	g/kW-hr	23.04	100.9
N_2O	EPA	[9]	1.00E-04	kg/MMBtu	4.01E-03	0.02
CO_2e	EPA	[10]	--	--	**2,939**	**12,871**

[8] Per Manufacturer Specification sheet for a Caterpillar G3516C (based on 100% load).

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for natural gas was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

BMOP - Deepwater Port WC509 platform

Platform Diesel Generators

Engine Rating [1]	=	1,500	kW
	=	2,012	HP
Total Operating Time [1]	=	100	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	14.08	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
$PM_{10,\ \text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
$PM_{2.5,\ \text{Filterable}}$	EPA	[3]	0.20	g/kW-hr	0.66	0.03
PM $_{\text{Condensable}}$	AP-42	[2]	5.39E-05	lb/HP-hr	0.11	5.42E-03
NO_x	EPA	[3]	6.40	g/kW-hr	21.17	1.06
SO_2	Fuel S Content	[4]	7.11E-04	lb/HP-hr	1.43	0.07
CO	EPA	[3]	3.50	g/kW-hr	11.58	0.58
VOC	EPA	[3]	6.40	g/kW-hr	21.17	1.06
H_2SO_4	Fuel S Content	[4]	2.22E-05	lb/HP-hr	0.04	2.23E-03

[1] Based on current project design specifications, provided by BMOP.

[2] Emission factors are based on AP-42 Chapter 3, Tables 3.4-1 and 2, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996). An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr.

[3] Per 40 CFR 60.4205(b) and Table 1 of 40 CFR 89.112. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit. Conservatively assume that filterable $PM=PM_{10}=PM_{2.5}$.

[4] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

[5] Per footnote f of AP-42 Chapter 3, Table 3.4-1, non methane VOC emission factor has calculated as 91% of TOC emission factor.

BMOP - Deepwater Port WC509 platform

Platform Diesel Generators

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42	[6], [7]	2.52E-05	lb/MMBtu	3.55E-04	1.77E-05
Acrolein	AP-42	[6], [7]	7.88E-06	lb/MMBtu	1.11E-04	5.55E-06
Benzene	AP-42	[6], [7]	7.76E-04	lb/MMBtu	1.09E-02	5.46E-04
Formaldehyde	AP-42	[6], [7]	7.89E-05	lb/MMBtu	1.11E-03	5.56E-05
Toluene	AP-42	[6], [7]	2.81E-04	lb/MMBtu	3.96E-03	1.98E-04
Xylenes	AP-42	[6], [7]	1.93E-04	lb/MMBtu	2.72E-03	1.36E-04
Total PAH	AP-42	[6], [7]	2.12E-04	lb/MMBtu	2.99E-03	1.49E-04
Total VOC HAPs					**2.22E-02**	**1.11E-03**

[6] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[7] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
CO_2	EPA	[8], [11]	73.96	kg/MMBtu	2,296	114.8
CH_4	EPA	[9], [11]	3.00E-03	kg/MMBtu	9.31E-02	0.00
N_2O	EPA	[9], [11]	6.00E-04	kg/MMBtu	1.86E-02	0.00
CO_2e	EPA	[10]	--	--	**2,304**	**115.2**

[8] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[11] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform

Platform B Cranes

Engine Rating [1]	=	354	kW
	=	475	HP
Total Operating Time [1]	=	4,380	hrs/yr
Operating load [1]	=	100%	
Total number Gen Sets [1]	=	2	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	3.33	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
			Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM $_{\text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
$PM_{10,\ \text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
$PM_{2.5,\ \text{Filterable}}$	EPA	[3], [4]	3.00E-02	g/kW-hr	0.02	0.05	0.05	0.10
PM $_{\text{Condensable}}$	AP-42	[5]	5.39E-05	lb/HP-hr	2.56E-02	5.61E-02	0.05	0.11
NO_x	EPA	[3]	0.60	g/kW-hr	0.47	1.03	0.94	2.05
SO_2	Fuel S Content	[6]	7.11E-04	lb/HP-hr	0.34	0.74	0.68	1.48
CO	EPA	[3]	3.5	g/kW-hr	2.73	5.99	5.47	11.97
VOC	EPA	[3]	0.285	g/kW-hr	0.22	0.49	0.45	0.97
H_2SO_4	Fuel S Content	[6]	2.22E-05	lb/HP-hr	1.06E-02	2.31E-02	2.11E-02	4.62E-02

[1] Based on current project design specifications, provided by BMOP.

[2] Based on AP-42 Chapter 3, Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines (October 1996).

[3] Per 40 CFR 60.4204(b) and Table 1 of 40 CFR 1039.101. Per 40 CFR 1039.101(e), emissions of PM, NO_X, and VOC are multiplied by the appropriate NTE multiplier.

[4] Conservatively assumed PM_{10}=$PM_{2.5}$.

[5] Conservatively based on AP-42 Chapter 3, Table 3.4-1, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996).

[6] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

BMOP - Deepwater Port WC509 platform

Platform B Cranes

Hazardous Air Pollutants

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
		Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42 [7], [8]	7.67E-04	lb/MMBtu	2.55E-03	5.59E-03	5.10E-03	1.12E-02
Acrolein	AP-42 [7], [8]	9.25E-05	lb/MMBtu	3.08E-04	6.74E-04	6.15E-04	1.35E-03
Benzene	AP-42 [7], [8]	9.33E-04	lb/MMBtu	3.10E-03	6.79E-03	6.20E-03	1.36E-02
1,3-Butadiene	AP-42 [7], [8]	3.91E-05	lb/MMBtu	1.30E-04	2.85E-04	2.60E-04	5.69E-04
Formaldehyde	AP-42 [7], [8]	1.18E-03	lb/MMBtu	3.92E-03	8.59E-03	7.85E-03	1.72E-02
Toluene	AP-42 [7], [8]	4.09E-04	lb/MMBtu	1.36E-03	2.98E-03	2.72E-03	5.96E-03
Xylenes	AP-42 [7], [8]	2.85E-04	lb/MMBtu	9.48E-04	2.08E-03	1.90E-03	4.15E-03
Total PAH	AP-42 [7], [8]	1.68E-04	lb/MMBtu	5.59E-04	1.22E-03	1.12E-03	2.45E-03
Total VOC HAPs				**1.29E-02**	**2.82E-02**	**2.58E-02**	**5.64E-02**

[7] Emission factors based on AP-42, Chapter 3, Table 3.3-2, Speciated Organic Compound Emission Factors for Uncontrolled Stationary Diesel Engines (October 1996).

[8] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis	Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
		Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
CO_2	EPA [9], [12]	73.96	kg/MMBtu	542.2	1,187.3	1,084.3	2,375
CH_4	EPA [10], [12]	3.00E-03	kg/MMBtu	2.20E-02	4.82E-02	4.40E-02	9.63E-02
N_2O	EPA [10], [12]	6.00E-04	kg/MMBtu	4.40E-03	9.63E-03	8.80E-03	1.93E-02
CO_2e	EPA [11]	--	--	**544.0**	**1,191.4**	**1,088.0**	**2,383**

[9] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[10] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[11] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[12] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform

Platform Firewater Pumps

Engine Rating [1]	=	485	kW
	=	650	HP
Total Operating Time [1]	=	100	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	2	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb
Average Heat Input Rate	=	4.55	MMBtu/hr

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine (lb/hr)	Annual Emissions from 1 Engine (tons/yr)	Hourly Emissions from All Engines (lb/hr)	Annual Emissions from All Engines (tons/yr)
			Value	Units				
PM $_{\text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
$PM_{10, \text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
$PM_{2.5, \text{Filterable}}$	EPA	[3], [4]	0.15	g/HP-hr	0.21	0.01	0.43	0.02
PM $_{\text{Condensable}}$	AP-42	[5]	5.39E-05	lb/HP-hr	3.50E-02	1.75E-03	0.07	3.50E-03
NO_x	EPA	[3]	3.00	g/HP-hr	4.30	0.21	8.60	0.43
SO_2	Fuel S Content	[6]	7.11E-04	lb/HP-hr	0.46	0.02	0.92	0.05
CO	EPA	[3]	2.60	g/HP-hr	3.73	0.19	7.45	0.37
VOC	EPA	[3]	3.00	g/HP-hr	4.30	0.21	8.60	0.43
H_2SO_4	Fuel S Content	[6]	2.22E-05	lb/HP-hr	1.44E-02	7.22E-04	2.89E-02	1.44E-03

[1] Based on current project design specifications, provided by BMOP.

[2] Based on AP-42 Chapter 3, Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines (October 1996).

[3] Per 40 CFR 60.4205(c) and Table 4 of NSPS Subpart IIII. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit.

[4] Conservatively assumed $PM_{10}=PM_{2.5}$.

[5] Conservatively based on AP-42 Chapter 3, Table 3.4-1, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996).

[6] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Therefore, emissions have been calculated based on a maximum sulfur content of 1000 ppm in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April 2003.

BMOP - Deepwater Port WC509 platform

Platform Firewater Pumps

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
			Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42	[7], [8]	2.52E-05	lb/MMBtu	1.15E-04	5.73E-06	2.29E-04	1.15E-05
Acrolein	AP-42	[7], [8]	7.88E-06	lb/MMBtu	3.59E-05	1.79E-06	7.17E-05	3.59E-06
Benzene	AP-42	[7], [8]	7.76E-04	lb/MMBtu	3.53E-03	1.77E-04	7.06E-03	3.53E-04
Formaldehyde	AP-42	[7], [8]	7.89E-05	lb/MMBtu	3.59E-04	1.79E-05	7.18E-04	3.59E-05
Toluene	AP-42	[7], [8]	2.81E-04	lb/MMBtu	1.28E-03	6.39E-05	2.56E-03	1.28E-04
Xylenes	AP-42	[7], [8]	1.93E-04	lb/MMBtu	8.78E-04	4.39E-05	1.76E-03	8.78E-05
Total PAH	AP-42	[7], [8]	2.12E-04	lb/MMBtu	9.65E-04	4.82E-05	1.93E-03	9.65E-05
Total VOC HAPs					**7.16E-03**	**3.58E-04**	**1.43E-02**	**7.16E-04**

[7] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[8] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions from 1 Engine	Annual Emissions from 1 Engine	Hourly Emissions from All Engines	Annual Emissions from All Engines
			Value	Units	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
CO_2	EPA	[9], [12]	73.96	kg/MMBtu	741.9	37.09	1,483.8	74.19
CH_4	EPA	[10], [12]	3.00E-03	kg/MMBtu	3.01E-02	1.50E-03	6.02E-02	3.01E-03
N_2O	EPA	[10], [12]	6.00E-04	kg/MMBtu	6.02E-03	3.01E-04	1.20E-02	6.02E-04
CO_2e	EPA	[11]	--	--	**744.4**	**37.22**	**1,488.88**	**74.44**

[9] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[10] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[11] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98.

[12] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

BMOP - Deepwater Port WC509 platform
Stationary Tank Emissions - Total VOC and Total HAP Losses

Platform	Tank ID	Roof Type	Standing Losses (tpy)	Working Losses (tpy)	Total VOC Losses (tpy)	Total HAP Losses (tpy)
WC509	Aviation Fuel Storage[1]	Horizontal Tank	2.90E-04	2.22E-04	5.12E-04	7.65E-05
	Crane Diesel Tank No. 1[2]	FRT (no floating roof)	4.14E-04	1.52E-03	1.93E-03	2.65E-04
	Crane Diesel Tank No. 2[2]	FRT (no floating roof)	4.14E-04	1.52E-03	1.93E-03	2.65E-04
	Primary Diesel Storage Tank[2]	Horizontal Tank	2.23E-03	6.28E-03	0.01	1.17E-03
	Surge Tank	Horizontal Tank	3.57	0.17	3.73	0.07
				Totals:	**3.74**	**0.07**

[1] TankESP default Jet Kerosene is used as a product for this tank.

[2] TankESP default Diesel stock is used as product for this tank.

BMOP - Deepwater Port WC509 platform
Stationary Tank Emissions - Individual HAP Losses

Platform	Tank ID	HAP Emissions (lb/yr)										
		Benzo(g,h,i)perylene	Biphenyl	Cumene	Cyclohexane	Ethylcyclohexane	Hexanol (1)	Neopentane {dimethylpropane (2,2)}	Pentane (n-)	Toluene diisocyanate	Trimethylbenzene (1,3,5)	Xylene (m-)
WC509	Aviation Fuel Storage[1]	0.0069	2.41E-16	-	-	0.0207	0.0139	3.31E-04	3.58E-14	0.0670	-	0.0442
	Crane Diesel Tank No. 1[2]	0.0077	2.95E-15	-	-	0.0118	0.0016	1.74E-03	6.41E-13	0.0898	0.1876	0.2303
	Crane Diesel Tank No. 2[2]	0.0077	2.95E-15	-	-	0.0118	0.0016	1.74E-03	6.41E-13	0.0898	0.1876	0.2303
	Primary Diesel Storage Tank[2]	0.0339	1.33E-14	-	-	0.0521	0.0068	7.69E-03	2.88E-12	0.3949	0.8273	1.0140
	Surge Tank	3.32E+01	9.34E-15	0.25	39.81	2.13	35.46	0.01	9.94E-12	16.28	0.37	6.53
		33.28	**2.87E-14**			**2.23**	**35.48**	**1.66E-02**	**1.41E-11**	**16.92**	**1.57**	**8.05**

[1] TankESP default Jet Kerosene is used as a product for this tank.

[2] TankESP default Diesel stock is used as product for this tank.

BMOP - Deepwater Port WC509 platform
Fugitive Emissions

					Equipment Counts														
Source	Contents	Representative Contents	Platform	Service	Valves	Flanges/Connectors	Pumps	Vapor/Gas Relief Valves	Compressors	Process Drains	Sampling Connections	Total VOC[1] (lb/hr)	Total VOC[2] (tpy)	Total HAP[3] (lb/hr)	Total HAP[2] (tpy)	Total H_2S[4] (lb/hr)	Total H_2S[2,4] (tpy)	Total CO_2e[5] (lb/hr)	Total CO_2e[2] (tpy)
Gas Inlet Scrubber No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 3	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Gas Inlet Scrubber No. 4	Natural Gas	Natural Gas	509B	Gas/Vapor	21	22	0	2	0	4	0	0.07	0.30	6.74E-03	0.03	0	0	17.51	76.68
Condensate Pump No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 3	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Condensate Pump No. 4	Natural Gas	Natural Gas	509B	Gas/Vapor	20	15	1	1	0	2	0	0.05	0.22	4.86E-03	0.02	0	0	12.62	55.28
Pig Launcher (Gas Export)	Natural Gas	Natural Gas	509A	Gas/Vapor	63	126	0	0	0	8	8	0.13	0.58	0.01	0.06	0	0	33.84	148.21
Pig Receiver (Oil Import)	Crude Oil	Crude Oil	509B	Light Liquid	9	17	0	0	0	4	0	0.10	0.45	5.82E-03	0.03	1.34E-03	1.98E-04	0	0
Oil Meter Skid	Crude oil	Crude Oil	509B	Light Liquid	52	105	0	0	0	6	1	0.57	2.50	0.03	0.14	7.39E-03	1.09E-03	0	0
Meter Prover Skid	Crude Oil	Crude Oil	509B	Light Liquid	8	16	0	0	0	1	0	0.08	0.36	4.65E-03	0.02	1.07E-03	1.58E-04	0	0
Pig Launcher No. 1 (Export to VLCC)	Crude Oil	Crude Oil	509B	Light Liquid	18	34	0	0	0	8	0	0.21	0.91	0.01	0.05	2.69E-03	3.95E-04	0	0
Pig Launcher No. 2 (Export to VLCC)	Crude Oil	Crude Oil	509B	Light Liquid	18	34	0	0	0	8	0	0.21	0.91	0.01	0.05	2.69E-03	3.95E-04	0	0
CALM Buoy #1	Crude Oil	Crude Oil	--	Light Liquid	20	50	0	0	0	0	0	0.20	0.89	0.01	0.05	2.63E-03	3.87E-04	0	0
CALM Buoy #2	Crude Oil	Crude Oil	--	Light Liquid	20	50	0	0	0	0	0	0.20	0.89	0.01	0.05	2.63E-03	3.87E-04	0	0
Surge Relief Valve Skid	Crude Oil	Crude Oil	509B	Light Liquid	20	18	0	0	0	2	0	0.19	0.85	0.01	0.05	2.52E-03	3.71E-04	0	0
Surge Tank	Crude Oil	Crude Oil	509B	Light Liquid	12	22	2	0	0	1	0	0.21	0.92	0.01	0.05	2.71E-03	3.99E-04	0	0
Surge Tank Pump No. 1	Crude Oil	Crude Oil	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	2.43E-03	0.01	5.61E-04	8.26E-05	0	0
Surge Tank Pump No. 2	Crude Oil	Crude Oil	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	2.43E-03	0.01	5.61E-04	8.26E-05	0	0
Sump System No. 1	Crude Oil	Crude Oil	509B	Light Liquid	15	32	2	0	0	3	0	0.25	1.09	0.01	0.06	3.22E-03	4.74E-04	0	0
Sump System No. 2	Crude Oil	Crude Oil	509C	Light Liquid	15	32	2	0	0	3	0	0.25	1.09	0.01	0.06	3.22E-03	4.74E-04	0	0
Firewater Pump No. 1	Diesel Fuel	Diesel Fuel	509B	Light Liquid	5	6	0	0	0	1	0	0.05	0.22	7.04E-03	0.03	0	0	0	0
Firewater Pump No. 2	Diesel Fuel	Diesel Fuel	509C	Light Liquid	5	6	0	0	0	1	0	0.05	0.22	7.04E-03	0.03	0	0	0	0
Air Compressor No. 1	Lubricating Oil	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Air Compressor No. 2	Lubricating Oil	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Platform Crane No. 1	Diesel Fuel	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Platform Crane No. 2	Diesel Fuel	Diesel Fuel	509B	Light Liquid	4	8	0	0	0	1	0	0.04	0.19	5.96E-03	0.03	0	0	0	0
Diesel Transfer Skid	Diesel Fuel	Diesel Fuel	509B	Light Liquid	18	30	2	0	0	1	0	0.27	1.17	0.04	0.16	0	0	0	0
Gas Generator No. 1	Natural Gas	Natural Gas	509B	Gas/Vapor	10	11	0	0	0	2	0	0.01	0.07	1.47E-03	6.44E-03	0	0	3.82	16.72
Gas Generator No. 2	Natural Gas	Natural Gas	509B	Gas/Vapor	10	11	0	0	0	2	0	0.01	0.07	1.47E-03	6.44E-03	0	0	3.82	16.72
Emergency Diesel Generator	Diesel Fuel	Diesel Fuel	509B	Gas/Vapor	5	6	0	0	0	1	0	0.09	0.41	0.01	0.06	0	0	0	0
Knockout System	Natural Gas	Natural Gas	509B	Gas/Vapor	30	40	0	2	0	2	0	0.08	0.36	8.20E-03	0.04	0	0	21.30	93.30
Fuel Gas Skid	Natural Gas	Natural Gas	509B	Gas/Vapor	68	81	0	6	0	13	5	0.23	1.00	0.02	0.10	0	0	58.66	256.92
Aviation Refueling	Aviation Fuel	Aviation Fuel	509A	Light Liquid	6	20	1	0	0	1	0	0.11	0.49	0.11	0.49	0	0	0	0
Total												4.26	18.65	0.44	1.91	0.03	4.89E-03	241.95	1059.75

[1] Emission factors based on EPA's Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017
https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf

[2] Based on continous operation (e.g. 8,760 hours per year).

[3] HAP emissions are based on the speciation of:
- Natural Gas Composition and Properties based on an April 13, 2020 sample at WC509.
- Diesel fuel HAP content consistent with tank emissions speciation.
- Crude Oil speciation per the maximum mass %, vapor values calculated for crude oil loading emissions.

[4] H2S emissions are calculated based on the mass balance and liquid H2S parition factors from the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93.
Short-term and annual H2S values are based on the values used to calculate crude oil loading emissions.

[5] CO2 and CH4 speciation of natural gas based on an April 13, 2020 sample at WC509.
CH4 and CO2 CO2e, weighted according to their global warming potential (GWP).
The GWP was obtained from table A-1 to Subpart A of Part 98.

BMOP - Deepwater Port WC509 platform

Loading Operations

Maximum Hourly Loading Rate [1]	=	80,000	bbl/hr
	=	3,360	1,000 gal/hr
Maximum Annual Loading Rate [1]	=	700,800,000	bbl/yr
	=	29,433,600	1,000 gal/yr

Crude Oil Loading Specifications		Maximum	Annual	
Arrival Emission Factor [2]	=	0.86	0.86	
Loading Temperature [1]	=	550	532	°R
Vapor Molecular Weight [1]	=	50	50	lb/lbmol
Crude Oil Liquid Molecular Weight [1]	=	207	207	lb/lbmol
True Vapor Pressure [1]	=	10.99	9.00	psia
Liquid H_2S Partition [3]	=	25	21	
H2S Molecular Weight	=	34.1	34.1	lb/lbmol

Criteria Pollutants

Pollutant	Emission Factor Basis		Hourly Emission Factor		Annual Emission Factor		Hourly Loading Emission	Annual Loading Emission
			Value	Units	Value	Units	(lb/hr)	(tons/yr)
VOC	AP-42	[2]	1.61	lb/1,000 gal	1.48	lb/1,000 gal	5,422	21,840
H_2S	Site Specific	[3], [4]	125	ppmw	5	ppmw	70.15	9.49

[1] Based on current project design specifications, provided by BMOP. Molecular weight referenced from AP-42, Chapter 7, Table 7.1-2.

[2] Per AP-42, Table 5.2-3 for crude oil loading into ships (uncleaned). Total loading loss based on AP-42, Section 5.2 Equations 2 and 3 (06/08).

[3] Mass balance based and liquid H_2S partion factors from the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93. Short-term H2S concentration from Nederland permit basis.

[4] Annual mass H2S emissions calculated from a conservative assumption of 5 ppmw. The average of all samples from Nederland (>3000 samples) is 1.31 ppmw.

BMOP - Deepwater Port WC509 platform

Loading Operations

Hazardous Air Pollutants

Crude Oil HAP Speciation (%)[5]			99% UPL[6]	99% UPL[7]	Nederland Basis[8]	Maximum HAP[9]	Hourly Emissions[10]	Annual Emissions
HAP	**Mass %, liquid**	**Mass %, vapor**	**Mass %, liquid**	**Mass %, vapor**	**Mass %, vapor**	**Mass %, vapor**	**lb/hr**	**tpy**
Hexane	2.07%	3.11%	3.09%	4.09%	3.38%	4.09%	221.8	893.2
Benzene	0.25%	0.19%	0.46%	0.34%	0.80%	0.80%	43.40	174.8
Toluene	0.69%	0.20%	1.10%	0.29%	0.36%	0.36%	19.27	77.61
Ethylbenzene	0.16%	0.01%	0.29%	0.02%	0.05%	0.05%	2.69	10.85
1,2,4-Trimethylbenzene	0.44%	0.007%	0.76%	0.01%		0.01%	0.58	2.33
1,3-dimethylbenzene	0.43%	0.04%	0.79%	0.05%		0.05%	2.58	10.41
1,4-dimethylbenzene	0.31%	0.03%	0.57%	0.03%		0.03%	1.80	7.25
1,2-dimethylbenzene (Xylene)	0.21%	0.01%	0.37%	0.02%	0.21%	0.21%	11.26	45.36
i-propylbenzene (Cumene)	0.04%	0.002%	0.08%	0.003%	0.006%	0.01%	0.32	1.28
Biphenyl[6]					0.00002%	0.00002%	0.001	0.004
Cresols[6]					0.0007%	0.001%	0.04	0.16
Naphthalene[6]					0.0006%	0.001%	0.03	0.14
Phenol[6]					0.001%	0.001%	0.08	0.33
Total HAP	**4.59%**	**3.60%**	**7.50%**	**4.86%**	**4.80%**	**5.60%**	**303.8**	**1,224**

[5] Maximum mass % in liquid of individual HAP from 13 samples of various crude types taken at Nederland from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.
Vapor weight percent calculated assuming annual average temperature.

[6] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in liquid, based on the results of the 13 samples from Nederland, by individual HAP.

[7] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in vapor, based on the calculated vapor speciation using results of the 13 samples from Nederland, by individual HAP.

[8] Speciated VOC components, vapor weight %, from the permit basis for the Nederland Terminal, which references Table 3-1 of API Publication 1673 (May 1998), and factors obtained from Mr. James Durham, EPA Office of Air Quality Planning and Standards.

[9] The maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP.

[10] Calculated as a percent of VOC emissions, as the crude samples demonstrated >99.9% is VOC.
Note that the "Total HAP" is the sum of all max individual HAP from the 13 samples.

APPENDIX C-6

112G APPLICATION (PUBLIC)

Note: Full version filed as privileged and confidential

ENERGY
TRANSFER

September 28, 2020

Ms. Melanie Magee
Environmental Engineer
Air Permits Section (APRE)
U.S. Environmental Protection Agency, Region 6
Mail Code: ARPE
1201 Elm Street, Suite 500
Dallas, TX 75201
magee.melanie@epa.gov

RE: Case-By-Case MACT Application for Blue Marlin Offshore Port LLC

Dear Ms. Magee:

Blue Marlin Offshore Port (BMOP) LLC (Applicant) is providing U.S. Environmental Protection Agency (EPA) Region 6 the enclosed Case-by-Case Maximum Achievable Control Technology (MACT) application. BMOP is proposing to develop the BMOP Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, BMOP will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block 509 (WC 509). At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year.

Per 40 CFR §63.40(b), the use of CALM-buoys in exposed waters to load crude oil into VLCCs (and other crude oil carriers) for export to the global market is subject to Subpart B of Part 63.

> *The requirements of §§ 63.40 through 63.44 of this subpart apply to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants after the effective date of section 112(g)(2)(B) (as defined in § 63.41) and the effective date of a title V permit program in the State or local jurisdiction in which the major source is (or would be) located unless the major source in question has been specifically regulated or exempted from regulation under a standard issued pursuant to section 112(d), section 112(h), or section 112(j) and incorporated in another subpart of part 63, or the owner or operator of such major source has received all necessary air quality permits for such construction or reconstruction project before the effective date of section 112(g)(2)(B).*

BMOP is proposing to "construct a major source" per 40 CFR §63.41. Since the proposed marine loading activity at the DWP is not regulated under another subpart of Part 63, a case-by-case

MACT application has been prepared and is being submitted to the EPA Region 6 for the DWP under the CAA Sections 112(g) and 112(j).

BMOP appreciates the EPA's review of this case-by-case MACT application. If you have any questions about this application, please contact Weston Threeton, P.E., PMP, at (713) 989-7733 or email at Weston.threeton@energytransfer.com.

Sincerely,

Gregory Mcilwain
SVP – Operations
Energy Transfer Partners, LLC

Enclosure

CASE-BY-CASE MACT APPLICATION
Blue Marlin Offshore Port LLC

Blue Marlin Deep Water Port Project

Prepared By:

TRINITY CONSULTANTS
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Metairie, LA
70001
(504) 828-5845

September 2020

Project 191001.0117

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1. EXECUTIVE SUMMARY

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM) to provide United States (U.S.) crude oil loading services onto very large crude carriers (VLCCs), and other crude oil carriers, for export to the global market.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. To accomplish this purpose, the Applicant will repurpose an existing subsea pipeline within the Stingray Pipeline System to transport crude oil to the proposed deep water port (DWP). This DWP will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Block 509 (WC 509). The DWP site will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet.[1] At the DWP location, VLCCs, or other crude oil carriers, will moor at one of two Catenary Anchor Leg Mooring (CALM) Buoys, a type of Single Point Mooring (SPM) buoy system. Floating crude oil hoses will be connected to the buoy to support crude oil loading. Up to 365 VLCCs, or other crude oil carriers, may be loaded per year. There is no offloading at the port, only loading will be happening. Crude oils that will be exported range from light to heavy grade crude and will be sent to the DWP from the existing Nederland Terminal.

The proposed project will require a DWP license in accordance with the Deep Water Port Act (DWPA). The Environmental Protection Agency (EPA) is identified as a cooperating agency in the review of a DWP license, in accordance with 33 CFR §148.3(d). The DWPA also requires evaluation of the DWP in accordance with the Clean Air Act (CAA). The two CALM Buoys for loading VLCCs (or other crude oil carriers) at the proposed DWP will be a major source of hazardous air pollutant (HAP) emissions.[2] This application presents a review of National Emission Standards for Hazardous Air Pollutants (NESHAP) applicability to the proposed Project. Through NESHAP regulations codified at 40 CFR Part 63, EPA defines the Maximum Achievable Control Technology (MACT) standards for HAP emissions from stationary sources. Following a detailed evaluation of MACT applicability, in particular for 40 CFR 63 Subpart Y, BMOP has confirmed that a case-by-case MACT evaluation is required for the Project, per 40 CFR 63, Subpart B. This application includes the requirements of a Case-by-Case MACT application in accordance with 40 CFR §63.40 through §63.44.

The remainder of the Executive Summary provides a summary of the detailed analysis presented in this Case-by-Case MACT application. The Executive Summary includes a high level review and presents the conclusions in regard to each of the following:

- DWP Project Facilities Overview (summary of Section 2)
- DWP Project MACT Applicability Overview (summary of Sections 3-5)
- Case-by-Case MACT Determination (summary of Section 6)

1.1 DWP Project Facilities Overview

The DWP will consist of modifications to existing offshore facilities, as well as new equipment offshore.

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[1] The DWP will be approximately 99 statute miles from where the pipe leaves the shore, also in Cameron Parish, Louisiana.

[2] Pollutants listed in or pursuant to Section 112(b) of the Clean Air Act. The list of HAP, including those EPA has since delisted or added pursuant to Section 112(b) can be found at: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications#mods

1.1.1 Modified Offshore WC 509 Operations

Flow through the existing offshore Stingray Pipeline will be reversed to transfer crude oil from the existing Station 501 onshore to the existing WC 509 platform complex. At the WC 509 platform complex, the following modifications will be made for exporting crude oil:

- Repurposing of WC 509B platform from natural gas service to dual purpose oil and gas service. This will entail removal of natural gas compressors and ancillary equipment with some equipment remaining to support gas operations.
- Installation of components for oil service, which include new 36-inch risers, batch switching/pigging capability, generators, fuel storage tanks, surge tankage, pumps, and other ancillary utility equipment. The installation will also include facilities for operations and DWP control offices.
- Expansion and continued use of WC 509C for crew quarters.

1.1.2 New Offshore Equipment

In addition to changes at the existing WC 509 platform complex, new equipment will be added offshore to serve the DWP, including:

- **Two new CALM Buoys**
  - The CALM Buoys will be anchored to the seafloor using a multiple-point, chain anchoring system. Each CALM Buoy will have floating hoses for vessel loading. CALM Buoy No. 1 is 4,710 feet from its WC 509 riser, while CALM Buoy No. 2 is 6,085 feet from its WC 509 riser.
- **Two new pipeline end manifolds (PLEMs)** connecting to each of the CALM Buoys, one for each buoy.
- **Two 36-inch, lateral subsea pipelines** installed from the existing WC 509 platform complex to the PLEM locations, one for each PLEM.

VLCCs or other crude carrying vessels will moor to the CALM buoys. As an SPM system, the vessels will be able to weathervane around the CALM buoy while moored and loading. No fixed structures or platforms will be located within ~ 4,500 feet of the buoy to allow safe vessel movement. This capability is an important design characteristic due to the DWP location of approximately 82 statute miles (71 nautical miles) from the nearest point on land. This location is classified as “exposed waters” by the United States Coast Guard (USCG), as it is greater than 20 nautical miles from the nearest harbor of safe refuge.[3] As well, the National Weather Service (NWS) provides distinct wind, wave, and weather forecasts for “offshore waters” greater than 60 nautical miles from shore, in comparison to “coastal water” forecasts inside of 60 nautical miles in the GOM.[4]

The BMOP Project is unique from other sources and contemporary crude oil export operations because of its conversion of existing offshore facilities to support new CALM buoys in loading crude oil for export into an international fleet of VLCCs, or other crude oil carriers.

1.2 DWP Project MACT Applicability Overview

In order to accomplish its primary purpose, as noted above, the Project requires unique design criteria that include conversion of existing offshore facilities to accommodate fully loading a VLCC in unprotected,

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[3] 46 CFR 170.050.

[4] https://www.nhc.noaa.gov/abouttafbprod.shtml

exposed waters. Further, the key design criteria provide a basis of comparison to other existing sources and regulatory applicability of NESHAP. As defined at 40 CFR §63.41, a "similar source" for MACT applicability will be structurally similar in design, similar in size or capacity, and have comparable emissions, such that the source could be controlled using the same control technology. In consideration of this regulatory criteria for identifying "similar sources" for MACT applicability, the following design, size, emissions, and capability of air emissions control specific to the proposed Project are delineated:

- Design:
  - Floating buoy instead of a fixed berth to accommodate loading of large crude-carrying vessels in unprotected, exposed waters of the open ocean
- Size:
  - Deep water location capable of fully loading VLCCs and other large seafaring crude-carrying vessels for crude oil export
  - Loading rate that can fully load a VLCC in approximately one day
- Emissions:
  - Loading into the marine vessel (compared to unloading only)
  - Export of various types of crude oil (not refined products or other commodities)
- Capability of Control:
  - Serving the global market with capability to load the international fleet of VLCCs and other seafaring crude-carrying vessels, and not limited to a confined route or constrained, customized vessel
  - Maintain safe loading, which requires vessel cargo pressure balancing, appropriate location of detonation arresters, and safe VLCC mooring in the Project location

The Project design and resulting HAP emissions are presented further in Section 2.

This itemized list is summarized for simplicity and to provide a direct comparison to other possible "similar sources" – both those that are affected sources under existing NESHAP, as well as other existing and proposed sources. This report evaluates the Project design in consideration of two potentially applicable requirements under 40 CFR Part 63:

- **Subpart Y** – National Emission Standards for Marine Tank Vessel Loading Operations
- **Subpart B** – Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Section, Sections 112(g) and 112(j)

As discussed below, the conclusion of the detailed analysis presented in this report is that Subpart Y is not applicable to the proposed Project, and that a Subpart B Case-by-Case MACT analysis is thus required per Subpart B. Accordingly, this report completes the application requirements for a Case-by-Case MACT and proposes a MACT standard for the Project.

1.2.1 40 CFR 63 Subpart Y

NESHAP Subpart Y is applicable to marine tank loading operations that are major sources of HAP, including "offshore loading terminals," which are defined at 40 CFR 63.561 to mean "a location that has at least one loading berth that is 0.81 km (0.5 miles) or more from the shore that is used for mooring a marine tank vessel and loading liquids from shore."

Section 3.1 of this report presents in detail that the proposed Project is not an "offshore loading terminal" under Subpart Y, for the following reasons.

- The Project does not include a new "loading berth."

  - The offshore Project does not meet the definitions of a new “loading berth” per 40 CFR §63.561 because the proposed DWP does not include the equipment “necessary to fill marine tank vessels.”
- The Project is not a “similar source” to any of the existing sources evaluated for the “offshore loading terminal” in the development of Subpart Y.
- The Project is not a “similar source” to the inshore sources identified as subject to local jurisdiction control requirements relied upon as the basis for the “MACT floor” for new “offshore loading terminals” under Subpart Y.
- The Project is a new source type, not conceived during the development of Subpart Y (1995 for the original rule, 2011 for the residual risk and technology review).
  - The market for U.S. export of crude oil into an international fleet of VLCCs did not exist because domestic crude oil production was low, expensive, and declining in volume
  - Until President Obama signed into law H.R. 2029 on December 18, 2015, crude oil was not allowed to be exported since the oil embargo began in 1975.

Each of these points are described in further detail in Section 3.1 of this application report. A thorough and detailed comparison is made to each floor source considered by EPA in the development of the rule to confirm that none of the Subpart Y terminals are similar sources, due to different design, size, emissions, and/or capability of control.

- Subpart Y non-applicability is consistent with a practical conclusion that EPA could not have considered crude oil export at a DWP at the time of rule development (1995 for the original rule, 2011 for the residual risk and technology review).

1.2.2 40 CFR 63 Subpart B

Since BMOP has demonstrated that Subpart Y does not apply, the proposed Project is therefore subject to a Case-by-Case MACT, in accordance with 40 CFR §63.40. This application follows the principles of a MACT determination per 40 CFR §63.43(d) and includes the application requirements per 40 CFR §63.43(e) in Appendix A. The application was prepared consistent with EPA guidance, including:

- Preparing a Notice of MACT Approval Under §63.43(g) of 40 CFR 63, Subpart B, Maximum Achievable Control Technology Emission Limitation for Constructed or Reconstructed Sources
  - U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions Standards Division, July 8, 1999
- Guidelines for MACT Determinations under Section 112(j) Requirements
  - U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, February 2002, EPA 453/R-02-001

The analysis conducted for the Case-by-Case MACT evaluation also considers relevant case law, including:

- Sierra Club v. EPA (97-1686);
- National Lime Association v. EPA (99-1325);
- Cement Kiln Recycling Coalition v. EPA (99-1457);
- Sierra Club v. EPA (02-1253);
- Mossville Environmental Action Now v. EPA (02-1282); and
- Sierra Club v. EPA (intervenor Brick Industry Association) (03-1202).

The Case-by-Case MACT evaluation completes a review of possible similar sources in Section 4 of this report, including technology transfer for other emission sources classified as “transfer losses.” Existing sources are evaluated, such as the Louisiana Offshore Oil Port (LOOP). While not “achieved in practice,” consideration is also given to other concurrent DWP applications, such as the Sea Port Oil Terminal (SPOT) project. The SPOT application proposes the construction of all new offshore pipelines, a new offshore platform, and two CALM buoys closer to shore (~30 to 35 statute miles) for a DWP to export crude oil and condensate. SPOT did not prepare a case-by-case MACT application, and self-identified their unique project as an “offshore loading terminal” subject to Subpart Y. BMOP is not similar to SPOT, for the following reasons:

- BMOP is not proposing to construct a platform, while SPOT is proposing to construct a custom-designed platform specific only to crude oil export operations
- BMOP is proposing the addition of CALM buoys at more than 6,000 feet distance from the existing offshore platform, while SPOT is proposing to construct new, dual pipelines and two CALM buoys within 4,000 feet of a newly constructed platform.
- BMOP’s project location is much further from shore (82 statute miles in exposed waters compared to ~30 miles in coastal waters for SPOT), in deeper water (162 feet deep compared to 114 feet deep for SPOT), and in a different weather and wave zone

EPA Region 6 correspondence has previously identified the basis for different NESHAP applicability between the proposed SPOT DWP and the proposed Texas Gulf Terminals Incorporated (TGTI) DWP. SPOT’s application identified applicability to Subpart Y while TGTI’s application identified applicability to Subpart B. EPA Region 6 identified their intention to apply the different NESHAP requirements, as proposed, given the “design” specific to each project.[5] SPOT’s design is unique from BMOP’s proposed Project. Consistent with EPA’s April 2019 correspondence, BMOP has evaluated the design specific to the proposed Project to conclude that Subpart B is applicable.

1.2.2.1 MACT Floor Analysis

The HAP emissions from crude types that can be loaded by the proposed Project have been evaluated and an analysis similar to EPA’s methodology for establishing the MACT floors for other recent 112(d) MACT determinations (upper prediction limit) was conducted to identify the emissions achieved by the best controlled similar source.[6] The result is a MACT floor of submerged fill and best management practices to mitigate HAP emissions from loading of crude oil, with a maximum of 5.60% total HAP by weight in the vapor, or less.

1.2.2.2 Beyond-the-Floor Analysis

Subsequently, BMOP considered additional emissions reductions, the costs of achieving reductions, and any non-air quality health and environmental impacts and energy requirements in a beyond-the-floor analysis presented in Section 5. BMOP has conducted a preliminary engineering analysis and cost estimate for vapor capture and control from loading VLCCs at the proposed CALM buoys with the construction of vapor return hoses, vapor PLEMs, subsea vapor return lines, a new platform to house vapor controls and required support equipment (e.g., blowers, generator, etc.), and vapor combustion units. The result is a cost effectiveness of $733,955 per ton of HAP removed. Along with additional non-air quality environmental and

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[5] Letter from Robert D. Lawrence, EPA Region 6, to Mr. Curtis E. Borland (U.S. Coast Guard (CG-OES-2), and Ms. Yvette Fields, Director, Office of Deepwater Ports & Offshore Activities, Maritime Administration (MAR-350), “RE: Marine Vessel Loading emissions,” April 5, 2019.

[6] Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, U.S. EPA, to Docket ID No. EPA-HQ-OAR-2002-0058, “EPA’s Response to Remand of the Record for Major Source Boiler,” July 14, 2014.

energy impacts, as well as unresolved safety risks, the beyond-the-floor analysis determines that add-on controls are infeasible for the proposed Project.

The application concludes with a proposed MACT requirement and emissions limit.

1.3 Case-by-Case MACT Determination

Based on the review and analysis presented in this MACT permit application, the following represents the Case-by-Case MACT determination for the proposed DWP:

- Control technology:
  - Submerged fill loading
- Emission standard:
  - Maximum true vapor pressure (TVP) of 10.99 psia and total HAP concentration of 5.60%, by weight in the vapor, for all crude oils loaded at the BMOP DWP
- Compliance assurance:
  - VOC Management Plan
  - Crude oil sampling and analysis at the Nederland Terminal
  - Monitoring of crude loading rate and number of vessels loaded

The Case-by-Case MACT standard and compliance assurance requirements are presented in detail in Section 6. The application requirements for a case-by-case MACT determination are included, as specified at 40 CFR §63.43(e)(2), in Appendix A.

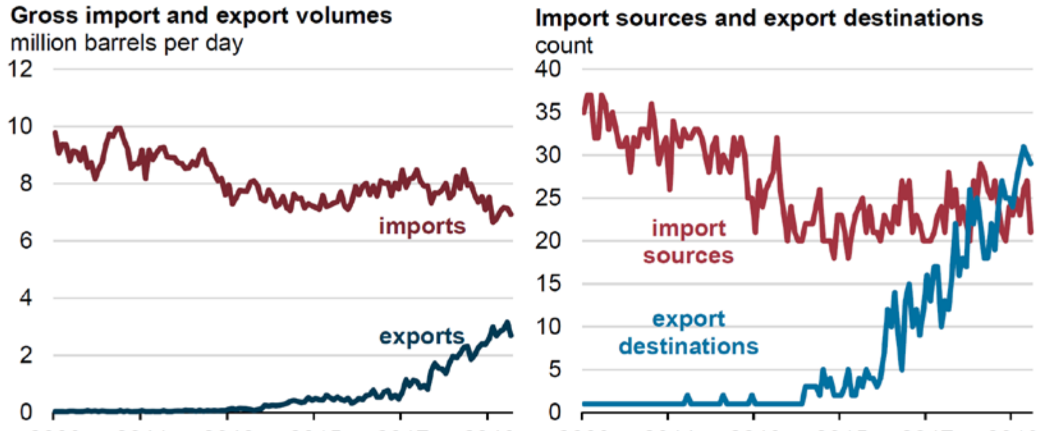
2. DESCRIPTION OF PROJECT

Section 2 of the application describes the project identifying key design criteria necessary for the project to meet its purpose, alternatives to the design that do not meet this purpose, and the resulting potential HAP emissions from the project.

2.1 Background

Beginning in 2019, the number of U.S. crude oil export destinations surpassed the number of locations of import for the first time. As well, the volume of domestic crude oil exported has increased exponentially in the last 5 years, averaging 3.5 MMbbl/day at the end of 2019.

Figure 2-1. Monthly U.S. Crude Oil Imports and Exports (Jan 2009-Jul 2019)[7]



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly*

The increase in crude oil export is a result of a number of commercial factors, including increased domestic production of light sweet crude oil, prior configuration of U.S. refineries for heavy sour crude oil, and growing demand for light sweet crude oil abroad. Importantly, however, the new market conditions are responding to a change in law.

Prior to 2015, U.S. laws and regulation allowed for unlimited export of petroleum products (e.g., gasoline and condensate from a distillation tower[8]), but export of crude oil was severely limited by a 1975 policy restricting the sale of U.S. crude. It was not until December 18, 2015 that crude oil export restrictions were lifted when President Obama signed into law H.R. 2029, following many reports and analysis identifying the benefits of crude oil export and participation in the global market of crude oil trade.

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[7] U.S. Energy Information Adminstration, “Today in Energy,” October 22, 2019. Accessed at: https://www.eia.gov/todayinenergy/detail.php?id=41754#:~:text=Conversely%2C%20the%20United%20States%20has,to%20export%20this%20crude%20oil.

[8] Clarified as a “petroleum product” by the U.S. Department of Commerce Bureau of Industry and Security on December 30, 2014.

Without a market need until 2016, existing terminals were not designed for global export of crude oil. The global trade market of crude relies on larger vessels, with VLCCs the preferred vessel class to economically ship bulk loads of crude around the world. Yet, no existing U.S. marine terminal was capable of fully loading a VLCC in 2016. A fully loaded VLCC has a draft of around 71 feet which is not compatible with existing shipping channel depths at Gulf Coast ports (typically 40-50 feet deep at the jetty).

In order to expand into the crude oil export market, existing terminals rely on reverse lightering. Reverse lightering is a process whereby smaller ships (which can navigate the depth limitations of onshore terminals) are used to shuttle crude oil from onshore terminals out to VLCC's in deeper waters which meet the depth requirements for VLCCs. Once the smaller vessels rendezvous with the VLCC in a designated trans-shipment area (TSA) in deep water of the GOM, the load is pumped from the smaller ship into the VLCC. This process is repeated multiple times (usually 4 depending on the size of the smaller ship) until the VLCC is fully loaded. Reverse lightering is time consuming, inefficient, costly, and introduces additional environmental and safety risks.

New designs for marine terminals are being considered to fully load VLCCs from ports, avoiding reverse lightering. The existing Nederland Terminal represents the second largest exporter of crude oil in the Gulf Coast,[9] but it cannot fully load a VLCC. The Nederland Terminal exports crude oil in smaller vessels, some of which function as a reverse lightering shuttle. The proposed Project will serve as an extension of the existing Nederland Terminal, to fully load VLCCs to expand into the newly-available market of global crude oil export. A comparison to reverse lightering is provided in Appendix F of this application.

2.2 Purpose of the Project and Key Design Criteria

The primary purpose of the Project is to provide for safe and reliable long-term supply of crude oil for export to the global market. To fulfill this purpose, the Project must be capable of fully loading the international fleet of crude-carrying marine vessels to accommodate the safe and efficient transport of crude. Accordingly, the Project requires a DWP that can accommodate the draft and berth of a fully loaded VLCC with the ability to load in varying meteorological conditions. This ensures safety in transfer and transit by minimizing risks of transportation incidents (e.g., spills, allisions, collisions). It is not possible for existing onshore terminals in the GOM to fully load a VLCC due to limited draft. There are only a couple existing onshore terminals in the GOM that can partially load a VLCC; loading is completed offshore via reverse lightering. The proposed DWP design avoids the inefficiency and cost of idled time at a fixed port for partial VLCC loading while offering the benefit of avoiding dock-constrained ports to free up dock space for other commodities. This approach also resolves the logistical challenges and added vessel traffic of reverse lightering while mitigating the risks and additional environmental impacts of multiple loadings for a single fully loaded VLCC.

The following are key design considerations for the siting criteria, consistent with the primary purpose of the Project:

- Location with deep water
- Location that is distant from sensitive coastal resources and that would minimize vessel traffic at inland waterways and eliminate the need for dredging
- Location near, but without interference to, designated shipping fairways

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[9] Morningstar Commodities Research, "Gulf Coast Crude Exporters Navigate Port Limitations – Vessel size logistics complicate shipments," May 13, 2019.

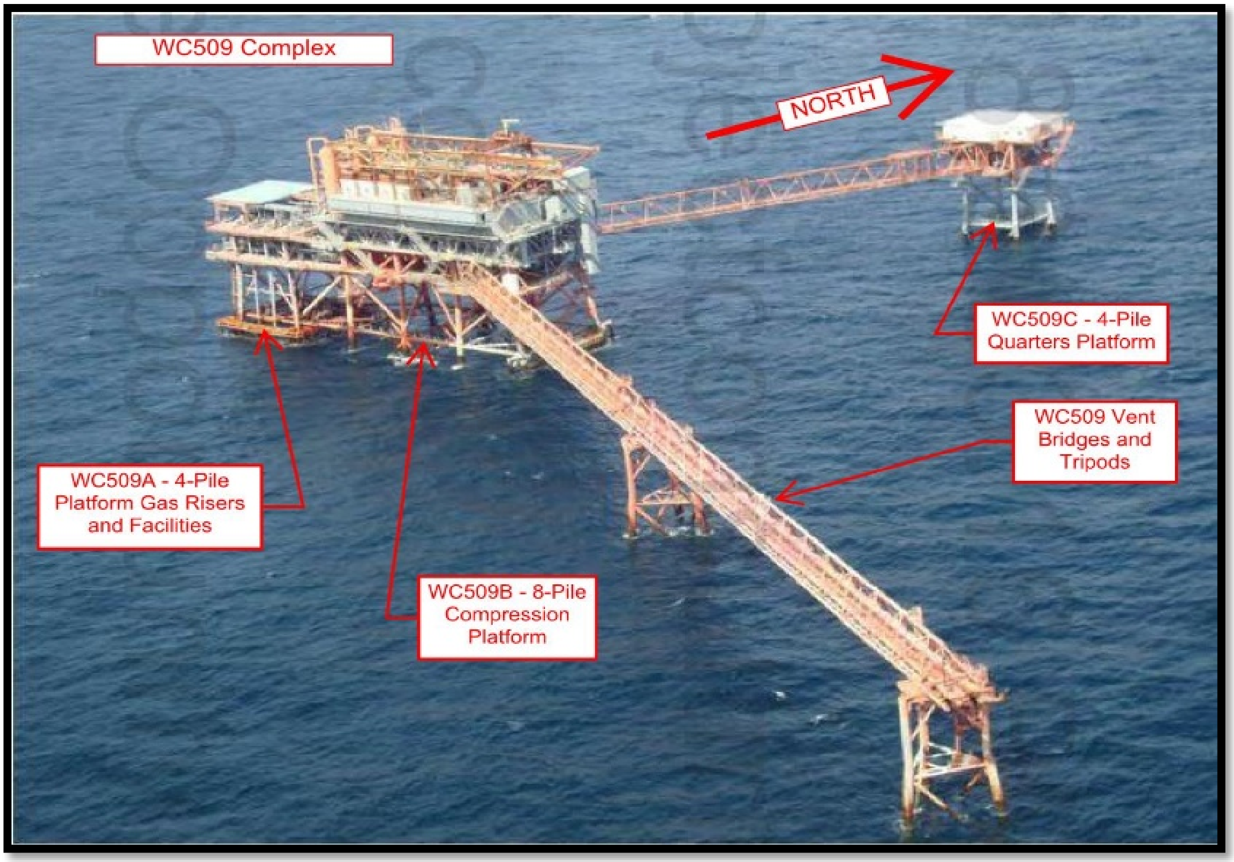
- Sufficient restricted safety area for safe transiting and loading of an international fleet of VLCCs and other large seafaring crude vessels
- Loading a ship from a floating buoy, as opposed to a fixed berth for maximum availability and safety in exposed deep water subject to unique offshore weather and wave conditions
- Ability to fully load a VLCC in approximately 1 day
- A DWP design that can be called upon by the existing worldwide fleet of VLCCs or other crude oil carriers by matching worldwide fleet piping manifold pressure limitations, and that utilize proven design that is safe to operate
- Use of existing infrastructure and facilities with a local fuel source, where possible
- Operational control and communications to enable safe loading
- Location with access to U.S. crude oil supply infrastructure, such as the Nederland Terminal, which is a key supply hub for domestic crude
- Flexibility to export a wide variety of crude oil types

These factors were specifically used in guiding the development of the proposed source, with the following conclusions dictating the basic design of the proposed source:

- Use of an existing offshore pipeline system provides access to the siting criteria to meet the Project purpose while minimizing total project impacts.
- Use of CALM buoys to provide safe, efficient, and high availability to load large seafaring vessels, including VLCCs, in the varying sea states of exposed deep water.
- Availability of an existing platform complex provides operational control and communications without requiring new structures and impacts.
- Access to the existing Nederland Terminal with the ability to provide a variety of domestic crude types for export.

With this project-specific evaluation, BMOP has identified the existing Stingray Pipeline System, which provides an existing 36-inch outer-diameter (OD) subsea pipeline from Cameron Parish, Louisiana to an existing platform complex in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Block (WC) 509.

Figure 2-2. Existing WC 509 Platform Complex



This existing platform complex is near existing shipping channels currently used by large seafaring crude oil vessels with a water depth >160 feet. The platform complex has access to offshore natural gas supply to serve basic platform utilities without necessitating that all utilities be powered by fuel delivered from shore.[10] The existing Nederland Terminal in Jefferson County, Texas, owned by Sunoco Partners Marketing and Terminals, L.P., receives a variety of crude types that will be accessed for export through the proposed Project.

The primary purpose and identified objectives defining the basic design of the Project cannot be attained with traditional crude export of existing operations. As such, these existing operations do not fit the purpose and objective of the Project, and would not be similar sources:

- Fully loading VLCCs through reverse lightering of smaller vessels shuttling back and forth to existing onshore terminals
- Use of a fixed loading berth
- Customized vessels to dedicated operations shuttling uniform product types between limited, defined locations

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[10] While the Project has the benefit of natural gas supply for basic utilities at the WC 509 complex, there is insufficient natural gas supply at WC 509 for supporting additioinal platforms or vapor combustion assist gas, discussed further in Section 5 of this application.

Instead, BMOP's proposed modification of this existing pipeline system and addition of CALM buoys to an existing platform complex conform to the design considerations to meet the project's purpose for safe and reliable export of crude oil to the global market.

The following subsections provide additional description of the basic design of the proposed Project.

2.3 Proposed Project Sources for Offshore Loading

The DWP will be located in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Blocks (WC) 509 and 508 and East Cameron Block 263. The DWP will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana, with a water depth of 162 feet.

The crude oil will be metered on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline end manifolds located on the seafloor below two CALM Buoys located in WC 508 and in East Cameron Block 263 (EC 263). From each PLEM, the crude oil will be routed to its respective floating CALM Buoy through submerged flexible hoses. VLCCs (or other large seafaring crude oil vessels) will moor at a CALM Buoy, retrieve and connect the floating crude oil hoses connected to the CALM buoy and the crude oil will then route from the Buoy to the VLCC for loading. Up to 365 large seafaring crude oil vessels may be loaded per year at a rate of up to 80,000 barrels per hour (bbl/hr).

The Project will accommodate loading up to 365 large seafaring crude oil vessels with the use of two CALM buoys. Loading will not occur at both buoys simultaneously. During the time necessary for a loaded vessel to disconnect and depart the safety zone, and for a subsequent vessel to approach the same buoy, moor, and attach to the loading hoses, the second buoy will be loading a moored ship at up to 80,000 bbl/hr. The loading operation will then switch to the alternate buoy, providing the ability to continuously load one ship at a time.

Table 2-1. DWP Components for Offshore Loading

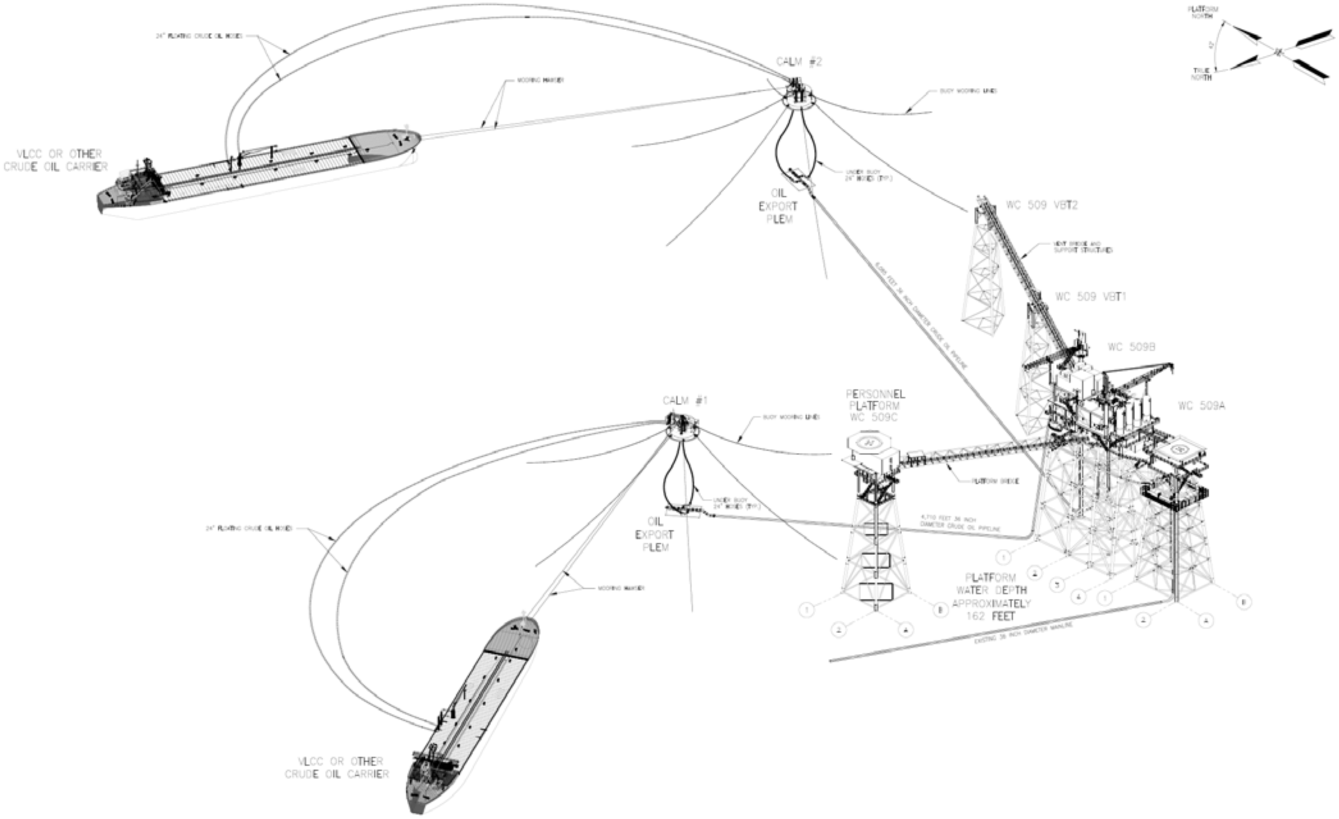
Component	Latitude (N) (degrees minutes seconds)	Longitude (W) (degrees minutes seconds)	Water Depth (feet)
WC 509 Platform Complex [a]	28° 26' 00.01"	93° 00' 15.23"	162
CALM Buoy No. 1 and PLEM (WC 508)	28° 26' 47.33"	93° 00' 13.30"	156
CALM Buoy No. 2 and PLEM (EC 263)	28° 26' 34.37"	92° 59' 19.21"	159

a. Riser #1.

CALM Buoy No. 1 is 4,710 feet from its WC 509B riser, while CALM Buoy No. 2 is 6,085 feet from its WC 509B riser. Floating and flexible 20- or 24-inch diameter hoses approximately 1,500 feet long will be installed for loading from the CALM Buoy to the VLCC (or other large seafaring crude carrier).

The floating hoses will be recovered by one of the DWP support vessels, lifted to the VLCC (or other crude carrier) loading manifold, and connected to the receiving flange. The floating hoses will simply float on the surface of the water and will weathervane dependent on the current when not being used for loading. The floating hoses will contain a butterfly valve on the end that will be utilized to isolate the hose after loading is complete and prior to placing the hoses back in the water. Additionally, a blind flange will be installed to further prevent any potential contamination or leakage while the hose is floating and waiting for the next VLCC (or other large seafaring crude carrier) to be loaded.

Figure 2-3. Schematic of Proposed Offshore Loading from WC 509



Offshore, the Project consists of the following modifications to the WC 509 platform complex:

- Two new Crude Oil Loading Pipelines
- Two new PLEM and CALM buoys located in WC 508 and EC 263
- Ancillary piping and equipment at the platform complex for crude oil export, including
  - Natural gas-fired generators
  - Diesel-fired emergency generator
  - Diesel-fired crane engines
  - Diesel-fired firewater pumps
  - Diesel fuel storage tanks
  - Lube oil, waste oil, and sump collection and storage
  - Aviation fuel storage tank
  - Surge vessel

These new sources are in addition to equipment required for continued transmission of natural gas. Also, the support equipment (e.g., engines) are subject to NESHAP standards issued pursuant to 112(d) of the

Clean Air Act (i.e., 40 CFR 63 Subpart ZZZZ). The "emission unit" requiring a case-by-case MACT evaluation is the loading of marine vessels at the CALM buoys.[11]

The proposed Project utilizes many existing facilities, both onshore and offshore. The existing Nederland Terminal provides access to and storage of multiple types of crude oil. The existing terminal and existing offshore pipeline and platform complex provide a direct access to crude oil supply for export. Use of existing infrastructure avoids the environmental impacts required to install greenfield terminals and new offshore pipelines. The proposed Project requires only minor equipment additions with minimal footprint. The new equipment will support the existing infrastructure and include a new onshore pump station located at the Nederland Terminal to control loading rates up to the pipeline capacity of 80,000 bbl/hr. A new onshore pipeline will connect the Nederland Terminal to existing Stingray facilities onshore, and the existing Stingray pipeline and existing WC 509 platform complex will support the delivery to the new DWP. The Project would not function as a DWP without each of these separate facilities and Project components. The modifications at WC 509 and new CALM buoys are simply the point of loading.

2.3.1 VLCC and Other Large Crude Carrying Vessels

A key criterion of the design of the Project is to be able to fully load VLCCs and other large crude-carrying vessels for international export. There are many different types and sizes of crude-carrying vessels, designed to meet specific needs for marine transportation of crude and other petroleum products. Seafaring vessels are categorized by capacity and dimensions. The capacity represents the efficiency of transfer where the greater the capacity, the more efficient the transportation of the cargo – especially for long distance (e.g., GOM to Asia). The dimensions are important as they define the ability for a Port of Call to receive the loaded vessel – both in terms of length and width of canals and draft for water depth of a channel. Four common classifications of crude-carrying vessels considered for BMOP include: articulated tug barge, Aframax, Suezmax, and VLCC.

Articulated tug barge are the smallest of these classifications. The barges provide flexibility to navigate shallow ports but are limited to short distances (often single round-trip routes) due to the inefficient, limited capacity.

Aframax are medium-sized crude-carrying vessels, where "AFRA" is an acronym for "average freight rate assessment." They are relatively small in size compared to VLCCs. It would take four aframax to carry the same capacity of a single VLCC. Aframax are ideal for short to medium haul trades and are therefore typically limited to regions of low crude production or regions with limited port access.

Suezmax get their name from the Suez Canal, as they are mid-sized vessels with a larger capacity than an Aframax but are designed to be able to navigate the Suez Canal. Suezmax are currently used for export from the GOM for cross-Atlantic travel. However, it takes two Suezmax to provide the same capacity as a single VLCC. VLCCs are extensively used around the world for crude oil shipments as a result of their improved efficiency and the ability of many international major crude oil ports to utilize them for loading and unloading operations.

There are additional classifications of much smaller vessels, such as Handymax. Handymax are small-sized cargo vessels which are regional carriers for small ports, draft restrictions, and small capacity requirements.

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[11] The term "emissions unit" does not have a regulatory or statutory meaning, but is used consistent with U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Guidelines for MACT Determinations under Section 112(j) Requirements, February 2002, EPA 453/R-02-001, page 3-1.

A comparison of large crude-carrying vessels is shown in the following table.

Table 2-2. Characteristics of VLCCs, Suezmax and Aframax Vessels

Characteristic	VLCC	Suezmax	Aframax	Articulated Tug Barge
Deadweight Tonnage with Maximum Load (metric tonnes)	320,000	220,000	120,000	45,000
Length Overall (feet)	1,092	900	820	600
Beam (feet)	197	164	105	105
Draft with Maximum Load (feet)	71	66	49	35

Sources: MARAD and USCG, 2020; Representative of Crowley 750 class (Blenkey, 2012).

The global trade market of crude oil relies on larger vessels, with VLCCs the preferred vessel class to economically ship bulk loads of crude around the world. The economy of scale improves for long distance travel, such that export to Asia offers significant savings in a VLCC in comparison to an Aframax. The vessel charter prices fluctuate along with the commodity pricing and demand (consistent with global market conditions). Analyses for accommodating larger vessels at a DWP have identified cost savings of $1 per barrel, in comparison to crude transport with an Aframax or reverse lightering.[12]

In order to be capable of fully loading a VLCC, a DWP needs to have a water depth of much more than 71 feet to safely accommodate the draft of these vessels. The Project location at WC 509 has a water depth of 162 feet, sufficient for meeting this design criterion.

In addition, at 1,092 feet long, a VLCC requires a large area to maneuver. The Project is specifically designed to accommodate the safety zone spatial distance requirements for VLCC approach and departure by providing approximately 6,000 feet and 4,700 feet separation between each floating buoy and the platform and 5,000 feet between the two buoys. The platform provides support for the DWP, but loading is not conducted directly from the platform itself due to the specific need to safely accommodate large vessels, such as VLCCs, in unprotected waters. The distance to the loading buoys (greater than a mile for buoy #2) is a layout and design need necessary to meet the Project’s purpose. Accordingly, the regulatory evaluation should be based on these specific project characteristics of the proposed DWP, which cannot be accomplished with a different design accommodation, or through existing onshore or nearshore facilities.

2.3.2 Offshore Loading Facilities

In order to accommodate VLCCs and other large crude carrying vessels in exposed offshore waters far from shore, the Project design evaluated different berthing options, and identified a CALM buoy single point mooring configuration as the only option that would meet the Project purpose.

2.3.2.1 CALM Buoy Design

The CALM buoy design is a specific configuration of SPM that enables loading large ocean-going crude carriers offshore in unprotected, deep water.

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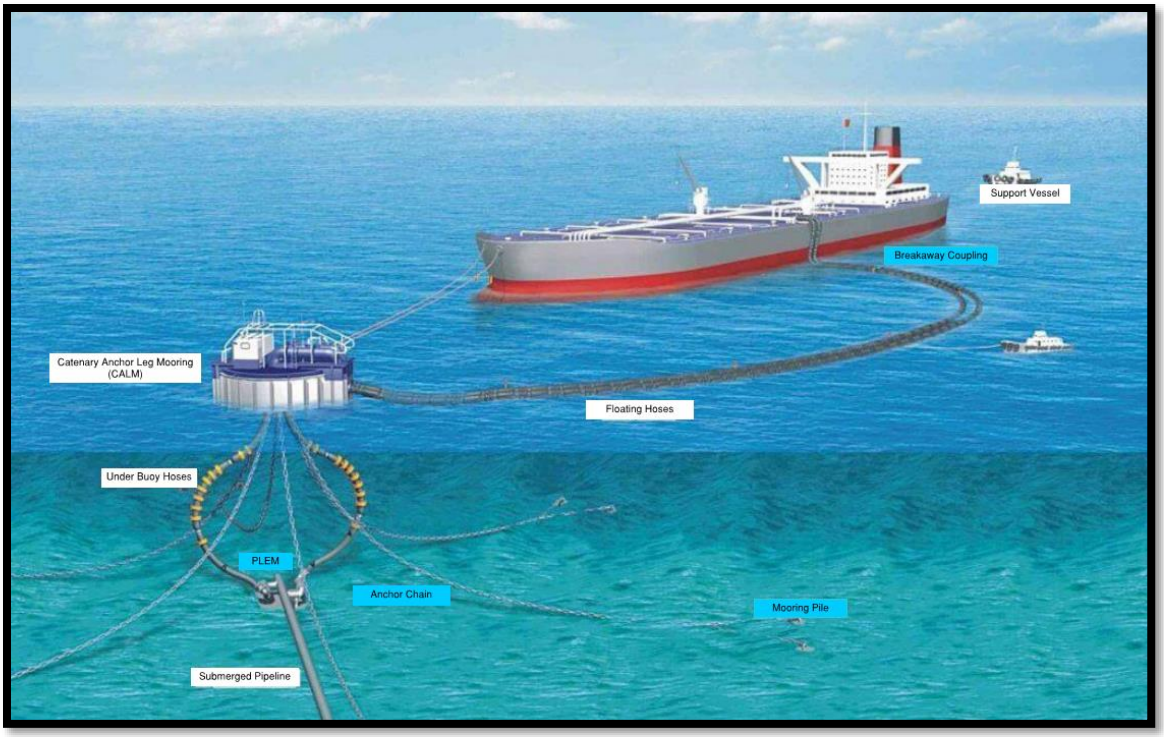
[12] “A comparison between estimated costs for present deliveries of crude and estimates of future delivery costs to a deepwater port using a 260,000 dwt tanker, yielded a savings attributable to the new port facility of about $1.00 per barrel...” https://www.govinfo.gov/content/pkg/CZIC-he554-n5-d44-1982-v-1/html/CZIC-he554-n5-d44-1982-v-1.htm

Figure 2-4. Typical CALM Buoy Mooring and Loading Arrangement[13]



The design consists of a buoy that is permanently connected to the seafloor by multiple mooring chains. The rotating turret or turntable within the buoy body allows a vessel to rotate around the buoy while moored and loading.

Under-buoy hoses (based on a “Lazy S” configuration [preferred] or a Chinese lantern design [alternative]), connects the floating buoy to an undersea PLEM and crude oil pipeline on the seafloor. These designs allow the buoy to rise and fall with wave action, while maintaining a constant connection to the subsea Pipeline End Manifold.

The flexibility of movement of the vessel and buoy provides a robust design for loading in offshore environments.

Mooring is simplified by providing a mechanism of anchoring large vessels to a single buoy in open waters via a mooring hawser connected to the buoy turntable. The design provides large vessels the ability to freely rotate 360 degrees around the buoy. Once moored, the vessel continues to have the freedom to weathervane while loading, permitting the vessel to keep the most favorable position in relation to the many dynamic variables in unprotected water, including wind, current, and wave climate. This rotational freedom, not capable with a fixed berth, offers significant advantages that meet the Project purpose:

- Ability to accommodate loading of VLCCs with high drafts
- Allows for loading rates that can fully load a VLCC in approximately one day
- Lower mooring forces than at a fixed berth

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[13] Downloaded from internet https://cultofsea.com/tanker/spm-single-point-mooring/, May 07, 2020.

- Greater vessel control for improved safety – important for safe mooring in the weather and wave conditions offshore in exposed waters
- Greater availability for loading operations in a wider range of weather and wave conditions, compared to fixed berths that have tighter restrictions in limited weather and wave conditions
- Shorter loading times than fixed berths and minimized demurrage
- Lower risks of vessel collisions with fixed structures
- Opportunity for minimizing environmental releases.

Rotational freedom permits favorable vessel positioning around the buoy such that the bow of the ship can be directed toward the wind/current. In a fixed berth, there is a chance that the wind/current will be broadside to the tanker, leading to excessive tanker movements and stress. This results in two noted improvements – faster total loading time and lower tanker movements. The Marine Board for the National Research Council has noted that faster, efficient loading can minimize air emissions.

> *Atmospheric emissions while loading cargo are minimized by filling each compartment as rapidly as possible, to reduce the amount of evaporation into the ullage space (an exception to this is at the start of loading when rapid rates may cause splashing, which increases evaporation)* [14]

Consistent with this, providing loading flexibility to minimize vessel movement due to wind, current, and waves also reduces sloshing and mixing of the cargo while loading, to help mitigate excessive evaporation.

In summary, the specific design of a CALM buoy improves efficiency, lowers safety risks, and can improve environmental performance for crude oil loading in deep water.

2.3.2.2 Fixed Loading Berths Did Not Meet Project Purpose

Existing onshore, inshore, and near shore marine terminals commonly use a fixed loading berth, such as a dock, pier, jetty, loading platform fixed berth with fixed loading arms, or multi-point buoy for a conventional fixed mooring arrangement. These fixed loading berths in protected water serve the unique criteria of nearshore loading in protected water, but present significant challenges in exposed water at ~82 miles distance from the nearest point on land.[15] An affiliate of BMOP currently operates marine loading from docks at the Nederland Terminal – the supply terminal for the Project. This terminal is limited by the depth and width of the channel, harbor access, and dock space and cannot meet the Project purpose (or accommodate fully loaded VLCCs). These same limiting factors exist at other existing onshore and inshore facilities.

A dock, pier or jetty is incongruous with a DWP in the GOM, simply due to the distance from shore and depth of water required.

A multi-point buoy for conventional mooring has been considered, but presents significant navigational challenges requiring more assist tug operation. Approach, loading, and departure conditions are restricted to calm weather and low wave conditions. Furthermore, with very large, difficult to maneuver VLCCs, the permissible weather and wave conditions will be significantly restricted for approach, loading, and departure

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[14] Marine Board, National Research Council, “Controlling Hydrocarbon Emissions from Tank Vessel Loading,” 1987, page 82. (Docket A-90-44, II-I-4)

[15] See 46 CFR 170.050. “Protected waters” means sheltered waters presenting no special hazards such as rivers, harbors, and lakes, etc. “Exposed waters” means waters more than 20 nautical miles (37 kilometers) from the mouth of a harbor of safe refuge and other waters which the Officer in Charge, Marine Inspection determines to present special hazards due to weather or other circumstances.

conditions. The Project location has unique weather and wave conditions (the NWS considers >60 nautical miles as "offshore waters" in the GOM with its own weather and wave evaluation). A conventional mooring arrangement requires a fixed position for the loaded vessel, which does not allow for weathervaning. This adds additional stress during mooring, particularly for VLCCs, that can act as a large "sail" with greater than 5,000 square feet of surface when wind is blowing, or the current is perpendicular to the mooring arrangement. For these reasons, conventional multi-point mooring is traditionally only used in nearshore locations.[16]

The same restrictions of fixed mooring that do not allow for fulfilling the Project purpose are the same for loading directly from a fixed platform, with the added safety risk of collision into the fixed structure. A fixed platform may be appropriate in protected waters inshore or nearshore, but still requires extensive safety considerations. Many platforms restrict vessels to only those with pilots previously approved for docking at the platform[17] and adhere to strict approach practices (e.g., limited speed), weather conditions, and other constraints even with assist tugs. This does not allow for the Project purpose of loading an international fleet of VLCCs and comes with the added safety risks and inefficiency.

Accordingly, the proposed Project design utilizes a CALM buoy SPM, and not a fixed loading berth.

2.4 Loading Emissions

In consideration of the Project purpose and corresponding design criteria, the potential HAP emissions from loading crude oil into VLCCs and other large crude-carrying vessels for export have been determined. HAP emissions are released as vapor is displaced from the loaded vessel tanks. The displaced vapor includes inert gas and evaporated VOCs from the tank contents. A portion of the VOCs are organic HAP. Accordingly, a determination of HAP emissions begins with calculating the total VOC releases from the loading operation.

2.4.1.1 Marine Loading – VOC Emissions

VOC emissions from marine loading of crude oil are calculated based on the maximum hourly loading rate (gallons per hour [gal/hr]) and Equations 2 and 3 of U.S. EPA's AP-42, Section 5.2 (07/08), which was developed specifically for loading crude oil into ships and ocean barges,[18] and has also been utilized by EPA in the development of NESHAP for onshore/near shore loading of crude oil.[19] The Project will load only crude oil, and no refined products. In addition to EPA's explicit direction in AP-42 to utilize Equations 2 and 3 for crude oil loading into ocean-going ships, this methodology is consistent with other marine loading of

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[16] https://www.bluewater.com/products-technology/mooring-systems/turret-mooring-systems/soft-yoke-tower/

[17] Example: United Riverhead Terminal, Inc., *Marine Information Handbook*, November 1, 2012.

[18] U.S. EPA, AP-42 Chapter 5.2 Transportation and Marketing of Petroleum Liquids, 6/08.

[19] "*We agree with the commenter that the emission factors for ships and barges, as applicable to the type of marine vessel being loaded, should be considered for estimating VOC and HAP emissions. We have revised the emission estimates using the barge and ship emission factors from AP–42,"* referenced from 76 FR 22582, April 21, 2011, left column. Also see Subpart Y: Email from Michelle Herman, Chevron to Steve Shedd, EPA Chevron Pipe Line Nederland TX Emissions Data for MVL, 5/18/2010, ID: EPA-HQ-OAR-2010-0600-0044, which uses AP-42 Eq. 2 and 3 for crude oil loading into ships, and Eq. 1 for gasoline loading.

crude and permitting determinations in Louisiana,[20] which is the nearest onshore state. To align with the nearest state consistent with the DWPA,[21] and based on Louisiana's recent determinations for crude loading into ships, Equations 2 and 3 are most appropriate to estimate emissions for the Project.

The application of Equations 2 and 3 are described below.

$$C_L = C_A + C_G$$

Where:

$C_L = Total\ Loading\ Loss, pounds\ per\ 1000\ gallons\ \left(\frac{lb}{10^3 gal}\right) of\ crude\ oil\ loaded$

$C_A = Arrival\ emission\ factor, contributed\ by\ vapors\ in\ the\ empty\ tank\ compartment\ before\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

$C_G = Generated\ emission\ factor, contributed\ by\ evaporation\ during\ loading, \frac{lb}{10^3 gal}\ of\ crude\ oil\ loaded$

BMOP conservatively uses the average arrival emission factor for an uncleaned ship/ocean barge tank, as provided in AP-42 Table 5.2-3. The generated emissions factor, C_G is calculated based on Equation 3 of AP-42, Section 5.2, as described below.

$$C_G = 1.84 \times (0.44 \times P - 0.42) \times \frac{MG}{T}$$

Where:

$P = True\ vapor\ pressure\ of\ loaded\ crude\ oil, psia$

$M = Molecular\ weight\ of\ vapors, \frac{lb}{lb - mol}$

$G = Vapor\ growth\ factor, 1.02\ (dimensionless)$

$T = Temperature\ of\ vapors, °R$

BMOP estimates a maximum hourly loading rate of 80,000 barrels per hour (bbl/hr) of crude oil and the annual loading rate is equivalent to continuous (e.g. 8,760 hours per year) loading at the maximum hourly loading rate.[22] The project will be able to load 700,800,000 barrels per year (bbl/yr). To calculate the VOC loading loss rate (in lb/10^3 gal), maximum hourly and annual average crude loading temperatures and crude true vapor pressures are used, based on Project design specifications. Because the crude oil will be subsea for approximately 100 nautical miles, the long-term temperature representative of the sea floor was used to estimate the loading temperatures.[23] The molecular weight of the crude oil (liquid and vapor) is based on AP-42, Chapter 7, Table 7.1-2 (06/20). A summary of the characteristics used to calculate VOC emissions are provided in the table below.

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[20] See examples: Part 70 Permit No. 2520-00033-V-14 for International Matex Tank Terminals – IMTT – St. Rose, Louisiana, 8/14/2019, based on crude loading emissions from Eq. 2 and 3 from application for Title V Revision, dated June 3, 2019, and also Part 70 Permit No. 2560-00034-V9 for Sugarland Pipeline Station/Terminal, Shell Pipeline Company, LP, St. James, Louisiana, based on crude loading emissions from Eq. 2 and 3.

[21] 33 USC §1518(b).

[22] 80,000 bbl/hr is approximately 3,360,000 gal/hr.

[23] Temperature data from ROMS Texas A&M University Outputs, Location: WC509, Depth 150.672 feet. Long-term average of 72.66°F used for annual average conditions and a maximum of 90°F used for short-term maximum conditions (max of dataset is 85.4°F.

Table 2-3. Marine Loading Emissions Specifications

	Maximum Hourly	Annual Average
Crude Loading Rate (bbl/hr)	80,000	80,000
Arrival Emission Factor	0.86	0.86
Loading Temperature (°R)	550	532
Vapor Molecular Weight (lb/lbmol)[24]	50	50
Liquid Molecular Weight (lb/lbmol)	207	207
True Vapor Pressure (psia)[25]	10.99	9.00

2.4.1.2 Marine Loading – HAP Emissions

Emissions of HAP are based on an identified maximum crude oil vapor HAP speciation, by individual HAP, provided in weight percent (wt%) of the vapor. These maximum individual HAP concentrations were determined from thirteen samples of various crude types at the Nederland Terminal from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.[26] The analytical results provided an extensive speciation of the crude oil, of which >99.9% was identified as VOCs. From these 13 samples, the average total HAP concentration in the liquid (wt.%) was 3.2%. This identifies the expected average HAP concentration to be less than 5%, by weight, in the liquid.

For preparing potential emissions, the concentration in the vapor phase was calculated. Consistent with AP-42, Chapter 7.1.4 (06/2020), Raoult's Law was followed to determine the HAP content in the vapor phase of the crude oil from the HAP content in the liquid phase. Raoult's Law states that the mole fraction in the liquid of a speciated component, when multiplied by the vapor pressure of that component is equal to the partial pressure of that component, or:

$$P_i = (P)(x_i)$$

Where:

$P_i = partial\ pressure\ of\ component, i, psia$

$P = vapor\ pressure\ of\ pure\ component\ i\ at\ the\ average\ daily\ liquid\ surface\ temperature, psia$

$x_i = liquid\ mole\ fraction, \frac{lb - mole}{lb - mole}$

The vapor pressure of each HAP species was determined using published Antoine Coefficients at the average daily temperature, described above.

The liquid mole fraction was determined from the liquid weight fraction of the component in the samples per:

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[24] U.S. EPA, AP-42 Chapter 7.1 Organic Liquid Storage Tanks, June 2020, Table 7.1-2.

[25] Maximum short-term and annual average true vapor pressure aligned with the permit limits for the origination of the crude oil for the BMOP Project – the Nederland Terminal. Note that the purpose of the project is to load a variety of both heavy and light crude oils, so using the permit limits is a conservative estimate of potential emissions for the Project.

[26] 49 CFR § 171.7(h)(45).

$$x_i = \left(\frac{Z_{Li}M_L}{M_i}\right)$$

Where:

$x_i = liquid\ mole\ fraction, \frac{lb - mole}{lb - mole}$

$Z_{Li} = weight\ fraction\ of\ component\ i\ in\ the\ liquid, lb/lb$

$M_L = molecular\ weight\ of\ liquid\ stock, \left(\frac{lb}{lb - mol}\right)$

$M_i = molecular\ weight\ of\ component, i, \left(\frac{lb}{lb - mol}\right)$

The vapor mole fraction was determined by:

$$y_i = \frac{P_i}{P_{VA}}$$

Where:

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$P_i = partial\ pressure\ of\ component, i, psia$

$P_{VA} = total\ vapor\ pressure\ of\ liquid\ mixture, psia$

The weight fraction in the vapor phase can then be determined from the mole fractions in the vapor phase.

$$Z_{Vi} = \frac{y_i M_i}{M_V}$$

Where:

$Z_{Vi} = vapor\ weight\ fraction\ of\ component\ i, lb/lb$

$y_i = vapor\ mole\ fraction\ of\ component\ i, \frac{lb - mole}{lb - mole}$

$M_i = molecular\ weight\ of\ component, i, \left(\frac{lb}{lb - mol}\right)$

$M_V = molecular\ weight\ of\ vapor\ stock, \left(\frac{lb}{lb - mol}\right)$

The resulting total HAP in the vapor averaged 2.4% for all 13 samples.

In order to ensure a conservative representation of potential emissions on a short-term basis, the 99% upper prediction limit (UPL) was calculated for each individual HAP identified in the 13 samples. BMOP used the higher of the 99% UPL from the 13 samples, or the Nederland Permit basis for each individual HAP, whichever was greater. The result is a conservative estimate for each individual HAP, and the total HAP (which is the sum of the highest values for each individual HAP).

BMOP has used the following crude oil vapor HAP speciation to estimate emissions.

Table 2-4. Crude Oil Vapor HAP Speciation

HAP	Vapor Weight %
Hexane	4.09
Benzene	0.80
Toluene	0.36
Ethylbenzene	0.05
1,2,4-Trimethylbenzene	0.01
1,3-dimethylbenzene	0.05
1,4-dimethylbenzene	0.03
1,2-dimethylbenzene (Xylene)	0.21
i-propylbenzene (Cumene)	0.01
Biphenyl	0.00002
Cresols	0.001
Naphthalene	0.001
Phenol	0.001
Total HAP	5.60

Hourly and annual VOC emissions are multiplied by each HAP speciation, above, to determine the hourly and annual HAP mass emission rates.

Table 2-5. Potential VOC and HAP Mass Emissions from Marine Loading

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC	5,422	21,840
HAP speciation:		
Hexane	221.8	893.2
Benzene	43.40	174.8
Toluene	19.27	77.61
Ethylbenzene	2.69	10.85
1,2,4-Trimethylbenzene	0.58	2.33
1,3-dimethylbenzene	2.58	10.41
1,4-dimethylbenzene	1.80	7.25
1,2-dimethylbenzene (Xylene)	11.26	45.36
i-propylbenzene (Cumene)	0.32	1.28
Biphenyl	0.001	0.004
Cresols	0.04	0.16
Naphthalene	0.03	0.14
Phenol	0.08	0.33
Total HAP	303.8	1,244

3. MACT APPLICABILITY

By the Clean Air Act Amendments in 1990, Congress required EPA to develop source-category-specific standards that represent the Maximum Achievable Control Technology (MACT) for HAP emissions control. “Control technology” is not limited to add-on pollution control devices, but include processes, methods, systems, and techniques to minimize HAP emissions. Because the amount of HAP emissions and the type of emissions reduction techniques varies across industries, EPA developed source-category-specific MACT requirements in accordance with Section 112(d) of the Clean Air Act, promulgated as different subparts in 40 CFR 63. The MACT standards were developed for all major sources of HAP.[27] For new source categories (or where EPA had yet to promulgate a source-category-specific standard), Section 112(g) of the Clean Air Act requires evaluation for a MACT on a case-by-case basis. As such, for a major source of HAP, either a source-category-specific standard applies, or a case-by-case MACT analysis is required.

For the proposed Project, the applicability of the source-category-specific *National Emission Standard for Marine Tank Vessel Loading Operations* (40 CFR 63 Subpart Y) is considered, as well as *Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections, Sections 112(G) and 112(J)* (40 CFR 63 Subpart B).

Because BMOP is proposing to construct a major source of HAP, Subpart B applies if the source category of the proposed Project emissions sources is not regulated, or exempt from regulation, under a standard issued pursuant to Section 112(d) of the Clean Air Act. As such, when evaluating the case-by-case applicability of the proposed offshore loading with BMOP, the non-applicability of Subpart Y is addressed first.

3.1 40 CFR 63 Subpart Y Is Not Applicable

The MACT requirements of *National Emission Standard for Marine Tank Vessel Loading Operations*, codified at 40 CFR 63 Subpart Y (“Subpart Y”), are applicable to “existing and new sources with emissions of 10 or 25 tons, as that term is defined in §63.561…”[28] With this generic language used in the “Applicability and designation of affected source” section of the rule, evaluating regulatory applicability is heavily dependent on contextual consideration of the definitions within the rule to identify what are “existing and new sources.” Per the Subpart Y definitions section:[29]

> <u>Source(s)</u> *means any location where at least one dock or loading berth is bulk loading onto marine tank vessels, except offshore drilling platforms and lightering operations.*

Thus, evaluation of the potential applicability of Subpart Y to the proposed use of CALM buoys to bulk load crude oil into a VLCC must further evaluate whether a buoy would be considered a “dock or loading berth” under the regulations. “Dock” is not defined at 40 CFR §63.561. However, the plain meaning of the word would not be misconstrued to include a floating buoy 82 statute miles into the GOM. The Project is not a “dock.” Regarding “loading berth”, Subpart Y provides a definition:

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[27] EPA has also promulgated some NESHAP that include area sources of HAP (sources that are not major HAP sources).

[28] 40 CFR §63.560(a)(1).

[29] 40 CFR §63.561.

> Loading berth *means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill marine tank vessels. The loading berth includes those items necessary for an offshore loading terminal.*"

From this definition, a list of components is delineated, the collection of which are a "loading berth." As well, a loading berth is extended to an "offshore loading terminal," which is also defined in Subpart Y as:

> Offshore loading terminal *means a location that has at least one loading berth that is 0.81 km (0.5 miles) or more from the shore that is used for mooring a marine tank vessel and loading liquids from shore.*

In turn, a "terminal" is defined as:

> Terminal *means all loading berths at any land or sea based structure(s) that loads liquids in bulk onto marine tank vessels.*

Taken collectively, Subpart Y is applicable to a loading berth that includes all of the equipment (loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves) necessary to fill marine tank vessels at sea based structure(s) that are greater than 0.5 miles from shore. With this linear construct of the rule definitions, one could suggest that Subpart Y is applicable to the Project.

However, that superficial interpretation fails when additional criteria – and the context of the Project – are considered to resolve the following undefined and unbounded language:

- Sea based structure(s)
- Greater than 0.5 miles from shore
- All of the equipment necessary to fill marine tank vessels

A review of the regulatory history of Subpart Y and other federal Clean Air Act regulations provide additional criteria to understand this rule language in the context of BMOP, and supports that Subpart Y simply does not apply to a floating buoy 82 statute miles offshore in exposed waters of the GOM to load VLCCs for crude oil export. Accordingly, the following sections present a review of the rule development history, focusing on the following key points:

- A "loading berth" at the "offshore loading terminals" referenced in the development of the rule and concurrent USCG regulations had the following characteristics, that do not align with the proposed Project:
  - Fixed loading positions,
  - Location in state territorial waters that are either "protected" or "partially protected" consistent with USCG definitions, and
  - All of the equipment necessary to fill marine tank vessels was at the "terminal."
- The Project is not a "similar source" to any of the existing sources evaluated for the "offshore loading terminal" subcategory in the development of Subpart Y based on a source-specific comparison of:
  - Design,
  - Size (capacity),
  - Emissions, and
  - Capability of Control.

- The Project is not a “similar source” to the inshore sources identified as subject to local jurisdiction control requirements relied upon as the basis for the “MACT floor” for new “offshore loading terminals” under Subpart Y.
- The Project is a new source type, not conceived during the development of Subpart Y (1995 for the original rule, 2011 for the residual risk and technology review), such that broad extension of the vague definition to a contemporary source type is inconsistent with the original intent during rule development.

3.1.1 Review of Other Clean Air Act Definitions Relating to a “Structure”

The term “sea-based structure” is not defined in Subpart Y, nor is “structure” defined in Part 63. Under Section 111(a)(3) of the Clean Air Act, the term “stationary source” means any building, structure, facility, or installation which emits or may emit any air pollutant. 40 CFR §52.21(b) continues to expand upon this terminology, but in the context of a Prevention of Significant Deterioration (PSD) permit:

> Building, structure, facility, or installation *means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement (U.S. Government Printing Office stock numbers 4101-0066 and 003-005-00716-0, respectively)*

The 1980 PSD rules identified marine terminal loading operations and defined “dockside activities” to identify the emissions activities that would be stationary sources, subject to stationary source regulations (such as PSD and Subpart Y).

> *The term "dockside activities" means those activities in which the ships would engage while docked at the terminal. While "stationary source" encompasses combinations of activities, it is limited to combinations that would be "stationary," that is, fixed to the particular site.*

And in considering “all of the pollutant-emitting activities,” a platform is not a pollutant emitting activity. As well, EPA’s considerations for construction permitting inform that EPA did not intend a single stationary source to encompass activities that would be many miles apart along a longline operation.[30]

While not specific to Part 63, each of these defined terms and statements of EPA’s intent in regulating stationary sources at the time provide context to Subpart Y definitions. From these approaches, the idea of a “terminal” and “loading berth” under Subpart Y can be focused with the following: equipment on the vessels are not stationary and do not make a “loading berth.” As well, all the equipment “necessary to fill marine tank vessels” must be dockside or at a common-sense notion of a single “plant.”[31] It is incongruous with common sense, case law, and the ordinary meaning of “building, structure, facility, or installation” to

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[30] 45 FR 52694-52695, August 7, 1980.

[31] Alabama Power Company, et al., Petitioners, v. Douglas M. Costle, As Administrator, Environmental Protection Agency, et al., Respondents, Sierra Club, et al., Intervenors., 636 F.2d 323 (D.C. Cir. 1980) - U.S. Court of Appeals for the DC Circuit - 636 F.2d 323 (D.C. Cir. 1980) - Argued April 20, 1979. Decided Dec. 14, 1979 (as Amended April 21, 1980).

group existing and new activities for marine loading that are many miles apart along a longline operation at separate stationary sources.[32]

The consideration of other Clean Air Act terminology informs the following criteria to interpret Subpart Y definitions:

- Sea based structure(s) refers to pollutant-emitting activities, not a platform by itself
- Greater than 0.5 miles from shore refers to a distance beyond which dockside activities are not "adjacent"
- All of the equipment necessary to fill marine tank vessels must be at a single stationary source

With this Clean Air Act characterization, Subpart Y cannot apply to the Project because the pollutant-emitting sea based structure is the marine loading from CALM buoys, which does not have an adjacent "dock" nor all the equipment necessary to fill marine tank vessels within a single stationary source. Additional criteria and technical evaluation of the Project in the context of the sources included in Subpart Y is provided in the following subsections.

3.1.2 Review of Sources Included in Subpart Y to Clarify Intent of "Loading Berth"

In order to provide better understanding of the intent of the regulatory language of Subpart Y, review of the rule development, evaluated comments, and specifically, the types of sources considered an "offshore loading terminal" is necessary.

3.1.2.1 Subpart Y Rule Development

Prior to EPA's development of a federal standard for emissions from marine vessel loading operations, some states and local agencies were developing area and port-specific requirements for emissions controls for barge and ship loading and ballasting. Recognizing the potential for disparate requirements and regulations that would lead to disjointed port requirements, essentially isolating marine vessel type and design unique to specific ports of call, the Maritime Administration (MARAD) identified the impact of this path as a risk to marine safety and a disruption to interstate and foreign commerce.

A committee, the Marine Board of the National Academy of Sciences' National Research Council (NRC), or "Marine Board," was established to assess the state of affairs and to make a recommendation. The Marine Board identified that onshore emissions controls could be evaluated at the federal level, but safety regulations were first necessary from the U.S. Coast Guard. A report from the Marine Board of the National Academy of Sciences' National Research Council (NRC) noted a need for EPA to set uniform emissions standards along with the U.S. Coast Guard's promulgation of safety requirements for these uniform emissions standards.[33] This evaluation ultimately led to the inclusion of Section 183(f) when the Clean Air Act was amended in 1990, which requires the development of reasonably available control technology (RACT) standards for tank vessels "consistent with the regulations regarding safety of the Department in

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[32] 45 FR 52695 provides examples of sources and distances that would not be considered "adjacent" and part of a single stationary source. One example identified that two facilities separated by a distance of 20 miles would be too far apart to treat as one source.

[33] Marine Board, National Research Council, "Controlling Hydrocarbon Emissions from Tank Vessel Loading," 1987. (Docket A-90-44, II-I-4).

which the Coast Guard is operating."[34] Section 3.1.3 evaluates the USCG regulations, and how they can inform EPA's intent for Subpart Y.

In developing the RACT requirements for VOC reductions from tank vessel loading, EPA concurrently developed the Part 63 MACT requirements for HAP emission standards under the authority of Section 112(d) of the Clean Air Act. EPA proposed the Subpart Y standards on May 13, 1994, to limit HAP from marine tank loading and unloading operations by requiring new and existing sources to use the maximum achievable control technology.

3.1.2.2 Proposed Subpart Y and Comments

The EPA proposed rules for RACT, and also included a MACT proposal under Section 112(d). For both Clean Air Act standards, EPA identified that the sources regulated "includes only emissions that are directly caused by the loading and unloading of bulk liquids at points where marine terminal equipment is connected to marine vessel sources." The rule development described the source category as "cargo is pumped from the terminal's large, above-ground storage tanks through a network of pipes and into a storage compartment (tank) on the vessel."[35] The rule evaluation was based on traditional marine onshore terminals with co-located tank farms and fixed loading berths. This consideration of applicable sources under review was reinforced by EPA's discussion and exclusion of lightering operations:

> *Thus, this source category does not include storage tanks and leaking equipment associated with terminal transfer operations. Nor does this source category include emissions from offshore vessel-to-vessel bulk liquid transfer operations (i.e., lightering operations).* ***Lightering operations do not take place at onshore terminals.*** *The Agency may consider addressing lightering operations in a separate source category.*[36]

In the proposed rule, the EPA discussed its approach to subcategorization, as allowed under Section 112(d)(1) of the Clean Air Act. The EPA noted that "size appears to be a likely candidate for a distinguishing feature" between facilities.[37] As part of the rulemaking, EPA proposed a subcategory for offshore terminals that are part of a land-based contiguous site.[38] EPA recognized that those offshore terminals (both subsea lines and platforms) presented unique challenges for the cost and environmental impacts of installing additional subsea lines to carry vapors to land-based equipment. However, EPA proposed inclusion of these offshore terminals to solicit comments regarding the feasibility and cost of controlling their emissions, or to include as a separate subcategory. Commenters supported further subcategorization, and especially for the offshore terminals in existence at the time.

EPA summarizes the comments regarding offshore terminal subcategorization as:

> *Commenters indicated that these types of vessel loading operations face significant challenges in controlling emissions that were different from land-based, contiguous loading operations. These challenges include high costs, technical complications, and permitting requirements that would result*

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[34] CAA Section 182(f)(2).

[35] Federal Register, Volume 59, Issue 92, May 13, 1994, Section I.C.1.

[36] Ibid, Section II.A.

[37] Ibid, Section III.D.2.

[38] The proposal refers specifically to offshore terminals "less than 0.5 mile from shore" for the contiguous terminal co-location consideration, as the 0.5 mile qualifier was originally considered as a bright line distance of co-location.

> *from requirements to construct new platforms to locate control equipment adjacent to the offshore terminal or additional subsea or surface lines to route loading vapors to onshore control equipment.*[39]

EPA concurred with these commenters that offshore loading terminals were not similar sources to onshore marine loading operations, and thus re-evaluated MACT for this subcategory. EPA noted there were no more than 30 sources considered for this subcategory (28 uncontrolled terminals identified), and fewer than 20 with subsea lines and that none of these terminals controlled emissions from marine tank vessel loading. The following table delineates a list of sources considered for the offshore terminal subcategory from a submitted comment.

Table 3-1. Sources Considered for the Offshore Terminal Subcategory During Subpart Y Development (1995)

Item	Location	Operator	Vapor Control Hardware
1	Barbers Point, HI	Hawaiian Independent Refinery	None
2	Barbers Point, HI	Chevron	None
3	Coho Terminal, CA	Unocal	None
4	Drift River, AK	Unocal	None
5	El Segundo, CA	Chevron	None [a]
6	Estero Bay, CA	Chevron	None
7	Estero Bay, CA	Pacific Gas & Electric	None
8	Encina, CA	San Diego Gas & Electric	None
9	Ellwood, CA	Mobil	None [b]
10	Huntington Beach, CA	Golden West Refining	None
11	Moss Landing, CA	Pacific Gas & Electric	None
12	Mandalay Beach, CA	Southern California Edison	None
13	River Head NY	Long Island Lighting Co.	None
14	LOOP Terminal, LA	Louisiana Offshore Oil Port, Inc.	None

Source: Letter from Mike Steinbrecher, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, “Proposed Rule: Marine Tank Vessel Loading Operations,” March 13, 1995, IV-D-136 of Docket A-90-44.

a. This terminal uses emission reduction credits generated from a vehicle scrappage program to meet the local marine vapor control requirements.

b. This terminal is served by a barge that has its own vapor control equipment.

As detailed in Section 3.1.5 of this application, none of the sources identified above are greater than two statue miles offshore, except for the LOOP Terminal (~20 statute miles offshore). However, the LOOP Terminal did not load into marine vessels at the time; LOOP was an import-only facility until physical modifications were made in 2017 to include the equipment necessary for loading. EPA’s final rule language for Subpart Y defines a loading berth as equipment “necessary to fill marine tanks.” The LOOP facility did not fill marine tanks, and thus did not have a loading berth under the rule when the final rules were promulgated. All of the “offshore *loading* terminals” reviewed for Subpart Y development were within 2 miles of shore.

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[39] 60 FR 48393, September 19, 1995, Left column.

With only a small grouping of operating sources considered by EPA as "offshore loading terminals," further explanation and description of the extent of the subcategory likely seemed unnecessary. Rather, generic language based only on a single distance of 0.5 mile from shore presumably appeared sufficient, as the Subpart Y requirements for existing offshore units – no control[40] - would not have changed with so few sources identified. As well, with less than 30 sources captured, and none affected by the rule (no change in practice or control), there is no indication that EPA considered a hypothetical future source in deeper and unprotected water compared to inshore or near-shore piers in protected bays when developing the Subpart Y standards.

3.1.3 Review of USCG Requirements That Inform Subpart Y Applicability

The EPA's uniform emission standards for Subpart Y were to mirror the USCG's safety requirements. The EPA developed emission standards <u>after</u> marine safety was confirmed, noting in the proposal "a primary concern in the implementation of these proposed regulations is safety." The EPA stressed that the goal of the proposed Subpart Y was that safety factors were considered and "nothing in the proposed regulations…is inconsistent with current U.S. Coast Guard regulations."[41] As discussed below, there is no information to indicate that DWP operations were considered at the time of Subpart Y development.

3.1.3.1 USCG Requirements Characterize a "Loading Berth" is a Fixed Berth

Subpart Y includes requirements for vapor control of new "offshore loading terminals," with vapor captured from loading and controlled by either a vapor combustion unit (VCU) or a vapor recovery unit (VRU).[42] The USCG defines safety requirements for *Facilities Transferring Oil or Hazardous Material in Bulk* at 33 CFR Part 154, which includes explicit requirements for facility vapor control systems (VCS).[43] The following USCG regulations provide directly relevant context to EPA's consideration of what is an "offshore loading terminal" in the development of Subpart Y.

3.1.3.1.1 <u>33 CFR §154.2000 Applicability</u>

> *(a)(4) A facility VCS that receives cargo vapor from a vessel when the VCS is connected to a facility's main VCS that serves plant processing areas, such as tank storage areas or tank truck or railcar loading areas, unrelated to tank vessel operations. The requirements of this subpart apply between the vessel vapor connection and the point where the VCS connects to the facility's main VCS.*

The USCG's initial applicability section for VCS safety requirements shows consideration of VCS at a fixed location with direct access to an onshore facility with tank storage areas and truck and railcar access. This is consistent with EPA's beyond-the-floor evaluation for existing "offshore loading terminals" in Subpart Y which simply added a $10,000,000 cost for subsea vapor pipelines back to shore from "offshore loading terminals," with the VCU sited onshore (with access to natural gas fuel). Even with such a simplified cost analysis, EPA determined that costs were prohibitive for a beyond-the-floor determination, as the costs were

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[40] The final requirements of Subpart Y exempted existing offshore loading terminals. It was not until the residual risk and technology rule in 2011 that EPA added the requirement for existing offshore loading terminals to utilize submerged fill to control emissions (76 FR 22566, April 21, 2011)

[41] Federal Register, Volume 59, Issue 92, May 13, 1994, Section I.D.3.a.

[42] 40 CR §63.562(b)(4).

[43] Promulgated prior to Subpart Y, 55 FR 2596, June 1990.

five times that of onshore capture and control.[44] EPA ultimately concluded that the MACT floor for existing offshore loading terminals was no control "because of the poor cost effectiveness resulting from these significantly higher costs, as well as the environmental, safety, and technical challenges associated with requiring control more efficiently than the MACT floor."[45]

3.1.3.1.2 33 CFR §154.2001 Definitions

> *Facility vapor connection means the point in a facility's vapor collection system where it connects to a vapor collection hose or the base of a vapor collection arm and is located at the dock as close as possible to the tank vessel to minimize the length of the flexible vapor collection hose, thus reducing the hazards associated with the hose.*

The vapor connection is required to be "as close as possible" to the tank vessel "at the dock." Again, USCG's requirements suggest that it considers a VCS is appropriate only in the context of a loading berth that has a "dock," which would be a fixed berth such as a pier, jetty, or fixed platform location. Each of these fixed surfaces would also provide a surface adjacent to the vessel to minimize the length of a hose or arm to the VCS.

3.1.3.1.3 33 CFR §154.2105 Fire, explosion, and detonation protection

> *(a)(1) Be capable of inerting the vapor collection line in accordance with 33 CFR 154.2107(a) before receiving the vessel's vapor and have at least one oxygen analyzer, which satisfies the requirements of 33 CFR 154.2107(f)(1) and (2), (g), and (h)(2) and (3), sampling the vapor concentration continuously at a point as close as practicable to the facility vapor connection. The total pipe length between the analyzer and the facility vapor connection must not exceed 6 meters (19.7 feet)*
>
> *(b)(1) Satisfy the requirements of paragraph (a)(1) of this section and have a detonation arrester located as close as practicable to the facility vapor connection. The oxygen analyzer required by paragraph (a)(1) can be located 4 meters (13.1 feet) downstream of the detonation arrester. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source, or*
>
> *(b)(2) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source.*

The USCG regulations are explicit in consideration of safety devices for a VCS. Each of the citations above provide a maximum distance for placement of the safety devices from the connection to the vessel.

3.1.3.1.4 33 CFR §154.2107 Inerting, enriching, and diluting systems

> *(b) A VCS that uses an inerting, enriching, or diluting system must be equipped, except as permitted by 33 CFR 154.2105(a), with a gas injection and mixing arrangement located as close as practicable to the facility vapor connection and no closer than 10 meters (32.8 feet) upstream from the vapor*

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[44] Letter from J.D. Bellows, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, "Technical Choices for Marine Vapor Controls on Loading Operations at Offshore Terminals, July 21, 1993, IV-D-136 of Docket A-90-44.

[45] 60 FR 48393.

> *processing unit or the vapor-moving device that is not protected by a detonation arrester required by 33 CFR 154.2108(b). The total pipe length between the arrangement and the facility vapor connection must not exceed 22 meters (72.2 feet). The arrangement must be such that it provides complete mixing of the gases within 20 pipe diameters of the injection point. The vapor piping between the arrangement and the facility vapor connection must be protected from any potential internal or external ignition source.*

Inerting, enriching, and diluting system safety requirements are a continuation of the exacting location requirements for detonation arresters, etc. The specific distance requirements can only be accommodated with an adjacent "dock," consistent with the applicability statement in 33 CFR §154.2000. Compliance with the safety device requirements is typically met at marine terminals with a dock safety unit (DSU), an entire skid that includes the detonation arrester, pressure control, oxygen analyzer, and inerting/enrichment equipment.

Figure 3-1. Example Dock Safety Unit

In requiring vapor control under Subpart Y that harmonized with the USCG safety regulations, EPA would have needed to consider environmental compliance options that could also conform with the safety requirements. Because USCG's safety requirements are limited only to applications with a "dock" and immediately adjacent surfaces to locate a DSU, EPA could not have considered a facility without a "dock" as requiring vapor capture and control as "nothing in the proposed [Subpart Y]…is inconsistent with current U.S. Coast Guard regulations."[46] Accordingly, a "loading berth" for a new "offshore loading terminal" was envisioned as a fixed berth, such as a pier, jetty, or loading platform. A CALM buoy is not a fixed berth, and the proposed Project has no location that can meet the USCG requirements for a DSU.

A CALM buoy is not consistent with this contextual understanding of "loading berth" under Subpart Y.

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[46] Federal Register, Volume 59, Issue 92, May 13, 1994, Section I.D.3.a.

3.1.3.2 USCG Requirements Characterize Distance Offshore

In addition to the context that USCG safety regulations provide to understand that a “loading berth” must be a fixed berth for purposes of consistent Subpart Y applicability, USCG definitions also help inform the practical bounds of “greater than 0.5 miles offshore.” All of the offshore sources in existence and considered for the rule development, including the import facility at the Louisiana Offshore Oil Port (LOOP),[47] are in protected waters or partially protected waters, as the terms are defined by USCG at 46 CFR §170.050.

Further, all sources “loading liquids from shore” that were grouped in the “offshore loading terminal” subcategory were within 3 statute miles of shore (state territorial waters in the case of the Subpart Y sources). Each such “offshore loading terminal” would have been under the jurisdiction of the state or local agency and thus requiring uniformity of a federal rule, per the Marine Board’s stated purpose driving federal rulemaking. Applying “offshore loading terminals” only to sources within state territorial waters is consistent also with the USCG regulations with which Subpart Y was directed to mirror, as 33 CFR §154.100 “does not apply to any offshore facility operating under the jurisdiction of the Secretary of the Department of Interior” – or those sources in the Outer Continental Shelf (OCS).[48]

No sources were evaluated or identified as being located in “exposed waters,” in the “ocean” which means greater than 20 nautical miles (~23 statute miles) offshore.[49] The definition of “exposed waters” is based on distance *and* weather – both of which significantly impact the design of the Project and access to resources (i.e., capability of control). Notably, the National Weather Service (NWS) specifically evaluates weather and wave conditions in regional zones offshore. The following figures present the zones for the East Coast and GOM, as well as the Pacific.

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[47] “The Louisiana Offshore Oil Port is a deepwater port designed for unloading crude oil cargoes from deep-draft tankers. The LOOP Marine Terminal is located in the Gulf of Mexico approximately 29 kilometers (18 nautical miles) offshore from the State of Louisiana.” https://www.loopllc.com/Information-Central/Port-Information

[48] Section 2 of the Submerged Lands Act (Public Law 31, 83rd Congress, 1st Session)

[49] 46 CFR §30.10-45, defines “Ocean – TB/O:” *Under this designation shall be included all tank vessels normally navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore*.

46 CFR §170.050(c), “Exposed waters” *means waters more than 20 nautical miles (37 kilometers) from the mouth of a harbor of safe refuge and other waters which the Officer in Charge, Marine Inspection determines to present special hazards due to weather or other circumstances*.

Figure 3-2. Atlantic Offshore and High Seas Forecast Areas

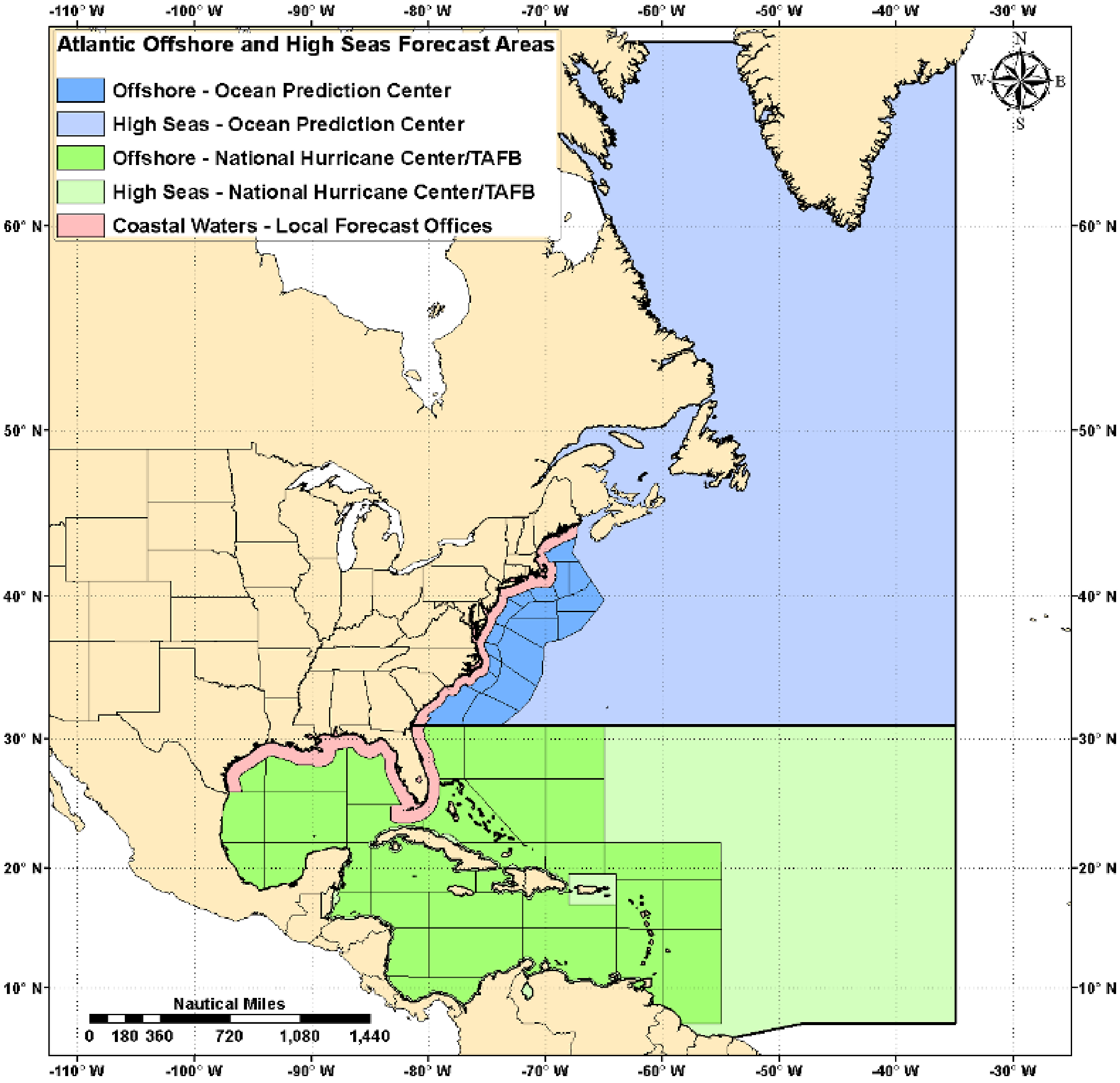
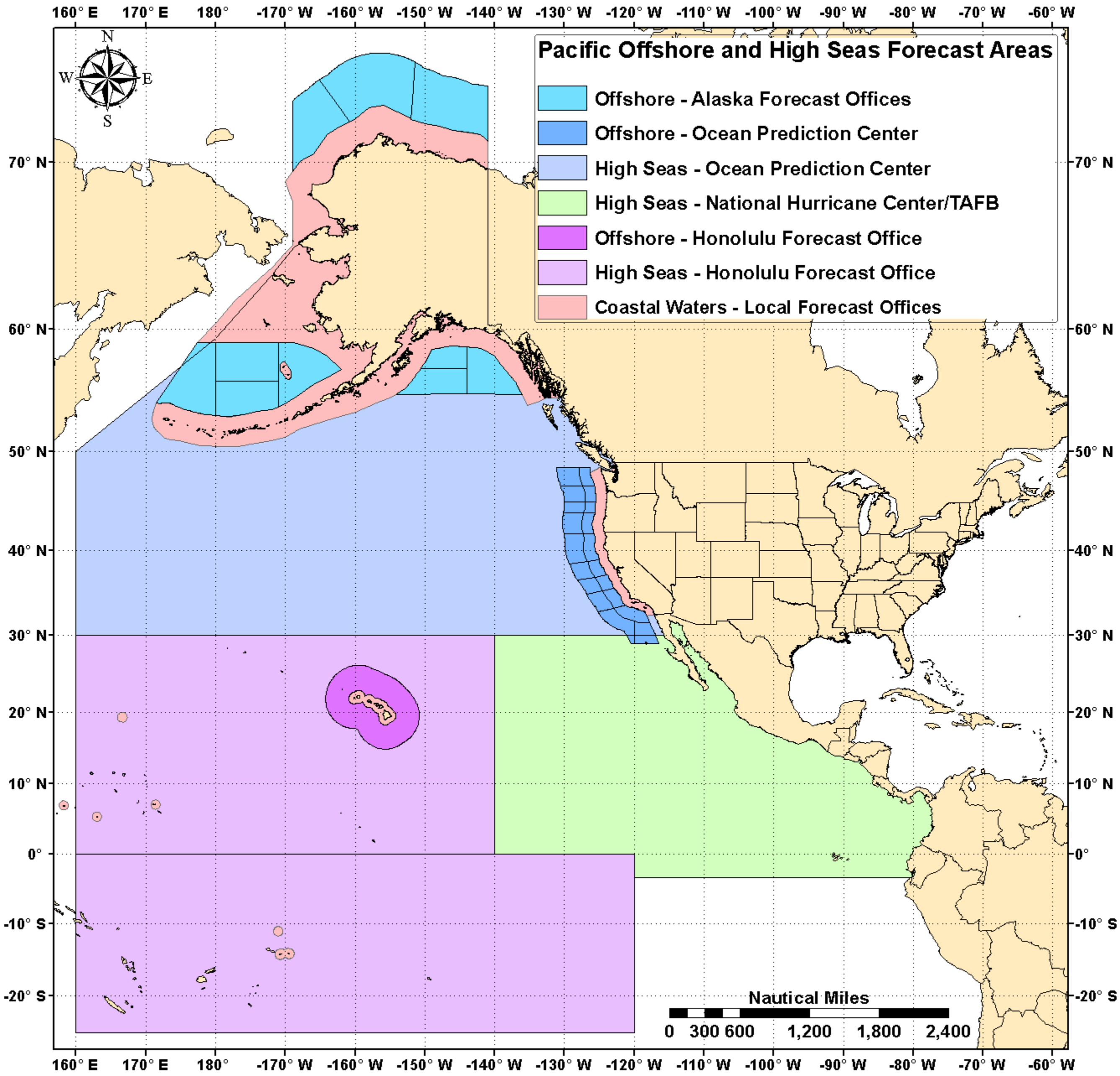


Figure 3-3. Pacific Offshore and High Seas Forecast Areas



Consistent with the USCG classification, the NWS classifies all near shore "coastal waters" (within 20 nautical miles of shore) as one weather zone.[50] In other words, weather and wave conditions are grouped for everything from 0.5 miles from the shore all the way to 20 nautical miles from the shore. In the GOM, a second weather and wave regional forecast is provided for "coastal waters" from 20 nautical miles out to 60

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[50] Examples, Coastal waters from Cameron LA to High Island TX out 20 NM (Zone GMZ450-222330). https://forecast.weather.gov/shmrn.php?mz=gmz450&syn=gmz400

nautical miles. At greater than 60 nautical miles offshore in the GOM the NWS further distinguish weather and wave data for distant “offshore waters.”[51] BMOP is located greater than 60 nautical miles from shore.

Because Subpart Y was developed in concert with USCG regulations, it is logical to interpret the Subpart Y promulgated subcategory for offshore loading terminals along with USCG definitions. All existing sources included in the subcategory were in “protected waters” or “partially protected waters” as defined at 46 CFR §170.050, with coastal weather conditions.

Accordingly, the context of the “offshore loading terminal” under Subpart Y should mean that all components necessary for a fixed loading berth at a single stationary source, which is located in a coastal area greater than 0.5 miles from shore in protected waters or partially protected waters are considered subject to the definition and subsequent Subpart Y applicability – not expansion of Subpart Y by virtue of an overly-broad definition to a DWP operation 82 nautical miles from shore that could not have been built when Subpart Y was promulgated.

3.1.4 The Project is Not a Similar Source to Subpart Y Offshore Loading Terminals

With a deeper evaluation of the floor sources, the context of rule development, and a contemporary lens on interpreting the applicability of Subpart Y, the BMOP Project is not a similar source to the “offshore loading terminal” subcategory. The enumerated characteristics of similar sources, design, size, emissions, and capability of control, are not met with any of the sources grouped under Subpart Y. This section details each of these dissimilar characteristics.

3.1.4.1 Similar Source Criteria

As identified in *Sierra Club v. EPA (intervenor Brick Industry Association) (03-1202),* the differentiation of broad source categories into subcategories is provided in the CAA itself, subject to reasonableness in the choice of subcategorization.

> *Section 112(d)(1) authorizes the Administrator to “distinguish among classes, types and sizes of sources within a category or subcategory,” and the language of subsections 112(d)(2) and (3) pervasively refers to standards for sources in each “category or subcategory.” The authority to generate subcategories is obviously not unqualified; at the least it must be limited by the usual ideas of reasonableness.* [Sierra Club v. EPA (intervenor Brick Industry Association) (03-1202)]

Following the direction in the CAA, EPA developed a definition for *similar source* during the initial rulemaking to implement Section 112(g).

> Similar source *means a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed major source such that the source could be controlled using the same control technology.* [40 CFR 63.41]

From EPA’s definition, there are four factors to consider.

1. Structurally similar in design
2. Structurally similar in size (capacity)
3. Comparable emissions
4. Capable of control using the same control technology

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[51] https://www.nhc.noaa.gov/abouttafbprod.shtml

EPA considered similar factors when evaluating what would be appropriate subcategorization under Subpart Y: size, commodities, and distance from shore. These Subpart Y-specific considerations are addressed along with the four factors in a review of the sources identified in the "offshore loading terminal" subcategory during the Subpart Y development. By evaluating these sources one-by-one against each of the four similar source criteria, it is evident that the proposed Project is not similar to any of the "offshore loading terminals" under Subpart Y. A case-by-case MACT review is instead required under Subpart B.

Overview of the purpose and design of the BMOP Project:

- Design:
  - Floating buoy instead of a fixed berth to accommodate loading of large crude-carrying vessels in unprotected, exposed waters of the open ocean
- Size (Capacity):
  - Deep water location capable of fully loading VLCCs and other large seafaring crude-carrying vessels for crude oil export
  - Loading rate that can fully load a VLCC in about a day
- Emissions:
  - Loading into the marine vessel (compared to unloading only)
  - Export of various types of crude oil (not refined products, condensate, or other commodities)
- Capability of Control:
  - Serving the global market with capability to load the international fleet of VLCCs, and not limited to a confined route or constrained, customized vessel
  - Maintain safe loading requiring vessel cargo pressure balancing, appropriate location of detonation arresters, and safe VLCC mooring in the project location

Each of these are compared to the Subpart Y sources identified by EPA during development of Subpart Y regulations for offshore loading terminals.

3.1.4.2 Not Structurally Similar in Design

Because the Project location is approximately 82 statute miles into the exposed offshore waters of the Gulf of Mexico, use of a non-fixed mooring location with the ability to weathervane is an important project design criterion. A fixed berth cannot be substituted and achieve the purpose of the Project – safe and efficient loading of crude for export. The following summarizes the contrast of the sources evaluated in the development of Subpart Y.

Table 3-2. Comparison of Design of BMOP Project to Subpart Y Sources

Source	Location	Distance to Shore	Berth	Similar Design?
BMOP	**Offshore in exposed waters**	**82 miles**	**Floating CALM buoys**	**Project Design**
Hawaiian Independent Refinery Barbers Point, HI	Nearshore, partially-protected coastal waters	1.8 miles	Floating SPM buoy	No

Source	Location	Distance to Shore	Berth	Similar Design?
Chevron Barbers Point, HI[52]	Nearshore, partially-protected coastal waters	1.38 miles	Fixed multi-buoy	No
Unocal Cojo Terminal, CA[53]	Nearshore, partially-protected coastal waters	0.38 miles	Fixed multi-buoy	No
Unocal Drift River, AK[54]	Inshore, protected waters	1.75 miles	Fixed loading platform	No
Chevron El Segundo, CA	Nearshore, partially-protected coastal waters	1.5 miles	Fixed multi-buoy	No
Chevron Estero Bay, CA[55][56]	Nearshore, partially-protected coastal waters	0.61 miles	Fixed multi-buoy	No
Pacific Gas & Electric Estero Bay, CA[57]	Nearshore, partially-protected coastal waters	0.85 miles	Fixed multi-buoy	No
San Diego Gas & Electric Encina, CA[58]	Nearshore, partially-protected coastal waters	0.5 miles	Fixed multi-buoy	No
Mobil Ellwood, CA	Nearshore, partially-protected coastal waters	0.5 miles	Fixed multi-buoy	No
Golden West Refining Huntington Beach, CA[59]	Nearshore, partially-protected coastal waters	1.36 miles	Fixed multi-buoy	No
Pacific Gas & Electric Moss Landing, CA[60]	Nearshore, partially-protected coastal waters	0.75 miles	Fixed multi-buoy	No
Southern California Edison Mandalay Beach, CA[61]	Nearshore, partially-protected coastal waters	1 mile	Fixed multi-buoy	No
Long Island Lighting Co. River Head, NY	Nearshore, partially-protected coastal waters	1.3 miles	Fixed loading platform	No

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[52] 67 FR 15484, April 2, 2002.

[53] California Coastal Commission, Application File No.: E-02-11, Unocal Corporation, Cojo Marine Terminal, Point Conception, Santa Barbara Co., Staff Report, 8/23/02.

[54] Alaska Department of Environmnetal Conservation Air Permits Program, Statemet of Basis for the terms and conditions of Permit No. AQ0190TVP03.

[55] Jones & Stokes Associates, United States. Bureau of Land Management. Pacific Outer Continental Shelf Office, National Coastal Ecosystems Team (U.S.), *Ecological Characterization of the Central and Northern California Coastal Region: pt. 1. Regional characterization*, 1981.

[56] California Coastal Commission, Application File No.: E-98-26, Chevron Pipeline Company, Estero Bay Marine Terminal Partial Abandonment, Revised Findings.

[57] City of Morro Bay, Coastal Land Use Plan, Chapter VII. Energy/Industrial Development. https://www.morro-bay.ca.us/DocumentCenter/View/513/LCP-Chapter-VII-Energy_Industrial-Development?bidId=

[58] https://www.nrg.com/case-studies/carlsbad.html

[59] https://www.latimes.com/california/story/2020-01-30/more-than-400-000-gallons-of-crude-oil-fouled-the-orange-county-coast-30-years-ago

[60] United States. National Oceanic and Atmospheric Administration, *Final Environmental Impact Statement and Management Plan for the Proposed Monterey Bay National Marine Sanctuary, Volume 1*, 1992.

[61] https://www.slc.ca.gov/wp-content/uploads/2018/08/PF2002-Decommissioning-Current.pdf

Source	Location	Distance to Shore	Berth	Similar Design?
Louisiana Offshore Oil Port, Inc. Terminal, LA	Partially-protected coastal waters	20 miles	Floating SPM buoy	No
Gaviota Interim Marine Terminal	Nearshore, partially-protected coastal waters	0.7 miles	Fixed multi-buoy	No
Santa Ynez Unit	Nearshore, partially-protected coastal waters	3.2 miles	Fixed tandem to OS&T	No
Chevron Richmond Refinery Long Wharf	Inshore, protected waters	0.75 miles	Fixed pier	No
Pacific Refining Hercules	Inshore, protected waters	0.6 miles	Fixed loading platform	No

None of the sources considered for the “offshore loading terminal” in the development of Subpart Y have a similar design. LOOP is not in “exposed waters” per the USCG’s definition and is considered a “coastal waters” location by the NWS.

3.1.4.3 Not Structurally Similar in Size

Considering the next criteria for similar sources, size, the following table presents a summary of the Subpart Y offshore loading terminal sources.

Table 3-3. Comparison of Size of BMOP Project to Subpart Y Sources

Source	Vessel Size	Depth of Water	Similar Size?
BMOP	**320,000 dwt**	**162 feet**	**Project Design**
Hawaiian Independent Refinery Barbers Point, HI[62]	150,000 dwt	~70 feet (max draft 55 feet)	No
Chevron Barbers Point, HI	125,000 dwt	~70 feet (max draft 55 feet)	No
Unocal Cojo Terminal, CA	Barge	32 feet	No
Unocal Drift River, AK	80,000 dwt	60 feet	No
Chevron El Segundo, CA	130,000 dwt	65 feet (max draft 56 feet)	No
Chevron Estero Bay, CA	50,000 dwt	52 feet (max draft 38 feet)	No
Pacific Gas & Electric Estero Bay, CA	50,000 dwt	50 feet (max draft 38 feet)	No
San Diego Gas & Electric Encina, CA	80,000 dwt	~50 feet (max draft 36 feet)	No
Mobil Ellwood, CA	30,000 dwt	60 feet (max draft 40 feet)	No
Golden West Refining Huntington Beach, CA	125,000 dwt	50 feet (max draft 42 feet)	No
Pacific Gas & Electric Moss Landing, CA	50,000 dwt	~50 feet (max draft 38 feet)	No
Southern California Edison Mandalay Beach, CA	80,000 dwt	45 feet (max draft 35 feet)	No

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[62] https://www.findaport.com/port-of-barbers-point-par-hawaii-spm

Source	**Vessel Size**	**Depth of Water**	**Similar Size?**
Long Island Lighting Co. River Head, NY	200,000 dwt	62 feet	No
Louisiana Offshore Oil Port, Inc. Terminal, LA	700,000 dwt	102 feet	No
Gaviota Interim Marine Terminal	40,000 dwt	40 feet (max draft 36 feet)	No
Santa Ynez Unit	60,000 dwt	>400 feet	No
Chevron Richmond Refinery Long Wharf	61,000 dwt	~50 feet	No
Pacific Refining Hercules	50,000 dwt	~40 feet	No

Source: Conventional Buoy Mooring Installations, California, Hawaii, and Mexico (West Coast) from Docket A-90-44.

For this criterion, none of the sources are similar. Only LOOP can accommodate a similar class of vessel, but LOOP did not have the capability to load vessels during Subpart Y development.

3.1.4.4 Not Comparable Emissions

The comparison continues for similar emissions profiles. In considering similar emissions for the sources under review in the development of Subpart Y, there is a significant difference in emissions at the offshore source depending on the commodity, and whether it is loaded or unloaded from ships. Identifying the adjacent facility is helpful to distinguish these marine loading emissions profiles, as this would direct the purpose of the marine loading.

Table 3-4. Comparison of Emissions of BMOP Project to Subpart Y Sources

Source	**Loading / Unloading**	**Commodity**	**Adjacent Facility**	**Similar Emissions?**
BMOP	**Loading**	**Crude Oil**	**None**	**Project Design**
Hawaiian Independent Refinery Barbers Point, HI	Unloading: Loading:	Crude Oil Refined Products	Refinery	No
Chevron Barbers Point, HI	Unloading: Loading:	Crude Oil Refined Products	Refinery	No
Unocal Cojo Terminal, CA	Loading	CA Crude Oil	Terminal	No
Unocal Drift River, AK	Loading	AK Crude Oil	Terminal	No
Chevron El Segundo, CA	Unloading: Loading:	CA Crude Oil Refined Products	Refinery	No
Chevron Estero Bay, CA	Loading	CA Crude Oil	Terminal	No
Pacific Gas & Electric Estero Bay, CA	Unloading	Fuel Oil	Power Plant	No
San Diego Gas & Electric Encina, CA	Unloading	Fuel Oil	Power Plant	No
Mobil Ellwood, CA	Loading	CA Crude Oil	Terminal	No
Golden West Refining Huntington Beach, CA	Unloading: Loading:	Crude Oil Refined Products	Refinery	No

Source	Loading / Unloading	Commodity	Adjacent Facility	Similar Emissions?
Pacific Gas & Electric Moss Landing, CA	Unloading	Fuel Oil	Power Plant	No
Southern California Edison Mandalay Beach, CA	Unloading	Fuel Oil	Power Plant	No
Long Island Lighting Co. River Head, NY	Loading and Unloading	Intl Crude Oil and Refined Products	Onshore Terminal	No
Louisiana Offshore Oil Port, Inc. Terminal, LA	Unloading	Intl Crude Oil	None	No
Gaviota Interim Marine Terminal	Loading	CA Crude Oil	Onshore Processing Facility	No
Santa Ynez Unit	Loading	CA Crude Oil	OS&T	No
Chevron Richmond Refinery Long Wharf	Unloading: Loading:	Crude Oil Refined Products	Refinery	No
Pacific Refining Hercules	Unloading: Loading:	Crude Oil Refined Products	Refinery	No

Again, none of the sources from Subpart Y review are similar to the proposed Project. Of the few that loaded crude oil, Cojo Terminal, Drift River, Chevron Estero Bay, Mobil Ellwood, Long Island River Head, Gaviota Interim Marine Terminal, and Santa Ynez Unit, none exported crude oil – they were only for distributing nearby produced crude to domestic refineries. The crude handled was from a single, or limited area of production, and did not experience the variability in crudes that the proposed BMOP Project will load. Furthermore, only one is still operating (now the United Riverhead Terminal, discussed in more detail later in this application).

3.1.4.5 Not Capable of Control Using the Same Control Technology

The final criteria considered in the evaluation of similar sources is whether the sources are capable of control by the same emissions control technology.

Table 3-5. Comparison of Control Capability of BMOP Project to Subpart Y Sources

Source	Vessel Fleet Loaded	Access to Resources	USCG-Compliant DSU-Capable	Similar Control Capability?
BMOP	**International**	**No**	**No**	**Project Design**
Hawaiian Independent Refinery Barbers Point, HI	Local, but not dedicated	Nearshore	No	No
Chevron Barbers Point, HI	Local, but not dedicated	Nearshore	No	No
Unocal Cojo Terminal, CA	Barge	Nearshore	No	No
Unocal Drift River, AK	International	Nearshore and fixed surface	Yes	No

Source	**Vessel Fleet Loaded**	**Access to Resources**	**USCG-Compliant DSU-Capable**	**Similar Control Capability?**
Chevron El Segundo, CA	Local, but not dedicated[63]	Nearshore	No	No
Chevron Estero Bay, CA	Local, but not dedicated	Nearshore	No	No
Pacific Gas & Electric Estero Bay, CA	Local, but not dedicated	Nearshore	No	No
San Diego Gas & Electric Encina, CA	Local, but not dedicated	Nearshore	No	No
Mobil Ellwood, CA	Customized, dedicated	Nearshore and onboard	Yes (onboard)	No
Golden West Refining Huntington Beach, CA	Local, but not dedicated	Nearshore	No	No
Pacific Gas & Electric Moss Landing, CA	Local, but not dedicated	Nearshore	No	No
Southern California Edison Mandalay Beach, CA	Barge	Nearshore	No	No
Long Island Lighting Co. River Head, NY	Local, but not dedicated	Nearshore and fixed surface	Yes	No
Louisiana Offshore Oil Port, Inc. Terminal, LA	International	No	No	**Yes**
Gaviota Interim Marine Terminal	Customized, dedicated	Nearshore and processing facility	No	No
Santa Ynez Unit	Customized, dedicated	Onboard tandem OS&T	Yes (onboard)	No
Chevron Richmond Refinery Long Wharf	Local, but not dedicated	Nearshore, fixed surface, and drivable wharf	Yes	No
Pacific Refining Hercules	Local, but not dedicated	Nearshore and fixed surface	Yes	No

Because of the requirement to serve a non-dedicated, international fleet of vessels through the use of floating mooring a great distance from shore, only the LOOP facility is similar for control capability evaluation. The challenge of non-fixed vapor capture lines a great distance from any surface (platform in this case) while meeting USCG requirements,[64] maintaining operability for safe loading with pressure control, and without ready-access to shore-based resources or equipment (e.g., vapor balancing from IFR tanks or consumption of recovered gas) is similar only to the LOOP facility from the table above. However, unloading a vessel does not have the same emissions profile as loading a vessel, and therefore, the control

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[63] Based on the time of initial Subpart Y development.

[64] EPA developed Subpart Y in tandem with the USCG's safety regulations, in an effort to establish federal requirements of environmental standards that mirrored safety standards, per recommendation in: Marine Board, National Research Council, "Controlling Hydrocarbon Emissions from Tank Vessel Loading," 1987. (Docket A-90-44, II-I-4).

evaluation for LOOP during Subpart Y development would not be relevant to the current BMOP Project for loading vessels.

Evaluation of the similar source criteria one-by-one demonstrates that the proposed project is not an "offshore loading terminal" under Subpart Y, nor is it a similar source to any of the marine loading facilities in existence during rule development (both originally in 1995 and during the residual risk and technology review of 2011).

3.1.5 The Project is Not a Similar Source to Subpart Y Floor Sources

With the submitted comments and concurrence on subcategorization, EPA acknowledged a difference between types of offshore loading terminals – such as those with subsea lines and those without – but set the new source MACT standard at 95% control based on two sources (and one without subsea lines), consistent with the Bay Area Air Quality Management District (BAAQMD) Regulation 8, Rule 44 that requires 95% control from these two inshore sources.

In their submittals to EPA, which led directly to the promulgated standard, the BAAQMD describes the following:

> *We have two facilities in the Bay Area with loading operations that occur more than 0.5 miles offshore. One is on a platform, and the other is on the end of a very long pier. Both operations are controlled, and both should be considered as part of the refinery from which the product originates.*[65]

These two identified controlled offshore loading operations, as described by BAAQMD, are part of a refinery, and load refined products, not crude oil. EPA included these two specific sources to be the MACT standard setting-sources for offshore loading terminals, despite their inshore geographic location and connection to a refinery. Further, BAAQMD's comment is more directed to the perceived separation of marine vessel loading as a single source determination from the contiguous and commonly controlled refinery based on only a 0.5 mile distance.[66] In response, the EPA replied:

> *The Agency maintains its position as stated in the proposed rule that a marine tank vessel loading operation that is at least one-half mile offshore is not part of a land-based contiguous site. The Agency agrees with commenters that these offshore terminals should be considered separate (stand-alone) sources because many are supplied solely by subsea lines and others, by definition, have at least one berth that is one-half mile or more beyond the shore line. Offshore loading operations with subsea lines in particular require the permitting of either additional subsea lines to carry vapors or permitting of docks or platforms. If permits are unavailable for these offshore terminals, compliance with these standards would be impossible. These factors result in significantly higher costs compared to onshore terminals.*[67]

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[65] Letter from Milton Feldstein, BAAQMD, to Air Docket Section (6102), U.S. EPA, "Attention: Docket Number A-90-44," July 18, 1994, Page 5 of 8, IV-D-80 of Docket A-90-44

[66] See definition of "affected source" in 40 CFR §63.2.

[67] U.S. EPA, OAQPS, *Federal Standards for Marine Tank Vessel Loading Operations and National Emissino Standards for Hazardous Air Pollutants for Marine Tank Vessel Loading Operations – Technical Support Document for Final Standards: Summary of Public Comments and Responses*, July 1995, EPA-453/R-95-014.

A 0.5-mile bright line test for a separate source determination is not consistently applied in all Clean Air Act rules, nor even in the applicability of the subcategorization under Subpart Y. A single source determination was not applied to the BAAQMD sources either, as the sources would not have been major HAP sources subject to Subpart Y at all if not considered a single source with the adjacent onshore refineries. Therefore, in applying the new source MACT limit based on these sources, EPA must have considered these sources as HAP major sources due to their contiguous and adjacent refineries.

The 0.5-mile qualifier is relevant in the context of what is “adjacent” for providing capability of control. In the preamble to the final rule EPA noted the following:

> *Comments in response to this request indicated that these types of vessel loading operations face significant challenges in controlling emissions that were different from land- based, contiguous loading operations. These challenges include high costs, technical complications, and permitting requirements that would result from requirements to construct new platforms to locate control equipment adjacent to the offshore terminal or additional subsea or surface lines to route loading vapors to onshore control equipment.*[68]

Here EPA indicates that control of offshore terminals would require “adjacent” new platforms to be constructed, or subsea lines back to shore. If EPA’s definition considers 0.5 miles as a bright line to distinguish “offshore” from “onshore” terminals, then Subpart Y would necessarily consider only platforms within 0.5 miles as “adjacent” in this same context. CALM buoys, by nature, cannot have a fixed platform within 0.5 miles. BMOP’s proposed design has both CALM buoys located greater than 0.5 miles from the existing WC 509 platform complex.

Further understanding of what could be a Subpart Y new “offshore loading terminal” requires contextual considerations specific to the two BAAQMD sources.

Through review of the Subpart Y docket (A-90-44), it is understood that the two controlled “offshore” sources referenced in the BAAQMD are:

- The long wharf extending from the Chevron Richmond Refinery, and,
- A fixed berth platform that was part of the former Pacific Refining Hercules Refinery.

3.1.5.1 Not Similar Due to Design in Shallow, Protected Waters with Fixed Berths

The following figures show the best controlled sources comprising the “offshore loading terminal” subcategory of Subpart Y.

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[68] 60 FR 48393, September 19, 1995, Left column.

Figure 3-4. Marine Loading from Chevron Richmond Refinery Long Wharf

The wharf is approximately 0.75 miles long, with access by motor vehicle. The water depth is approximately 40-50 feet.[69] This accessibility reduces the impacts and loading delays of vapor line connections, pressure balancing, provides a surface for appropriately locating safety devices (e.g., detonation arresters) and efficient response time for troubleshooting, maintenance, and repair.

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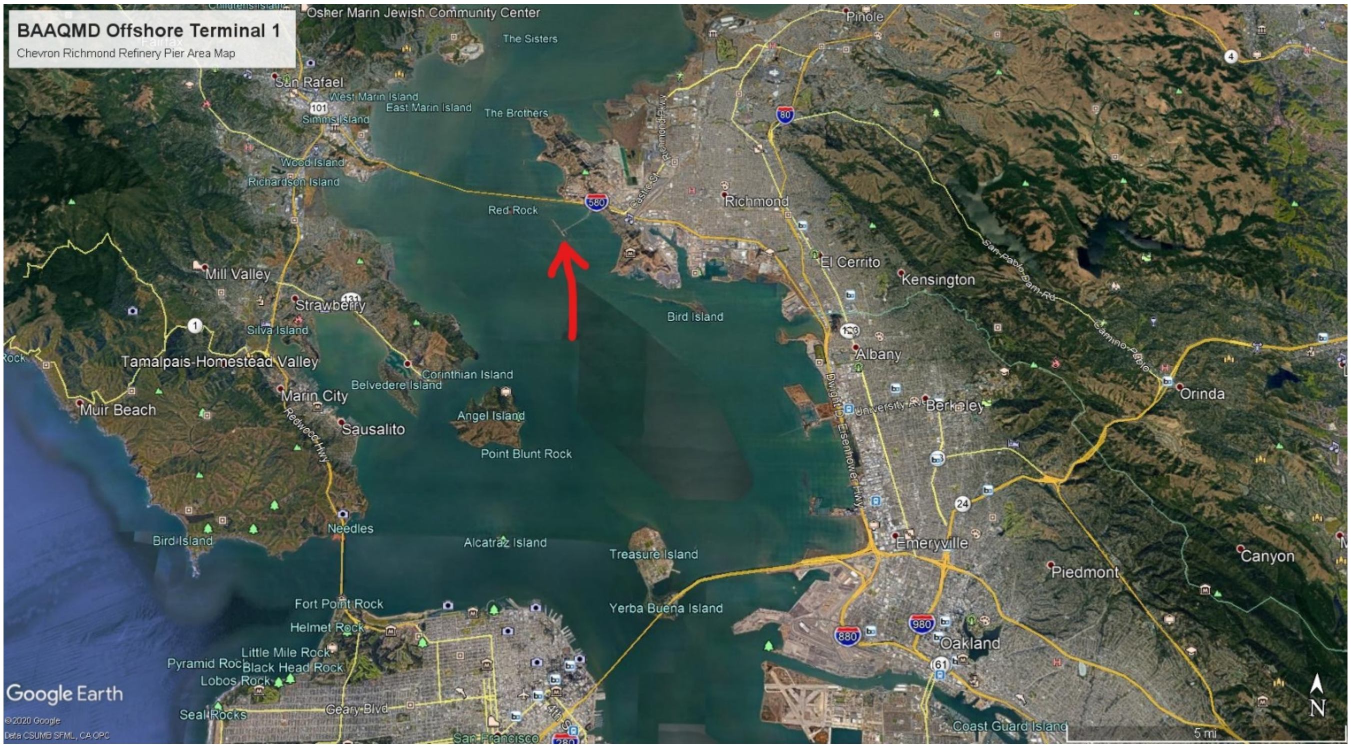
[69] NOAA Nautical Chart 18649. https://charts.noaa.gov/PDFs/18649.pdf

Figure 3-5. Chevron Richmond Refinery Long Wharf Area Map



The wharf is also entirely within the protected waters of the San Francisco Bay.

Figure 3-6. Marine Loading from Pacific Refining Hercules Fixed Berth

The platform previously loaded products from the Pacific Refining Hercules Refinery at a fixed berth.[70] It was approximately 0.6 miles from shore, in water depth between 30 and 40 feet. Note that the fixed loading berth has since been removed. Only the pier to the east remains (which is closer than 0.5 miles from shore).

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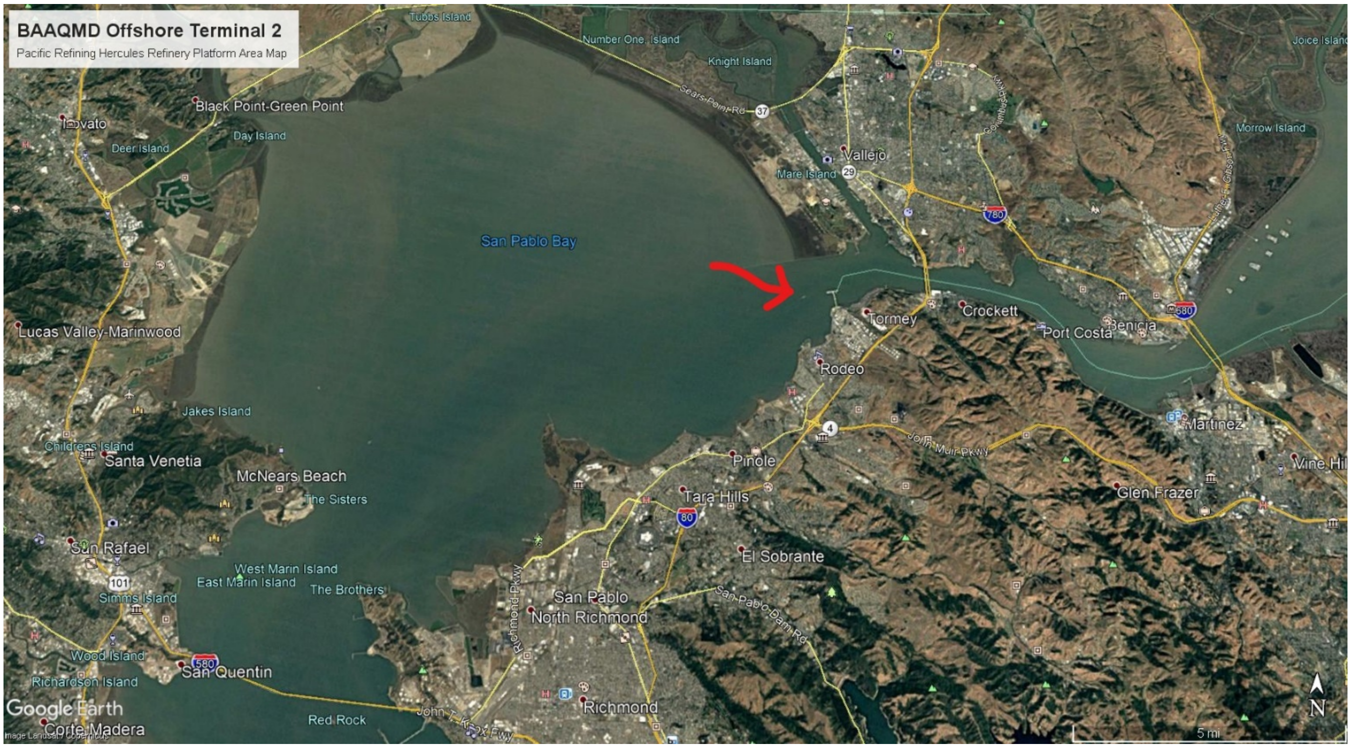
[70] The State of California has also identified ambiguity in the term “berth” and has proposed to add a definition to the California Code of Regulations, Title 17. Public Health, Division 3. Air Resources, Chapter 1. Air Resources Board, Subchapter 7.5 Airborne Toxic Control Measures, §93120(b): Berth means “a vessel’s allotted place at a wharf, pier, or dock.” The rationale for including this proposed definition was specifically to clarify that offshore tanker terminals without fixed loading berth – using the multi-buoy El Segundo Marine Terminal as a specific example of what is not a “berth.”

Figure 3-7. Pacific Refining Hercules Fixed Loading Platform Area Map



The Hercules platform is even further inshore than the Richmond long wharf, in the protected waters of San Pablo Bay.

These area maps make visually clear the distinction between these “offshore loading terminals” serving as the basis for the subcategory in Subpart Y and a DWP in the outer continental shelf approximately 82 statute miles into the ocean in exposed offshore waters. Subpart Y explicitly addresses “…offshore facilities have many loading berths located on very long piers further from shore…”[71] Neither of these Subpart Y facilities with multiple loading berths on very long piers can fully load large ocean-going crude vessels, such as VLCCs, for global export. Both have ready-access to shore based resources and provide fixed berths for USCG-compliant DSUs and a VCS in accordance with 33 CFR §154. The relatively short vapor line length would have minimal pressure drop, mitigating the need for large shore-based blowers and intricate pressure balancing.

Further, the State of California has also identified ambiguity in the term “berth” and chose to define this term as “a vessel’s allotted place at a wharf, pier, or dock.”[72] The rationale for including this definition was specifically to exclude offshore tanker terminals – using El Segundo as a specific example. The fixed berth design inshore is not representative of BMOP.

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[71] See letter from Matthew Todd, API, to Air and Radiation Docket ID No. EPA-HQ-OAR-2010-0600, “Comments on EPA’s Proposed Rule – Residual Risk and Technolgoy Review (RTR) “National Emission Standards for Marine Tank Vessel Loading Operations” 75 Federal Register 65068 (October 21, 2010),” December 6, 2010, page 8.

[72] Section 93130.2(b).

3.1.5.2 Not Similar Due to Emissions from Petroleum Product Commodities

The floor sources could not accommodate VLCCs, nor did they load crude oil into vessels at all.

EPA's proposed rule considered facilities that both load and unload liquid commodities (e.g., crude oil, gasoline, jet fuel, kerosene, toluene, alcohols, fuel oil numbers 2 and 6, some chemicals, and groups of solvent or petrochemical products, etc.). EPA identified 1,648 U.S. terminals and sorted them by thirteen (13) different classifications of commodities. Crude oil (commodity number 1311 per the Army Corps of Engineers' Water Resources Support Center) was a separate and distinct commodity category used for classification from gasoline (commodity number 2911) and other petroleum products and volatile organic liquids.

Furthermore, of the crude oil terminals identified, EPA noted that nearly 50% of all crude oil loaded, and almost 80% of all emissions from the commodity, was attributed to a single terminal, Alyeska's Valdez, Alaska terminal.[73] The Valdez Marine Terminal (VMT) subsequently became its own subcategory because it loaded only crude oil, its loading rates were 15 times higher than the other marine terminals, and it was subjected to unique weather conditions. EPA's promulgation of a single-source subcategory for VMT is similar to a case-by-case MACT analysis, and for very similar reasons to BMOP's Project (crude oil only, high loading rates, unique weather conditions offshore).

In further Subpart Y rule development and evaluation in the residual risk and technology review, EPA once again focused on the commodity loaded (75 FR 65068). Based on preliminary review of the 2005 National Emissions Inventory (NEI) and a sales quote from a single vendor for a single terminal, EPA proposed to require the addition of vapor capture and control capable of achieving 97% reduction from those offshore loading terminals with capacities greater than 1 million barrels of *gasoline* per year. EPA noted that the HAP emissions from offshore loading terminals did not result in unacceptable risk. Instead, the control technology proposal was based on a re-review of the beyond-the-floor analysis, from the original 1995 standard.

EPA's review in the development of Subpart Y identified HAP emissions from gasoline loading specifically as necessitating additional subcategorization for emissions control (following the previous discussion above).[74] The focus on gasoline loading is consistent with the two floor sources, which also loaded refined products, such as gasoline.

At the time of Subpart Y development, methyl tertiary butyl ether (MTBE) was commonly used as an oxygenate, and would comprise nearly 12% of the gasoline vapors, by weight.[75] As well, benzene concentrations were almost 1% by weight of the vapor phase. In comparison, of the 13 samples of crude analyzed from the Nederland terminal for the BMOP Project, the average benzene was less than 0.1% in the vapor phase (an order of magnitude lower). These two HAPs in gasoline that were evaluated during Subpart Y development have significantly higher concentrations in gasoline than in crude (about 70 times

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[73] U.S. EPA OAQPS, *VOC/HAP Emissions from Marine Vessel Loading Operations, Technical Supprot Document for Proposed Standards*, May 1992, EPA-450/3-92-0012.

[74] 76 FR 22576, April 21, 2011, middle column. Following review of comments, EPA did not finalize a requirement for control by existing offshore loading terminals for any amount of gasoline throughput. Instead, EPA finalized the requirement to load by submerged fill, only.

[75] California Environmental Protection Agency, "MTBE Briefing Paper," April 24, 1997 (updated September 3, 1998). "Currently, MTBE is added to about 30 percent of the gasoline consumed in the U.S. and to virtually all of the gasoline consumed in California."

higher). As a result, the commodities loaded at the Hercules fixed berth and the Richmond long wharf, including oxygenated gasoline, have an inherently different HAP emissions rate.

The following table presents an extended comparison of the HAP composition of oxygenated gasoline loaded by these two sources in Subpart Y, and the crude oil proposed to be loaded in the BMOP Project.

Table 3-6. Comparison of HAP in Gasoline Loaded by Subpart Y Sources and BMOP Crude

HAP	Oxygenated Gasoline[a] (vapor wt %)	BMOP Project Crude Oil[b] (vapor wt %)	Gas HAP Compared to Crude HAP
Hexane	1.4	2.15	65%
Benzene	0.7	0.12	574%
Toluene	1.1	0.11	968%
Ethyl benzene	0.1	0.008	1,219%
Sum of other HAP	1.1	0.051	2,152%
MTBE	11.9	-	--
Total HAP	**16.3%**	**2.4%**	**679%**

a. U.S. EPA, *Gasoline Distribution Industry (Stage I) – Background Information for Proposed Standards*, EPA-453/R-94-002a, January 1994.

b. Average mass % in vapor of individual HAP from 13 samples of various crude types taken at Nederland from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.

This comparison demonstrates that the gasoline loaded by the floor sources under consideration in Subpart Y is a very different commodity with different HAP emissions than the proposed BMOP Project. Even with these higher HAP rates, EPA confirmed the cost of vapor capture and control from offshore loading was evident as economically infeasible. Per EPA:

> *As discussed in the cost section of the response to comment and the cost memoranda in the docket, we received and considered the comments on the control costs, emission rate differences for ships and barges, additional costs for offshore facilities, and the HAP content in gasoline. All those factors change the cost-effectiveness calculations. Based on information received as part of the comments, we reevaluated the costs used at proposal. The revised costs and emissions for the proposed threshold of 1 million bbl/yr gasoline are as high as $500,000 per ton of HAP emissions reduced (1.9 tons of HAP reduced annually per facility) for loading ships offshore. Looking at a less stringent threshold for the final rule of 7 million bbl/yr of gasoline loaded would likely achieve little or no HAP or VOC emission reductions, since many facilities near that threshold were required to install controls under the current rule. We agree with commenters that these costs are unreasonable.*[76]

Through this evaluation of the floor-setting sources for all "offshore loading terminals" in the docket, it is clear EPA's grouping of similar sources for the promulgated Subpart Y standard for new offshore terminals is very different than the BMOP proposed crude oil export operation.

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[76] 76 FR 22581, April 21, 2011, right column.

3.1.6 Historical Interpretation of Subpart Y Confirms Non-Applicability to BMOP

As noted previously in this report, crude oil export was banned during the development and promulgation of Subpart Y and was not lifted until President Obama signed into law H.R. 2029 on December 18, 2015. EPA directly considered the crude oil market when assessing the regulatory impact of Subpart Y, noting: "Most, if not all, crude oil loaded in this country is eventually purchased and processed by domestic petroleum refineries."[77] At the time of Subpart Y rule development in 1994, the domestic oil production was 6.66 million barrels per day (MMbbl/day) and declining. The U.S. was considered a "high cost producer" because it had already depleted known low-cost reserves. Crude oil imports were therefore increasing to offset the declining production and increasing consumption.[78] The volume of crude oil exported today was not fathomed in Subpart Y development, and thus was not taken into consideration in the applicability, nor regulatory impact assessment.

The proposed BMOP Project is now under consideration because of the recent change in law and increase in domestic production of crude. A similar source project would not have been considered during the development of Subpart Y, and through EPA's own statements of justification of what would be a similar source in the rule, size of the terminal – both in terms of the size of ship that can be loaded (depth of water and loading rate), commodities loaded (refined products have different emissions characteristics), and distance from shore (0.5 mile long piers, wharfs, and fixed structures have ready-access to onshore resources, while facilities on the Outer Continental Shelf are much more remote) – the BMOP Project is not a similar source to an "offshore loading terminal" under Subpart Y.

Review of similar regulatory language in other parts of the Clean Air Act, concurrent USCG regulations which the EPA was directed to mirror, and a detailed review of each of the sources included, and excluded, from the "offshore loading terminal" subcategory confirms EPA's intent for applicability of Subpart Y – all components necessary for a loading berth at a single stationary source, all of which is located greater than 0.5 miles from shore in protected waters or partially protected waters.

Historical interpretation provides a reasonable context of the generalized words in Subpart Y, upholding the rule language for deterministic application to sources in existence at the time. An obstinate focus on breadth of the nonspecific rule text alone yields an unbounded interpretation (i.e., structure is any physical presence even of small size, or greater than 0.5 miles goes on to infinity). It is simply inconsistent with the rule development to stretch a very limited subcategory of only ~20 identified sources to infinity. Further, applying Subpart Y out of context leads to absurd results. Applying a 1990 local county rule for only two dockside sources to a brand-new terminal design 82 statute miles offshore would result in a requirement to use an undemonstrated control that cannot conform to USCG safety requirements. Accordingly, the definitions of 40 CFR §63.561 must be congruous with history, and a new source type of a DWP for crude oil export is not an "offshore loading terminal" applicable to Subpart Y.

3.2 40 CFR 63 Subpart B Applicability

EPA is directed to develop standards for each source category of major sources and sources of HAP delineated in Section 112(b) of the Clean Air Act. These standards are promulgated in 40 CFR Part 63 to

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[77] U.S. EPA OAQPS, *VOC/HAP Emissions from Marine Vessel Loading Operations, Technical Supprot Document for Proposed Standards*, May 1992, EPA-450/3-92-0012.

[78] U.S. Department of Commerce Bureau of Export Administration, *The Effect on the National Security of Imports of Crude Oil and Refined Petroleum Products, An Investigation Conducted Under Section 232 of the Trade Expansion Act of 1962, as Amended*, November 1999.

regulate emissions of HAP that require the maximum degree of reduction in emissions (per CAA §112(d)(2)). The EPA developed the MACT standard for marine tank vessel loading operations at Subpart Y. No other MACT standard applies to marine tank vessel loading operations.

For major sources of HAP that are not regulated by an existing standard under Part 63, either because the source category is not a Section 112 listed category or because a standard has not yet been adopted, Section 112(g) of the Clean Air Act requires a MACT determination on a case-by-case basis. This case-by-case process ensures that major sources of HAP are properly controlled – and ensures no gaps in regulation for major sources of HAP.

Because Subpart Y does not apply to the proposed Project, and the Project will be a major source of HAP, this section evaluates the applicability of 40 CFR §63 Subpart B – *Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections, Sections 112(g) and 112(j)*. It is appropriate to evaluate a modern project with a contemporary understanding of maritime operations, USCG terminology, technology, and economic, health, and environmental impacts. A case-specific evaluation under Subpart B is appropriate for this source-type (now possible since December 18, 2015), and the modification of existing facilities and infrastructure to export crude through new CALM buoy loading points.

3.2.1 Regulatory Applicability

While the platform complex and infrastructure are existing, the proposed marine loading activity will be a new major source of hazardous air pollutants.[79] BMOP's proposed marine loading activity is not regulated under another subpart of Part 63, as discussed above. Per 40 CFR §63.40(b), the conversion of the platform and pipeline to a DWP for crude oil export is subject to Subpart B of Part 63.

> *The requirements of §§ 63.40 through 63.44 of this subpart apply to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants after the effective date of section 112(g)(2)(B) (as defined in § 63.41) and the effective date of a title V permit program in the State or local jurisdiction in which the major source is (or would be) located unless the major source in question has been specifically regulated or exempted from regulation under a standard issued pursuant to section 112(d), section 112(h), or section 112(j) and incorporated in another subpart of part 63, or the owner or operator of such major source has received all necessary air quality permits for such construction or reconstruction project before the effective date of section 112(g)(2)(B).*

BMOP is proposing to "construct a major source" per 40 CFR 63.41 with the addition of the CALM buoys and marine loading to the existing platform complex at WC 509. The proposed Project includes additional sources, such as new reciprocating internal combustion engines. These additional sources are affected sources under other Part 63 subparts (Subpart ZZZZ). As such, Subpart B applicability addressed in this application is specific to the marine loading of crude oil at the CALM buoys.

A case-by-case MACT determination is required prior to construction of the Project. The process for obtaining the determination is defined at 40 CFR §63.43. Accordingly, this application considers the following, as identified in 40 CFR §63.43(d) and (e), respectively:

- Principles of MACT Determinations, and

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[79] The BMOP project will meet part 2 of the definition of "construct a major source" under 40 CFR §63.41: "To fabricate, erect, or install at any developed site a new process or production unit which in an of itself emits or has the potential to emit 10 tons per year of any HAP or 25 tons per year of any combination of HAP...".

- ► Application Requirements for a Case-by-Case MACT Determination.

The application requirements are delineated in Appendix A of this application.

3.2.1.1 Principles of MACT Determinations

Defining MACT on a case-by-case basis follows the Principles of MACT Determinations of 40 CFR 63.43(d)(1-4), below.

3.2.1.1.1 40 CFR §63.43(d)(1) – MACT Floor

> *The MACT emission limitation or MACT requirements recommended by the applicant and approved by the permitting authority shall not be less stringent than the emission control which is achieved in practice by the best controlled similar source, as determined by the permitting authority.*

The first principle considers an evaluation of the "emissions control which is achieved in practice by the best-controlled similar source." This is fundamentally the same as the "MACT Floor" analysis for standards prepared under Section 112(d)(3) of the Clean Air Act.[80] In the preamble to Subpart B, EPA explicitly stated that:

> *…the owner or operator must demonstrate to the permitting authority that emissions will be controlled to a level consistent with the "new source MACT" definition in section 112(d)(3) of the Act.*[81]

Moreover, a Case-by-Case MACT application does not require consideration of sources outside of the U.S.:

> *For constructed and reconstructed major sources, the minimum requirement for a case-by-case MACT determination, consistent with section 112(d), is the level of control that is achieved in practice by the best controlled similar source. The definition of MACT for new source MACT in this rule does not require consideration of sources outside the U.S.*[82]

Identifying similar sources is necessarily unique for a case-by-case analysis for a new source type. A statutorily defined source category may not be relevant. For new designs, there may not yet exist something that is similar. For a 112(g) analysis, the "MACT floor" determination must consider transfer of technologies from a general classification of source types. Consistent with the first principle of MACT determinations, BMOP has evaluated possible similar sources, including transfer of technologies relevant in this part of the analysis, to identify what is achieved in practice in Section 4 of this application.[83]

3.2.1.1.2 40 CFR §63.43(d)(2) – Beyond the Floor

> *Based upon available information, as defined in this subpart, the MACT emission limitation and control technology (including any requirements under paragraph (d)(3) of this section)*

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[80] Section 112(d)(3) of the Clean Air Act.

[81] 61 FR 68385, December 27, 1996.

[82] 61 FR 68384, December 27, 1996.

[83] "The EPA believes that because the Act specifically indicates that existing source MACT should be determined from within the source category and does not make this distinction for new source MACT, that Congress intends for transfer technologies to be considered when establishing the minimum criteria for new sources." See 61 FR 68384, December 27, 1996, right column.

> *recommended by the applicant and approved by the permitting authority shall achieve the maximum degree of reduction in emissions of HAP which can be achieved by utilizing those control technologies that can be identified from the available information, taking into consideration the costs of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements associated with the emission reduction.*

The second step in defining MACT is to identify the "maximum degree of reduction in emissions…taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements…" Analogous to §63.43(d)(1) relating to the traditional "MACT floor" analysis for Section 112(d) rules, this principle mirrors the language and requirements of the "Beyond-the-Floor" (or "BTF") analysis.[84]

While the transfer of technologies evaluated under §63.43(d)(1) does consider costs, the economic consideration is relative, and with the intent of identifying a source that has a similar capability of control for defining the floor.[85] Accordingly, the floor analysis is limited to technologies employed at sources in the U.S. only. For the BTF analysis, any control technologies that can be identified are evaluated, with costs specific to the Project associated directly with the emission reduction that could be achieved for the specific project. BMOP has performed this control technology analysis, referred to as a BTF analysis for familiarity with the analogous Section 112(d) step, in Section 5 of this application.

3.2.1.1.3 40 CFR §63.43(d)(3) – MACT Can Be a Work Practice Requirement

> *The applicant may recommend a specific design, equipment, work practice, or operational standard, or a combination thereof, and the permitting authority may approve such a standard if the permitting authority specifically determines that it is not feasible to prescribe or enforce an emission limitation under the criteria set forth in section 112(h)(2) of the Act.*

Following the two principles above, the standard is ultimately either an emission limitation or a work practice standard. BMOP has recommended a work practice and an emission limitation in Section 6 of this application.

3.2.1.1.4 40 CFR §63.43(d)(4) – MACT Considers Proposed or Presumptive 112(d) Standards

> *If the Administrator has either proposed a relevant emission standard pursuant to section 112(d) or section 112(h) of the Act or adopted a presumptive MACT determination for the source category which includes the constructed or reconstructed major source, then the MACT requirements applied to the constructed or reconstructed major source shall have considered those MACT emission limitations and requirements of the proposed standard or presumptive MACT determination.*

The fourth principle notes that proposed standards (or presumptive MACT) must be considered. This is relevant for proposed projects for which EPA is in the process of developing a Section 112(d) standard but has not yet completed the process. For the new source type of a DWP for crude oil export, EPA has not proposed a NESHAP, nor is there a presumptive MACT determination. BMOP has discussed in detail the

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[84] Portion of the definition of "MACT" under 40 CFR 63.41.

[85] "The EPA believes that the practical use and effectiveness of any transfer technology should be generally comparable across emission units. While the particular pollutants emitted need not be the same, the following factors may be considered: the volume and concentration of emissions, the type of emissions, the similarity of emission points, and the cost and effectiveness of controls for one source category *relative* to the cost and effectiveness of those controls for the other source category, as well as *other operating conditions*." Emphasis added. See 61 FR 68385, December 27, 1996, left column.

non-applicability of Subpart Y in Section 3.1. While this standard is not applicable, BMOP has considered the review for the subcategory “offshore loading terminals” emission limitations and requirement. In particular, BMOP has evaluated vapor capture and control that would be a transfer of technology from the sources regulated under Subpart Y.

4. MACT FLOOR

The first “Principle of MACT determinations” for 40 CFR 63, Subpart B is provided as the following:

> *The MACT emission limitation or MACT requirements recommended by the applicant and approved by the permitting authority shall not be less stringent than the emission control which is achieved in practice by the best controlled similar source, as determined by the permitting authority.* [40 CFR 63.43(d)(1)]

The first principle is also referred to as the “MACT Floor.” Additional detail regarding the MACT Floor is included in the first part of the definition of the MACT limitation for new sources.

> Maximum achievable control technology (MACT) emission limitation for new sources *means the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source…* [40 CFR 63.41]

Thus, there are two key definitions in determining the MACT Floor.

1. Similar source
2. Achieved in practice

4.1 Similar Source Evaluation

BMOP has identified the design, capacity, emissions, and capability of control unique to the proposed Project in Section 3.1.4.1 of this application, repeated here for quick reference.

- Design:
  - Floating buoy instead of a fixed berth to accommodate loading of large crude-carrying vessels in unprotected, exposed waters of the open ocean
- Size (Capacity):
  - Deep water location capable of fully loading VLCCs and other large seafaring crude-carrying vessels for crude oil export
  - Loading rate that can fully load a VLCC in about a day
- Emissions:
  - Loading into the marine vessel (compared to unloading only)
  - Export of various types of crude oil (not refined products, condensate, or other commodities)
- Capability of Control:
  - Serving the global market with capability to load the international fleet of VLCCs, and not limited to a confined route or constrained, customized vessel
  - Maintain safe loading requiring vessel cargo pressure balancing, appropriate location of detonation arresters, and safe VLCC mooring in the project location

In the context of Section 112(g), specifically, EPA notes a determination that a source is similar is based on just two of those criteria:[86]

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[86] 61 FR 68384, December 27, 1996, middle column.

1. Whether the two sources have similar emission types, and
2. Whether the sources can be controlled with the same type of control technology.

As a general guide in identifying control options for a gas stream, the EPA has identified five different classifications of emissions sources:[87]

1. Process vent or stack discharges,
2. Equipment leaks,
3. Evaporation and breathing losses,
4. Transfer losses, and
5. Operational losses.

The proposed Project would be classified as "transfer losses" based on the emissions of an organic liquid (crude oil) resulting from the transfer of the material from one unit to another. EPA acknowledged that "while two pieces of apparatus can be classified within the same emission source type, this does not automatically mean that the emission points can be controlled using the same type of control technology."[88]

The preamble to Subpart B continues to direct the consideration of control technology in identifying a similar source. EPA notes their belief that Congress intended for "transfer technologies to be considered when establishing the minimum criteria for new sources." When considering a case-by-case MACT rule, which was intended as a "gap-filling" rule while EPA was continuing to develop Part 63 standards, consideration of a transfer technology is a reasonable starting point for review of a new source. "Transfer technologies" is in consideration of the principles in Section 112(d)(3), however, and is not a suggestion that just because two sources are both classified in "transfer losses" that a floor is automatically defined based on use of the control somewhere in the very broad classification.

> *The EPA believes that the practical use and effectiveness of any transfer technology should be generally comparable across emission units.*

Accordingly, transfer of technology relies on a practical function and comparable effectiveness. This is a key point for comparability. Subpart B does not require a MACT control because it is theoretically possible under ideal conditions. Instead, the transfer of technologies is intended only to identify a control of equal practical use and effectiveness when considering the floor (not the BTF).

As well, each of the following factors are delineated for consideration of a transfer of technology:

- Volume and concentration of emissions
- Type of emissions
- Similarity of emission points
- Cost and effectiveness of controls for one source category relative to the cost and effectiveness of those controls for the other source category, as well as
- Operating conditions.[89]

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[87] 61 FR 68384, December 27, 1996, middle and right columns.

[88] 61 FR 68384, December 27, 1996, right column.

[89] 61 FR 68385, December 27, 1996, left column.

For the purposes of this application (and subsequent case law on interpreting Section 112(d)(3), directly referenced as the basis), the cost and effectiveness of controls *specific* to the Project is only considered in the beyond-the-floor analysis in Section 5. For a similar source consideration of transfer of technology, however, EPA is providing additional insight into how to assess similar "capability of control" for new source types. As well, EPA continues the "practical use and effectiveness" considerations for similar sources through way of subcategorization.

> *In making case-by-case MACT determinations, the EPA believes that permitting authorities may find it necessary to subcategorize particular source categories into technically distinct groupings… …Possible criteria can include technically distinct processes or operations (including differences between batch and continuous operation), fundamental differences in emission characteristics or control device applicability, differences in safety considerations, and the appropriate consideration of opportunities for pollution prevention.*

Accordingly, transfer technologies help identify the similar sources within a general classification, and further subcategorization based on the fundamental differences in the control device applicability and safety considerations.

For this Project, BMOP is proposing a DWP for loading crude oil into VLCCs and other crude carriers, and technologies applied at other marine loading terminals can be assessed for a transfer of technology. Although the Project is a new source type not applicable to Subpart Y, EPA has already identified the appropriateness of subcategorization of marine loading terminals through this rule development. Section 3.1 presents the main considerations for subcategorization of marine loading terminals, which concluded a need to distinguish "offshore loading terminals" and other marine terminals – even down to a single source (e.g., VMT). EPA identified a distinction with offshore loading terminals "because of the poor cost effectiveness resulting from these significantly higher costs, as well as the environmental, safety, and technical challenges associated with requiring control more efficiently than the MACT floor."[90]

The emissions from the Project will be similar to crude oil loading operations close to shore. EPA has already identified the relative cost and unique offshore operating conditions (even within 2 miles of shore) as justification for subcategorization. BMOP's operating conditions are even more extreme, at ~82 statute miles offshore with no adjacent fixed loading berth.

The similar source analysis for this case-by-case MACT application considers operating sources that may be controlled with the same type of control technology, given the unique operating conditions, safety, and relative costs. To avoid redundancy, each source already evaluated as dissimilar under Subpart Y in Section 3.1 is not repeated.

With these critical design requirements, the following current operations in the U.S. were evaluated as possible similar sources.[91]

- LOOP
- Limetree Bay Terminal
- United Riverhead Terminal
- El Segundo Marine Terminal

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[90] 60 FR 48393, September 19, 1995.

[91] 61 FR 68384, December 27, 1996.

Each of these sources is evaluated in the following subsections.

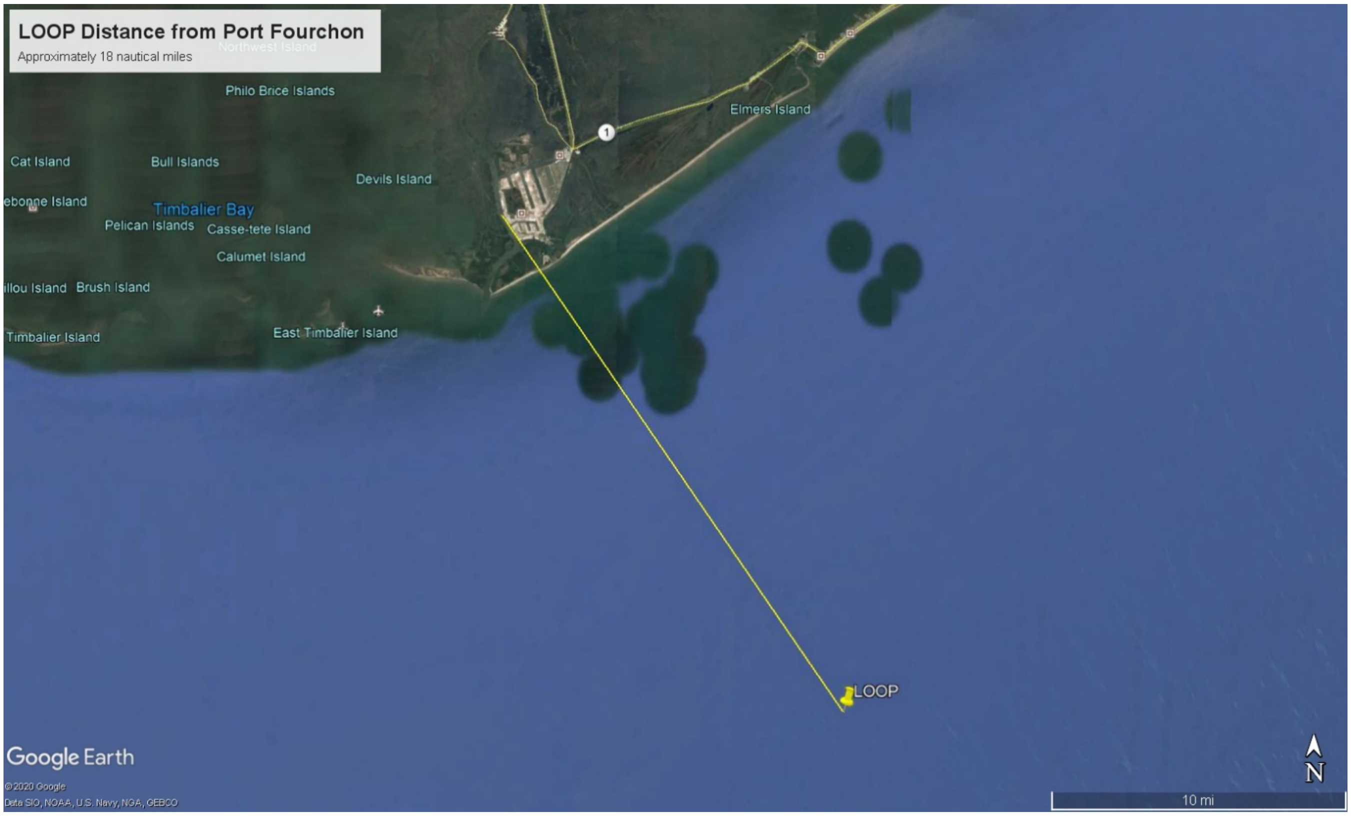
4.1.1 LOOP

LOOP was designed in 1972 to unload crude from large crude carriers. LOOP was operating during the Subpart Y rule development, as identified in Section 3.1. However, until recently, LOOP was an import-only facility. As such, the facility was not subject to Subpart Y as an "offshore loading terminal" because it did not "fill marine tank vessels" – it only emptied them.

LOOP is approximately 18 nautical miles offshore of Port Fourchon, Louisiana, in coastal waters that are 110 feet deep. The facility includes an offshore platform complex that includes four 7,000 hp pumps, meters, valves, etc., for unloading crude oil from vessels at a rate up to 100,000 bbl/hr.[92] The crude is piped onshore to underground storage caverns and tanks at a storage facility in Clovelly, Louisiana. The DWP can accommodate VLCCs at three SPM buoys, each approximately 1.2 statute miles from the platform complex.

All of the equipment necessary for unloading offshore sources evaluated for the rule development, including LOOP,[93] is in protected waters or partially protected waters, as the terms are defined at 46 CFR §170.050.

Figure 4-1. LOOP Distance from Harbor of Safe Refuge



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[92] https://www.loopllc.com/Services/Vessel-Loading

[93] "The Louisiana Offshore Oil Port is a deepwater port designed for unloading crude oil cargoes from deep-draft tankers. The LOOP Marine Terminal is located in open waters of the Gulf of Mexico approximately 29 kilometers (18 nautical miles) offshore from the State of Louisiana." https://www.loopllc.com/Information-Central/Port-Information

In 2017, LOOP conducted modifications to the existing platform and infrastructure to accommodate loading of VLCCs at the three SPM buoys. LOOP now states that they can fully load a VLCC in 2.5 days (~37,000 bbl/hr).[94] LOOP first loaded a VLCC in February 2018.[95] At present, LOOP is the only DWP capable of fully loading VLCCs for export of crude oil in the GOM, and averages one VLCC loaded per month.[96] The only other avenue for crude oil export from the GOM is through smaller vessels or reverse lightering.

LOOP does not utilize a vapor control system to capture and control displaced vapors from loading VLCCs but relies on submerged fill to mitigate VOC emissions. BMOP is more than three times further from shore, in exposed waters of the open ocean, compared to LOOP's location in partially-protected coastal waters. The location affects the weather and wave profiles, which in turn dictates the design of the DWP to accommodate loading in common conditions and to withstand the extreme conditions. Being in deep, exposed waters, operating practices that require calm sea states would significantly restrict the availability of the proposed Project, to a greater extent than facilities closer to shore. A vapor capture and control system would restrict operating conditions at BMOP, and since not applied at LOOP, would not be transferrable to BMOP.

4.1.2 Limetree Bay Terminal

The HOVENSA refinery in St. Croix was also an existing facility during the development of Subpart Y. At that time, the refinery unloaded crude (e.g., from Venezuela), and loaded refined products (e.g., gasoline) at the many docks on a long pier.

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[94] http://www.dnr.louisiana.gov/assets/docs/energy/policypapers/AW_AmericasEnergyCorridor_Revised.pdf

[95] Greg Miller, Petroleum Economist, “Bringing VLCCs to port,” February 26, 2019.

[96] Craig Jallal, Riviera, “US Gulf: the expanding sweet spot for VLCC trades,” January 17, 2020.

Figure 4-2. Aerial Photograph of HOVENSA[97]

The HOVENSA refinery provided comments in consideration of the Subpart Y rule development and residual risk and technology review, classifying docks 3 and 4 (those furthest from the terminal) as “offshore loading terminals”.

Of note, HOVENSA identified many challenges unique to St. Croix that distinguished the capability of control, costs, and practical efficiency and operability that would not be similar to traditional mainland onshore marine terminals. The operating conditions at the facility included the following challenges: [98]

- Direct Costs – Wage Rates; Relocation incentives; Per diem; Housing costs; Rotational leave; Guarantees on minimum overtime; Retention bonus

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[97] Comments of HOVENSA, L.L.C. on National Emission Standards for Hazardous Air Pollutants: Marine Tank Vessel Loading Operations, 75 FR 65067-65149, October 21, 2010 (“MTVLO MACT Proposal”), December 6, 2010, ID: EPA-HQ-OAR-2010-0600-0280.

[98] Comments of HOVENSA, L.L.C. on National Emission Standards for Hazardous Air Pollutants: Marine Tank Vessel Loading Operations, 75 FR 65067-65149, October 21, 2010 (“MTVLO MACT Proposal”), December 6, 2010, Page 15, ID: EPA-HQ-OAR-2010-0600-0280.

- Productivity - Limited local availability of higher-level craftsman (i.e. fitters, welders, instrument technicians, electricians); Limited 3rd Party Services and Resources
- Design Requirements - Installed Spare Equipment, Seismic/Hurricane/Tropical/Marine Design Specifications
- Capital Spare Parts Requirements – Transportation Costs, Ocean Freight, Air Freight, Vendor Representatives, Construction Equipment, Construction Tools, Off-location Personnel, Higher Turnover Rate
- Equipment and Tools Rental Durations
- Mobilization and Demobilization Travel pay to/from location

HOVENSA identified each of these operating conditions as increasing the costs of controls by at least two-fold and noted this was typical of non-continental facilities.

The HOVENSA refinery was later idled (shutdown completed February 2012) and Limetree Bay Terminals, LLC purchased the facility (finalized purchase agreement in January 2016), initially restarting the storage terminal operations.[99]

The facility currently operates 11 docks, one of which is a new SPM 5,800 feet offshore from the existing docks. The SPM can accommodate a VLCC and was successfully commissioned in May 2020.[100] The following figure presents an aerial view of the new SPM, with the existing docks at the top of the image.

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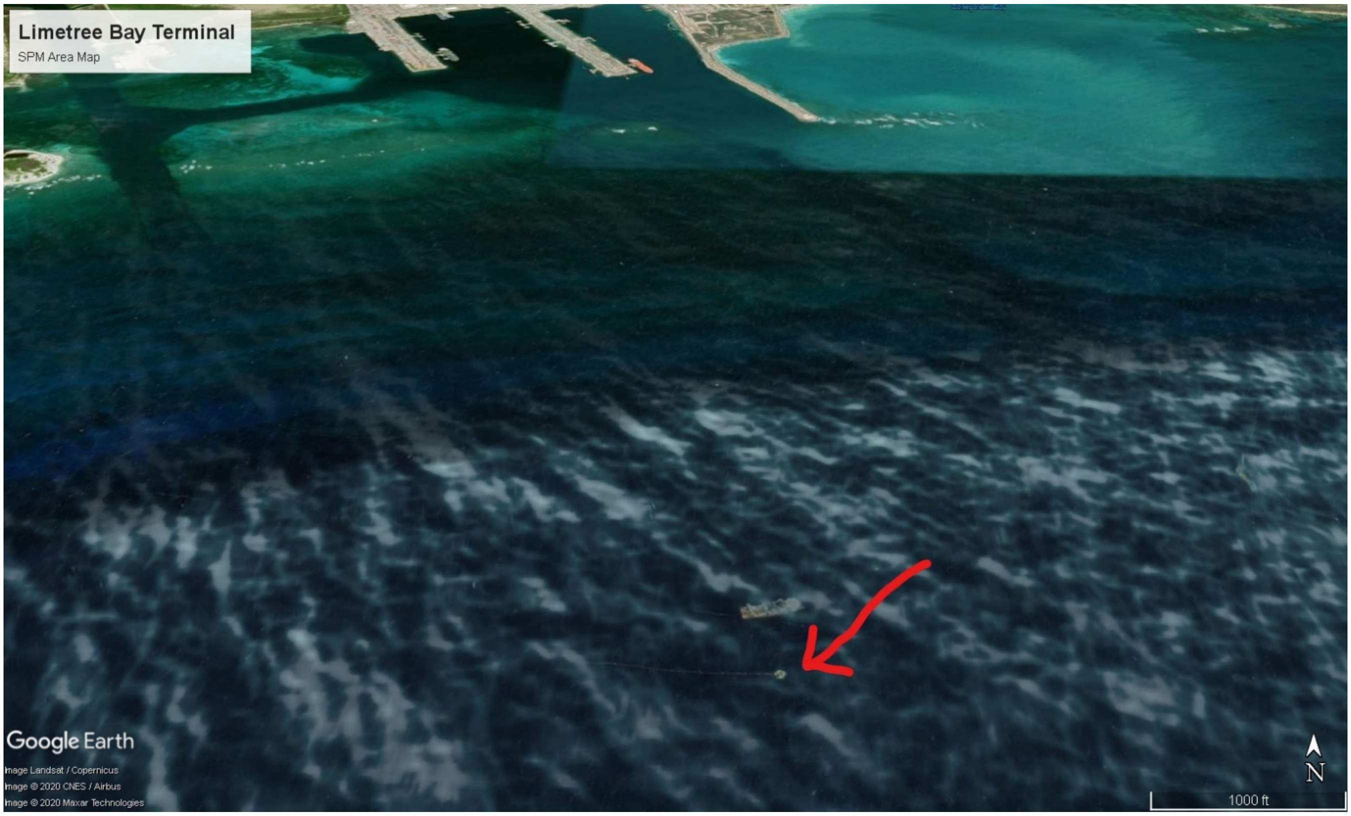
[99] https://www.ogj.com/refining-processing/article/17249641/limetree-bay-terminals-finalizes-deal-for-st-croix-refining-complex

[100] https://www.limetreebayenergy.com/limetree-bay-successfully-commissions-spm/

Figure 4-3. Limetree Bay Terminal SPM Aerial



The new SPM is greater than 0.5 miles offshore and more than a mile from the existing terminal. This new SPM would also fall within the general terminology of the definition of a new "offshore loading terminal" under Subpart Y. In response to permitting questions in regards to the new SPM, EPA responded "that the addition of the SPM is reasonably considered to be an extension of the existing marine loading terminal." [101] Although separated by greater than 1 mile (the separate source qualifier applied in Subpart Y development for the floor sources), the EPA believes the new SPM is a modification to the existing docks, with an added emissions point. Modifications are not subject to new source MACT (under either Subpart Y or Subpart B).

EPA has issued a preliminary determination for a draft Plantwide Applicability Limit (PAL) for the Limetree Bay Terminal and Refinery.[102] This determination covers the entire facility, which includes the SPM.[103] This

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[101] Letter from William L. Wehrum, Assistant Administrator, U.S. EPA OAR, to Ms. Johnson Koch, Perkins Cole, "Re: Limetree Bay Terminals, St. Croix, U.S. Virgin Islands – Permitting Questions," April 5, 2018. The letter was in response to a question regarding PSD applicability. Because the new SPM does not have vapor capture and control capable of complying with 40 CFR §63.562(b)(4), which would be necessary for a new "offshore loading terminal," the EPA's response is also applied to Part 63.

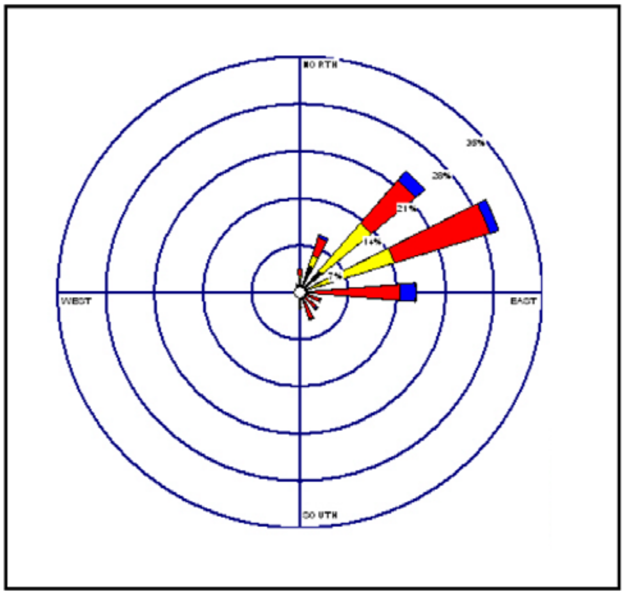
[102] Limetree Bay Terminals and Limetree Bay Refining, St. Croix, U.S. Virgin Islands, Draft Plantwide Applicability Limit Permit, EPA – PALs – VI-001/2019, September 20, 2019.

[103] Limetree Bay Terminals, "Application for Plantwide Applicability Limit (PAL) Permit for Limetree Bay Terminals, LLC and Limetree Bay Refining, LLC, St. Croix, U.S. Virgin Islands, November 26, 2018. Page 1-3 and Table B-20 (page 80 of 94) explicitly identify the SPM as part of the 11 docks in the Terminal Operations. It should also be noted that the crude oil loading emissions at 127,100,000 bbl/yr was calculated based on AP-42, Chapter 5.2, Equations 2 and 3, and without add-on control efficiency.

preliminary determination recognizes that operation of the new SPM does not utilize vapor capture and control. There is no evidence of a case-by-case MACT determination.

The non-continental operating conditions described by HOVENSA also apply to BMOP, though the proposed Project has additional challenges that impact operations to a greater extent than the new Limetree Bay SPM. In addition to the cost-effecting resource challenges, the BMOP location is much farther removed from any shore-based resource. As well, the weather at St. Croix is consistent and predictable, in contrast to offshore waters in the GOM, as shown in the following wind rose.

Figure 4-4. St. Croix Wind Rose[104]



The island of St. Croix has far more resources than 82 statute miles of open water. The design of the Limetree Bay Terminal SPM also presents different operability considerations as compared to BMOP, if a vapor capture and control system were to be utilized. For example, the subsea pipeline would slowly rise from under the buoy to shore at a slope, which provides different engineering solutions for liquid dropout removal. The predictable weather and calm sea state in the nearshore location also provides greater availability under constrained weather and wave conditions compared to BMOP. BMOP's operating conditions are more extreme and costly to operate a vapor capture and control system in comparison to Limetree Bay Terminal.

Limetree Bay Terminal does not utilize vapor capture and control of the SPM loading ~1 statute mile from the onshore docks and terminal. BMOP's operating challenges are amplified, relative to Limetree Bay Terminal, and thus further confirm that a transfer of technology of vapor capture and control from marine terminal docks is not a similar source.

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[104] Comments of HOVENSA, L.L.C. on National Emission Standards for Hazardous Air Pollutants: Marine Tank Vessel Loading Operations, 75 FR 65067-65149, October 21, 2010 ("MTVLO MACT Proposal"), December 6, 2010, Page 5, ID: EPA-HQ-OAR-2010-0600-0280.

4.1.3 United Riverhead Terminal

The United Riverhead Terminal is the only offshore loading and unloading platform on the East Coast for crude oil and other petroleum liquids. The platform includes two fixed loading berths:[105]

- North berth:
  - Vessels up to 225,000 DWT
  - Maximum draft of 62 ft.
- South berth:
  - Vessels up to 42,000 DWT
  - Maximum draft of 42 ft.

The terminal receives product from ships, and then loads into barges for delivery on the East Coast (primarily Central and North Atlantic region).[106] The maximum design loading rate is 30,000 bbl/hr. The terminal notes that it is “capable of handling a VLCC”, but by the noted maximum draft and local distribution market by barge, the terminal is not able to fully load a VLCC for export, which requires a vessel of 320,000 DWT and a minimum draft of 71 feet (and >90 feet typical).

The fixed berth is located approximately 1.3 statute miles from the shore in the protected waters of the Long Island Sound.

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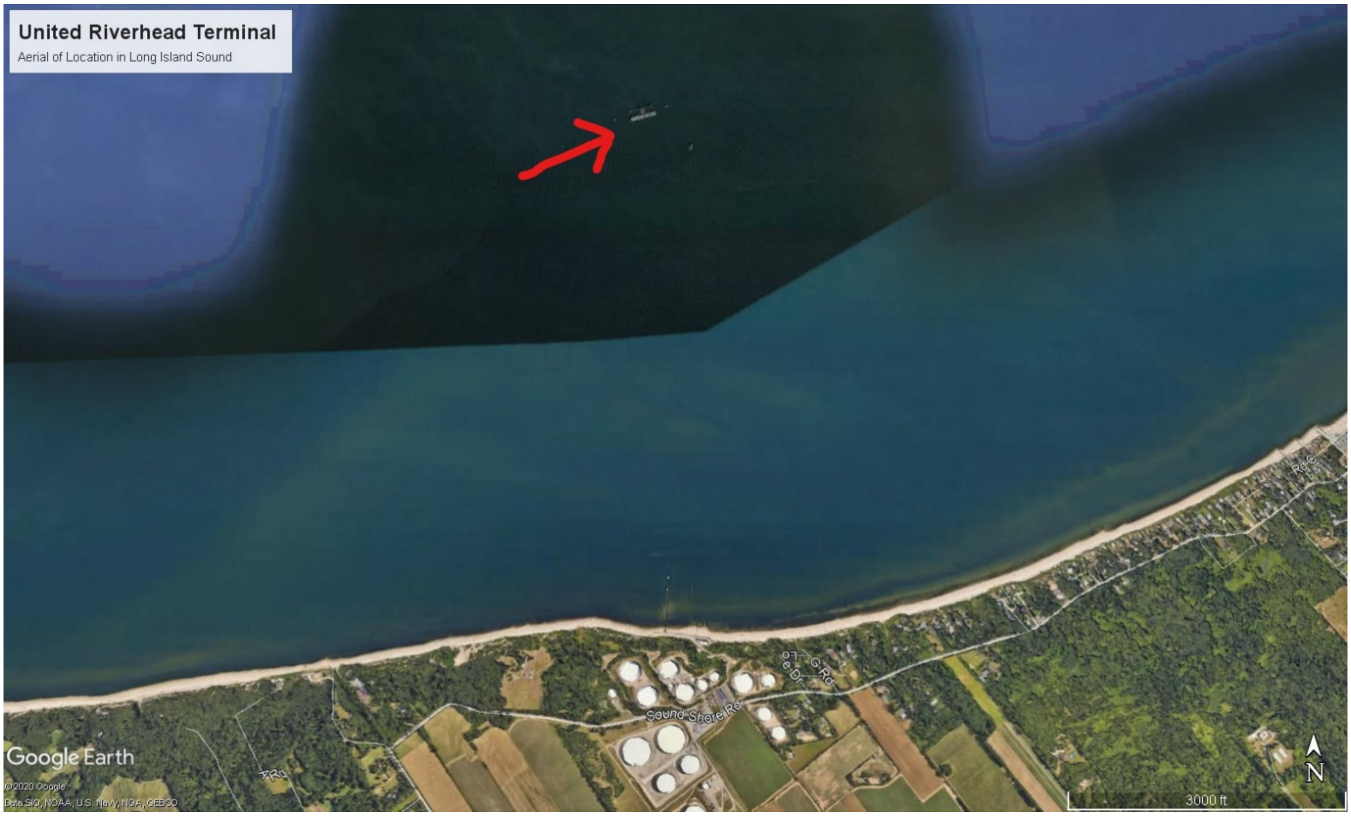
[105] United Riverhead Terminal, Inc. Marine Information Handbook, November 1, 2012.

[106] http://www.worldportsource.com/ports/review/USA_NY_United_Riverhead_Terminal_4182.php

Figure 4-5. United Riverhead Terminal Fixed Berth Aerial



Ships are loaded and unloaded with arms on the fixed berth. The loading berth does not include vapor capture or control, though it is a major stationary source for hazardous air pollutants.[107]

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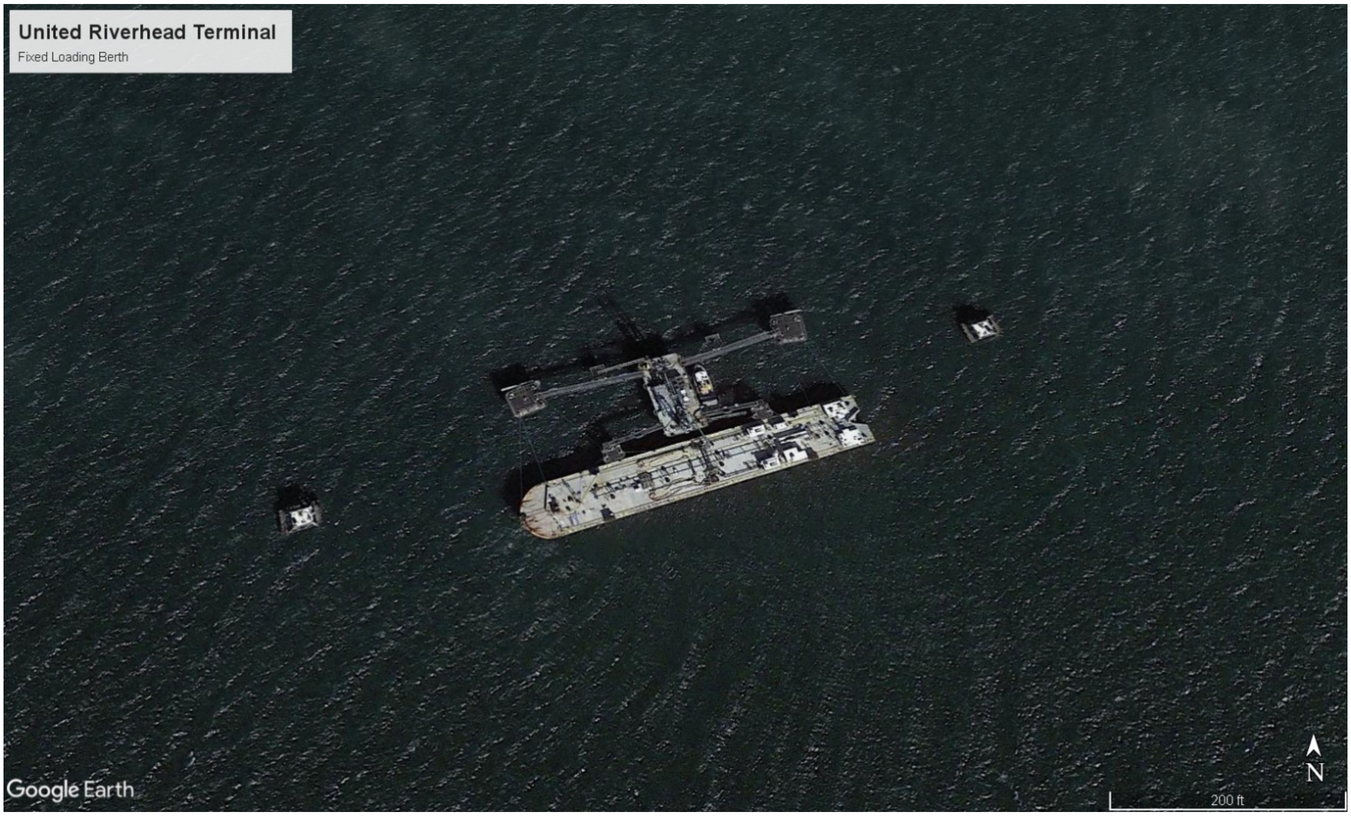
[107] New York State Deparment of Environmental Conservation, Permit Review Report, Permit ID: 1-4730-00023/00030, Renewal Number: 2, April 12, 2016, Page 5 of 21.

Figure 4-6. Marine Loading from United Riverhead Terminal Fixed Berth



The offshore loading berths, identified as Emission Unit 00005, are considered part of a single stationary source with the onshore tank farm and loading rack. United Riverhead Terminal has completed an economic evaluation for the cost of adding vapor capture and control. The New York State Department of Environmental Conservation has confirmed that the cost of control, even with a platform near shore in protected waters, is economically infeasible.

> *United Riverhead Terminal also operates an offshore loading platform and dock located approximately one mile off the shore of Long Island. The operations performed on the platform are a source of VOC emissions, and therefore must be evaluated for VOC RACT applicability. The analysis conducted by the facility demonstrates that the cost of installing an appropriate control device on the platform exceeds the cost effectiveness threshold established by the Department's DAR-20 guidance document. Accordingly, the Department has granted United Riverhead Terminal a variance from the VOC RACT requirements of 6 NYCRR Part 229 for the operations conducted on the offshore loading platform.*[108]

BMOP's location and use of CALM buoys requires significantly different operating conditions. The relative costs at United Riverhead Terminal compared to the extreme operating conditions for BMOP confirm that a transfer of technologies for vapor capture and control is not a MACT floor.

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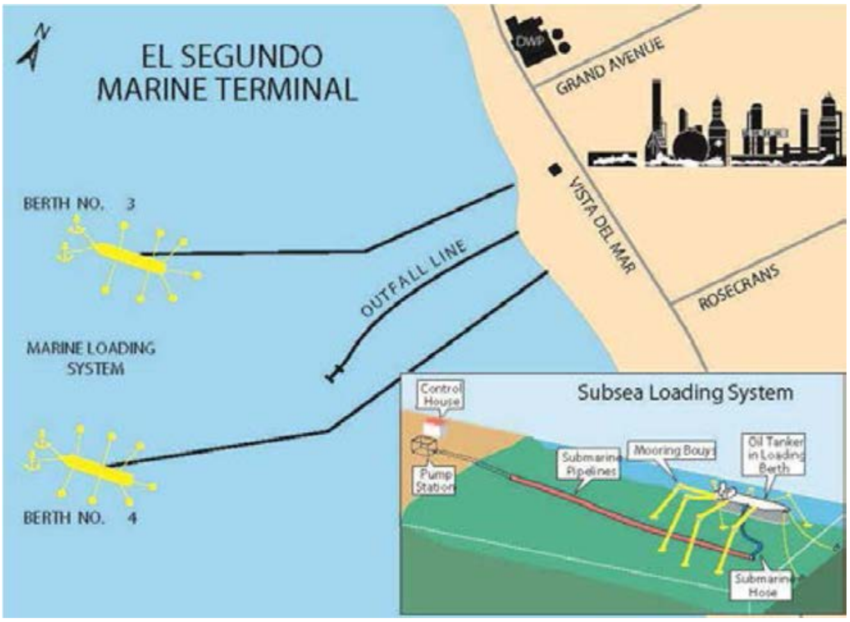
[108] New York State Deparment of Environmental Conservation, Permit Review Report, Permit ID: 1-4730-00023/00030, Renewal Number: 2, April 12, 2016, Page 21 of 21.

4.1.4 El Segundo Marine Terminal

The ChevronTexaco El Segundo Marine Terminal includes two offshore unloading/loading berths in the Santa Monica Bay.

Figure 4-7. El Segundo Marine Terminal[109]



The two multi-buoy berths moor vessels in a fixed position in 78 feet of water approximately 1 nautical mile from shore, using subsea pipelines to connect to the onshore terminal and refinery.[110]

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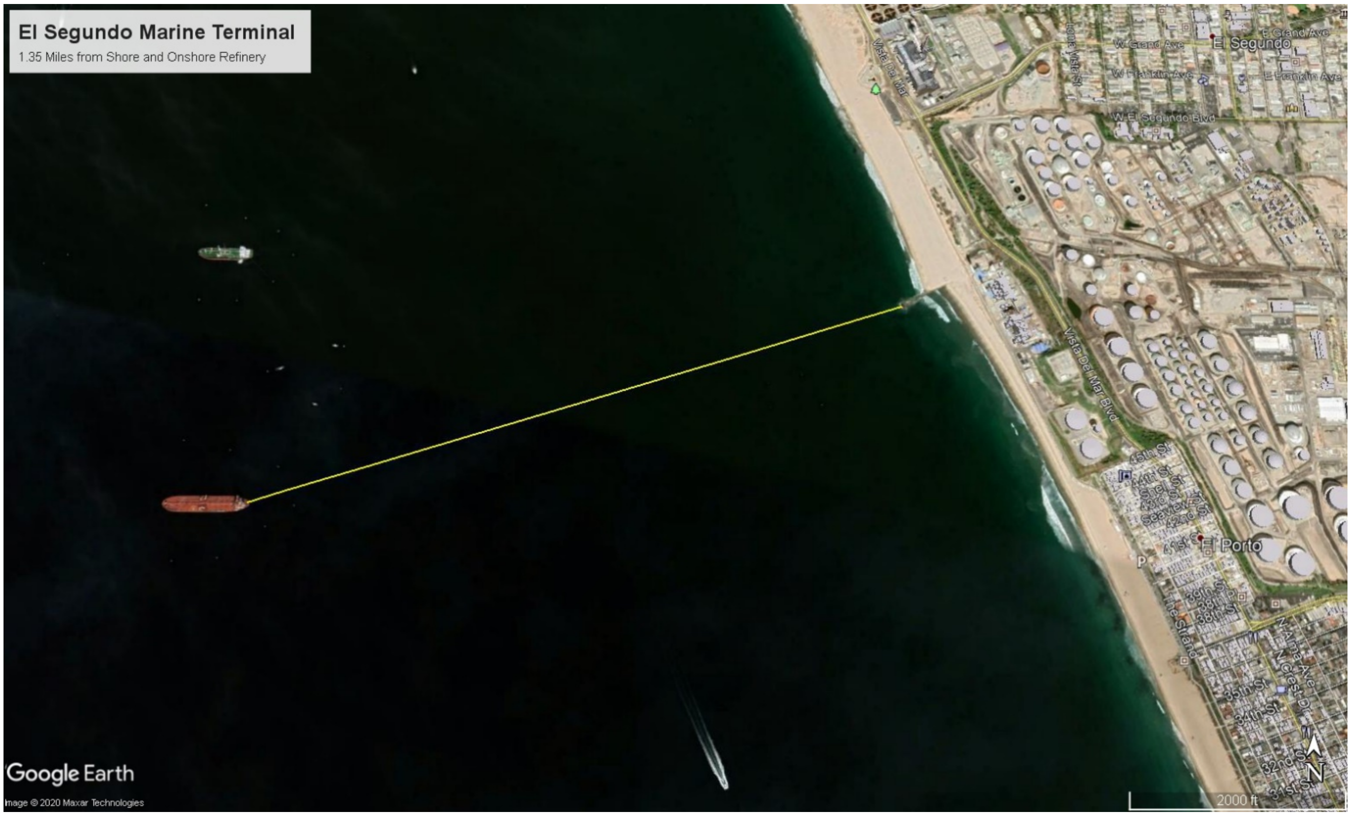
[109] El Segundo Refinery Marine Terminal Loading System – Preventing any environmental incident from occurring is Chevron's top priority.

[110] 68 FR 41091, July 10, 2003.

Figure 4-8. El Segundo Marine Terminal Distance from Shore



The two berths have the following vessel capacities:

Table 4-1. Physical Limitations for Vessels Calling at El Segundo

Berth	Max Operating Draft	Max Length	Max Tonnage	Max Distance (waterline to center of manifold)
Berth 3	51 feet	1,000 feet	150,000 DWT	58.5 feet
Berth 4	56 feet	1,000 feet	211,000 DWT	61.0 feet

Source: Chevron Products Company El Segundo Refinery Marine Terminal Manual (Revised February 2009).

Note that the El Segundo Marine Terminal was operating during the development of Subpart Y but did not include vapor capture or control at that time. In submitted comments on the proposed Subpart Y, Chevron identified a cost evaluation for capturing vapors and returning to shore for control as cost prohibitive at $485,000/ton of HAP removed.[111] Chevron noted that the only feasible option for their specific operation was vapor recovery from a barge or workboat.

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[111] Letter from J.D. Bellows, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, “Comparison Of Onshore vs. Offshore Marine Vapor Recovery System Costs,” July 21, 1993, IV-D-136 of Docket A-90-44.

The offshore terminal directly supports the refinery, and unloads/loads crude oil and refined products. Because the berths directly support the refinery, crude oil is typically unloaded – not loaded – to supply the refinery. Refined products are loaded in customized vessels. The South Coast Air Quality Management District (SCAQMD) requires that all marine vessel loading be captured and controlled, per SCAQMD Rule 1142. This is a similar local-jurisdiction requirement to the BAAQMD rule considered for the Subpart Y development.

In order to comply with this requirement, El Segundo previously authorized the use of a custom barge and now utilize their own customized tankers.

4.1.4.1 Customized Barge

When not loading one of the customized tankers owned by Chevron, the terminal complies with Rule 1142 by using the Barge San Pedro, which is customized with carbon canisters for VOC control of loading vapors. There are specific considerations that limit the operability of the terminal with this barge:[112]

- The loaded vessels may be required to purge, wash, gas free, visually check, and re-inert the cargo tanks prior to entry into SCAQMD waters. This significantly restricts the vessels that will call upon El Segundo.
- The fendered barge will be positioned immediately adjacent to the port side of the vessel
- The maximum allowable loading rate is 15,000 bbl/hr
- If a vessel is not gas free, the carbon canisters on the barge may be exhausted prior to completion of loading, which then creates a regulatory compliance issue with SCAQMD vessel requirements.

With a very small maximum loading rate and limited capacity of the carbon canisters, the barge would not be capable of controlling a full load, which would take approximately a week. As well, this design constraint does not have the same impact at El Segundo, which is near shore for relatively quick access to replacement canisters. At 82 statute miles offshore, the operational constraint of frequent canister replacements and limited loading rates would create too great a restriction for BMOP.

With fixed mooring positions, the terminal manual restricts operation to calm conditions (less than 8-foot swell and wind speed less than 20 knots – direction dependent). This is acceptable given the location in partially-protected waters near shore, with predictable, calm weather typical of Southern California.

A barge or other workboat required to be adjacent to the port side of a VLCC in exposed waters in the open ocean would create additional operational restrictions for safety as a result of potential collisions.

4.1.4.2 Customized Tankers

El Segundo utilizes custom tankers with onboard vapor recovery. As the owner of the terminal and refinery, Chevron is also the owner and operator of vessels that typically call on the marine terminal. The primary purpose of the dedicated fleet is to carry refined products from Chevron's Richmond Refinery and El Segundo Refinery to the Barber Point terminal in Hawaii. The marine terminal for loading becomes a company-internal operation and is not akin to crude oil export.

Key differences between the El Segundo Marine Terminal and BMOP DWP include the fact that the El Segundo Marine Terminal:

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[112] Chevron Products Company El Segundo Refinery Marine Terminal Manual (Revised February 2009).

- cannot fully load VLCCs,
- is near shore in protected waters,
- has dedicated, customized vessels to capture and control vapors, and
- loading rates are capped at 20% of BMOP's proposed loading rate.

Accordingly, El Segundo is not a similar source and the use of customized vessels for refined product loading for an adjacent refinery is not a transferrable technology due to significant differences in operating conditions.

4.1.5 Summary of Similar Source Evaluation

The following table summarizes each of the described facilities using the similar source criteria of Subpart B.

Table 4-2. Comparison of Similar Sources to BMOP

Similar Source Criteria	LOOP	Limetree Bay Terminal	United Riverhead Terminal	El Segundo Marine Terminal
Volume and concentration of emissions	Similar concentration, but less than half the loading rate and ten times less volume	Similar concentration, but less volume	Similar concentration, but less volume	**Not similar** –less volume and concentration due to smaller vessels and vapor capture constraints
Type of Emissions	Similar crude oil vapors displaced from marine vessel	Similar crude oil vapors displaced from marine vessel	Similar crude oil vapors displaced from marine vessel	**Not similar** – Primarily load refined products (different HAP conc.)
Similarity of emission points	Similar SPM and vessel class	Similar SPM and vessel class	**Not similar** – fixed berth with platform surface adjacent to vessel	**Not similar** – fixed position buoys with smaller vessel class
Cost and effectiveness of controls	Similar – submerged fill	Similar – submerged fill	Similar – submerged fill	**Not similar** – relies on dedicated vessels customized with controls.
Operating conditions	**Not similar** – located in partially-protected coastal waters	**Not similar** – located within 2 miles of shore	**Not similar** – located within 2 miles of shore	**Not similar** – located within 2 miles of shore

Note: Based on the criteria delineated in the preamble to Subpart B, at 61 FR 68384, December 27, 1996.

Based on the summary above, LOOP and the SPM at the Limetree Bay Terminal are similar in emissions and capability of control, with the exception of the operating conditions – both are in partially protected coastal waters. The proposed Project location in exposed waters in the ocean requires operating conditions unique to the weather, waves, and remote setting with limited access to shore-based resources.

Both LOOP and Limetree Bay Terminal utilize submerged fill as the control technique for loading crude oil into VLCCs, and both were only recently capable of loading crude oil. Though not a similar source based on all of the Subpart B criteria, BMOP's conclusion that the MACT floor is submerged fill remains consistent with other contemporary control determinations for loading crude oil into a VLCC at an SPM.

4.2 Other Crude Oil Export DWP Applications

Other companies have also recently proposed the construction of deep water ports for crude oil export. None of these have operations and controls that are "achieved in practice." Not only are they not yet constructed and operating, but none have even completed permitting evaluations or have final authorization to begin construction. In accordance with the first "Principle of MACT Determinations" at 40 CFR §63.43(d)(1), the MACT Floor represents an emission control which is achieved in practice. Thus, hypothetical proposed sources do not impact the MACT floor.

While the other crude oil export DWP applications cannot be used to define the floor, the applications can be evaluated for approaches to emissions controls that can be considered as transfer technologies or in a beyond-the-floor analysis.

In this light, EPA has provided initial review of two of the DWP projects, which generally represent other recent applications: Texas Gulf Terminals Inc. (TGTI) and Enterprise Products Sea Port Oil Terminal (SPOT).

When EPA was evaluating TGTI and SPOT, a letter was provided to the USCG to clarify a single difference between the projects' designs that enabled EPA to explore a difference in applicability to Subpart Y. EPA noted their intention to apply Subpart Y requirements to SPOT's proposed project "based on the design of their project, including the construction and use of a platform structure to facilitate loading operations at their offshore loading terminal." EPA also confirmed their intent to propose an action on TGTI's Case-by-Case MACT application "based on the design of their project (single point mooring buoy without a platform structure)…"[113] It should be noted that this inter-agency letter was specific to these two projects, and was not regulatory guidance or formal interpretation, as it was not made available for public comment.

The April 5, 2019 letter specifically acknowledges that the applicability (and inapplicability) of a NESHAP, Subpart Y in this instance, is based on the *design specific* to each project. This is congruous with a portion of *Sierra Club v. EPA (intervenor Brick Industry Association) (03-1202)*, and the definition at 40 CFR §63.41, that in order to be a "similar source" for regulation, a stationary source must have each of the following:

1. Similar in *design*,
2. Similar in capacity,
3. Comparable emissions, and
4. Capable of control using the same control technology.

This is also consistent with Subpart B considerations of a similar source for TGTI, as the design specific to the project would inform the capability of control (relative costs and operational considerations).

It is appropriate for EPA to consider the specific projects in the context of each of the criteria above for whether they are similar sources to the "offshore loading terminal" subcategory. While EPA's statement

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[113] Letter from Robert D. Lawrence, EPA Region 6, to Mr. Curtis E. Borland (U.S. Coast Guard (CG-OES-2), and Ms. Yvette Fields, Director, Office of Deepwater Ports & Offshore Activities, Maritime Administration (MAR-350), "RE: Marine Vessel Loading emissions," April 5, 2019.

notes the similar source determination is based on the entire design, the capability of control is interpreted through the lens of case law and the definition of 40 CFR §63.41. Therefore, it is pertinent that EPA identified the *construction* and use of a platform as one distinguishing factor.

BMOP has reviewed the publicly available submittals for SPOT,[114] as well as TGTI. The entire design considerations for a similar source argument at SPOT are not available or readily apparent, as the applicant simply stated "40 CFR 63.562b(4) would apply to the SPOT DWP" without elaborating. As well, without the source operating (or even fully engineered), a basis of comparison can only consider conceptual distinctions that affect relative costs of control or operating conditions. Based on the available information, the high-level project scope of SPOT is very different from BMOP. The following table presents a comparison of the proposed project construction to make a DWP comparison.

Table 4-3. Comparison of Projects in April 5, 2019 EPA Region 6 Letter to BMOP

Proposed Construction	TGTI	SPOT	BMOP
New Onshore Terminal	*Yes* – New TGTI Onshore Terminal	*Yes* – New Oyster Creek Terminal	**No** – existing Nederland Terminal
New Offshore Pipeline(s)	*Yes* – 1 New 30" Pipeline	*Yes* - 2 New 30" Bi-directional Pipelines	**No** – existing Stingray
Facilities for Multiple Commodities	*Yes* – WTI Crude Oil and Condensate	*Yes* - Crude Oil and Condensate	**No** - Crude Oil only
Loading Buoys	*Yes* - 1 New SPM	*Yes* – 2 New SPMs	*Yes* – 2 New SPMs
DWP Location in Coastal Waters[a]	*Yes* – 14 statute miles in partially-protected coastal waters	*Yes* - ~30 statute miles in coastal waters	**No** – ~82 statute miles in exposed offshore waters in the ocean
New Offshore Platform	**No** – no offshore platform	*Yes* - New 8-pile platform	**No** – existing WC 509

a. The NWS classifies all waters in the GOM within 60 nautical miles of shore as "coastal waters."

BMOP is not proposing the construction of an offshore platform, as is SPOT. The existing platform complex continues to include living quarters and natural gas service – it is not a dedicated, purpose-built platform for crude oil loading. Instead, it offers an existing location to oversee the DWP operations and provide metering and other ancillary equipment.

The WC 509 platform cannot support vapor recovery or vapor combustion, due to weight and space constraints and safety concerns. For BMOP to have a project similar in design to SPOT, an entirely new platform would need to be constructed, which is not part of the project purpose or design. EPA has

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[114] A similar source analysis or detailed evaluation of Subpart Y applicability was not identified in a review of SPOT's PSD application and the information made available through Docket ID: EPA-R06-OAR-2019-0576. Approximated applicability of other NESHAPs and inconsistencies in VCU capabilities on low NO_X VCUs in the submittal suggest a detailed analysis was not conducted.

seemingly agreed that increasing platform size and space would "redesign the project," as they have concurred with SPOT's argument in their best available control technology (BACT) analysis.[115]

> *Carbon Adsorption-Absorption is deemed technically infeasible and not carried forward in the BACT analysis because it has significant platform infrastructure requirements that would change the basic design of the platform…*[116]

A BACT analysis is slightly different than a MACT analysis. In this case, however, the comparison is relevant for consideration of transfer of technology at a similar source. EPA's draft permit included a determination that project-designed constraints of platform space (when constructing a new platform is part of the project design) allow for exclusion of alternate controls options with better pollutant removal performance. For comparing conceptual designs of a project that are not achieved in practice for how they would inform transfer of technology, "limited platform space" presents an operating condition that affects relative costs, and effectiveness of controls that would not be a similar source for a DWP.

From a relative cost, safety, and operability consideration, BMOP is closer to TGTI for capability of control, as TGTI would also require construction of an entirely new platform to consider a VCS (not just an increase in size of the one already considered for construction in the project). Unlike TGTI, however, BMOP is significantly farther offshore into exposed waters with different weather and wave impacts. Accordingly, BMOP is not similar to SPOT nor TGTI, but these projects support a conclusion that transfer of technology requiring the addition of platform space not currently available or part of the Project design is not a similar source.

4.3 Achieved in Practice

"Achieved in practice" is not defined in the regulation or statute. A review of relevant case law provides specific considerations for how to determine achieved in practice in accordance with Section 112(d)(3) of the Clean Air Act.

4.3.1 Case Law Informs "Achieved in Practice"

In *Sierra Club v. EPA (97-1686)*, the predominant challenge was that EPA failed to meet the statutory requirements in setting the floor for medical waste incinerators.[117] The Court provided additional guidance

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[115] See page 13 of 108 of "Statement of Basis: Draft Prevention of Signficant Deterioration Preconstruction Permit and Title V Operating Permit for SPOT Terminal Services LLC, Permit Numbers: R6PSD-DWP-GM7 and R6T5-DWP-GM7," November 8, 2019. See page 13 of 108: "This alternative requires a *substantial amount of operational space* that is difficult to accommodate on an offshore platform… Based on the significant amount of project redesign associated with this alternative and the lack of demonstration in practice for an offshore installation, the adsorption with absorption alternative is considered technically infeasible." Also see page 19 of 108: "SCR is considered a technically infeasible option due to the unacceptable operating temperatures of the combustor, *increase in deck size* required to accommodate the SCR, vapor combustor capacity and the batch mode process." Emphasis added.

[116] Sea Port Oil Terminal Project Offshore Brazoria County, Texas, U.S. Environmental Protection Agency Region 6 Prevention of Significant Deterioration Air Permit Application, Page 48. Docket ID: EPA-R06-OAR-2019-0576.

[117] Note that *Sierra Club v. EPA (97-1686)* dealt with Section 129 of the Act, while case-by-case MACT derives from Section 112. However, in multiple subsequent court rulings, the DC Circuit Court of Appeals has determined that in determining the MACT floor the minor differences in Section 129 and Section 112 do not result in a different conclusion. For example,

on how to appropriately determine achieved in practice. That is, the best controlled similar source must be able to demonstrate compliance under the worst foreseeable operating conditions.

> *First, EPA would be justified in setting the floors at a level that is a reasonable estimate of the performance of the "best controlled similar unit" under the worst reasonably foreseeable circumstances.... It is reasonable to suppose that if an emissions standard is as stringent as "the emissions control that is achieved in practice" by a particular unit, then that particular unit will not violate the standard. This only results if "achieved in practice" is interpreted to mean "achieved under the worst foreseeable circumstances." In National Lime Ass'n v. EPA, 627 F.2d 416, 431 n.46 (D.C. Cir. 1980), we said that where a statute requires that a standard be "achievable," it must be achievable "under most adverse circumstances which can reasonably be expected to recur." The same principle should apply when a standard is to be derived from the operating characteristics of a particular unit.*

Thus, once the best controlled similar source is identified, appropriate consideration of variability at that source is required to arrive at the MACT floor.

In *Cement Kiln Recycling Coalition v. EPA (99-1457)*, the Court clarified again that “achieved in practice” is specific to the best performing source (not an application of the best controls to the worst performing source).[118]

> *While standards achievable by all sources using the MACT control might also ultimately reflect what the statutorily relevant sources achieve in practice, EPA may not deviate from [Section 112(d)(3)'s] requirement that floors reflect what the best performers actually achieve by claiming that floors must be achievable by all sources using MACT technology.*

In *Sierra Club v. EPA (intervenor Brick Industry Association) (03-1202)*, the Court expounded on its earlier discussion of variability in determining what is actually achieved in practice.

> *Defending its approach, EPA points to Mossville Environmental Action Now v. EPA, 370 F.3d 1232 (D.C. Cir. 2004), in which we held that floors may legitimately account for variability because “each [source] must meet the [specified] standard every day and under all operating conditions.” Id. At 1242. In Mossville, however, record evidence demonstrated that the floor reasonably estimated the actual variability of the best performing source.*

Accordingly, courts have ruled that achieved in practice means:

- Achieved in practice must not deviate from Section 112(d)(3), as specifically referenced in the preamble to Subpart B.[119]
- The floor must be set based on that achieved specifically by the best performing similar source.

> *The Sierra Club does not challenge EPA's extension of Sierra to existing source standards. Instead, it argues that Sierra's Chevron one analysis does not control this case because* [Section 112] *differs from* [Section 129] *(at issue in Sierra).... We do not agree that the difference between the two sections requires a different result....*[National Lime Association v. EPA (99-1325)].

[118] The Court cited Sierra Club v. EPA (97-1686) and National Lime Association v. EPA (99-1325).

[119] 61 FR 68385, December 27, 1996: “...the owner or operator must demonstrate to the permitting authority that emissions will be controlled to a level consistent with the ‘‘new source MACT’’ definition in section 112(d)(3) of the Act.

- Variability of source emissions should be considered such that the best controlled source will meet the floor under the worst reasonably foreseeable circumstances.

4.3.2 Summary of “Achieved in Practice” by Operating U.S. Offshore Terminals

None of the operating offshore terminals in the U.S. discussed previously in this section are similar sources to BMOP. While the capability of vapor capture and control does not transfer to the proposed Project, the use of submerged fill loading is achieved in practice and is a transferrable technology to BMOP.

> *Submerged fill reduces the amount of emissions generated from the loading of vessels by reducing turbulence and misting. Use of this technique results in a 60-percent reduction in emissions compared to splash loading.*[120]

This is consistent with the USCG requirements at 46 CFR 153.282 and is common among marine vessels.

> *The Commenter noted that submerged fill, as defined by the Coast Guard, has been standard industry practice for some time, reduces HAP emissions, and eliminates static electricity from free-falling cargo, thereby enhancing operational safety.*[121]

4.3.3 Selected MACT Floor Control Technology

Submerged fill is an effective way to reduce HAP emissions by 60% and conforms with the Project design criteria for a similar source to be able to load into the international fleet of VLCCs and other crude-carrying vessels.

Accordingly, the floor control technology is the use of submerged fill. Section 6 of this application provides recommended MACT requirements. The corresponding recommended emissions standard considers variability consistent with other recent EPA MACT determinations, to identify the emissions “achieved in practice” for crude oil loading into VLCCs at a DWP.

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[120] 75 FR 65115, October 21, 2010, right column

[121] 76 FR 22581, April 21, 2011, left column.

5. BEYOND-THE-FLOOR

The second "Principle of MACT determinations" for 40 CFR 63, Subpart B is provided as the following:

> *Based upon available information, as defined in this subpart, the MACT emission limitation and control technology … recommended by the applicant and approved by the permitting authority shall achieve the maximum degree of reduction in emissions of HAP which can be achieved by utilizing those control technologies that can be identified from the available information, taking into consideration the costs of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements associated with the emission reduction.* [40 CFR 63.43(d)(2)]

The second principle is referred to as "Beyond the Floor," or "BTF." Additional detail regarding BTF is included in the second part of the definition of the MACT limitation for new sources.

> *Maximum achievable control technology (MACT) emission limitation for new sources means the emission limitation … which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed or reconstructed major source.*
> [40 CFR 63.41]

BTF MACT requires the following four items:

1. The maximum degree of reduction achievable
2. Consideration of non-air quality health and environmental impacts and energy requirements in achieving that reduction
3. Consideration of cost in achieving that reduction
4. "Other" impacts assessment

As described in Section 2, the purpose of the Project and location in exposed waters offshore requires use of CALM buoys. Considering available information specific to CALM buoys – vendors and previous installations – BMOP has identified only a single international SPM system that has retrofitted a SPM with a customized vapor control system for loading of crude oil into VLCCs on a pilot basis. This pilot is a source- and location-specific implementation. The pilot does not reflect vendor offerings or standard engineering.

Of the >500 worldwide installations, no other SPM buoys were identified as operating with a vapor control system. The SPM buoys are using only submerged fill and a VOC management plan. This BTF evaluation considers the adaptation of control alternatives employed for other marine loading terminals onshore, or those that have fixed berths.

Listed in the next subsections are specific vapor control systems analyzed as BTF potential controls:

- Vapor Combustion Control
- Vapor Recovery Control
- Vapor Balancing
- Vapor Control System Onboard VLCC
- Vapor Control System Onboard Support Vessel

The detailed review of each vapor control systems results in the following conclusion: vapor capture and control has never been adapted to the unique, extreme operating conditions of BMOP. There are physical design considerations of the Project (e.g., length of hoses and pipelines, water depth, weather and wave conditions, and platform constraints) that add unresolved safety risks to vapor capture and control. Even assuming that not-yet-demonstrated engineering could be developed, vapor capture at the Project would have inherent impacts to operations, significantly reducing the capacity of the Project to such an extent that it would no longer meet the Project purpose and would be prohibitively expensive.

5.1 Vapor Combustion Control

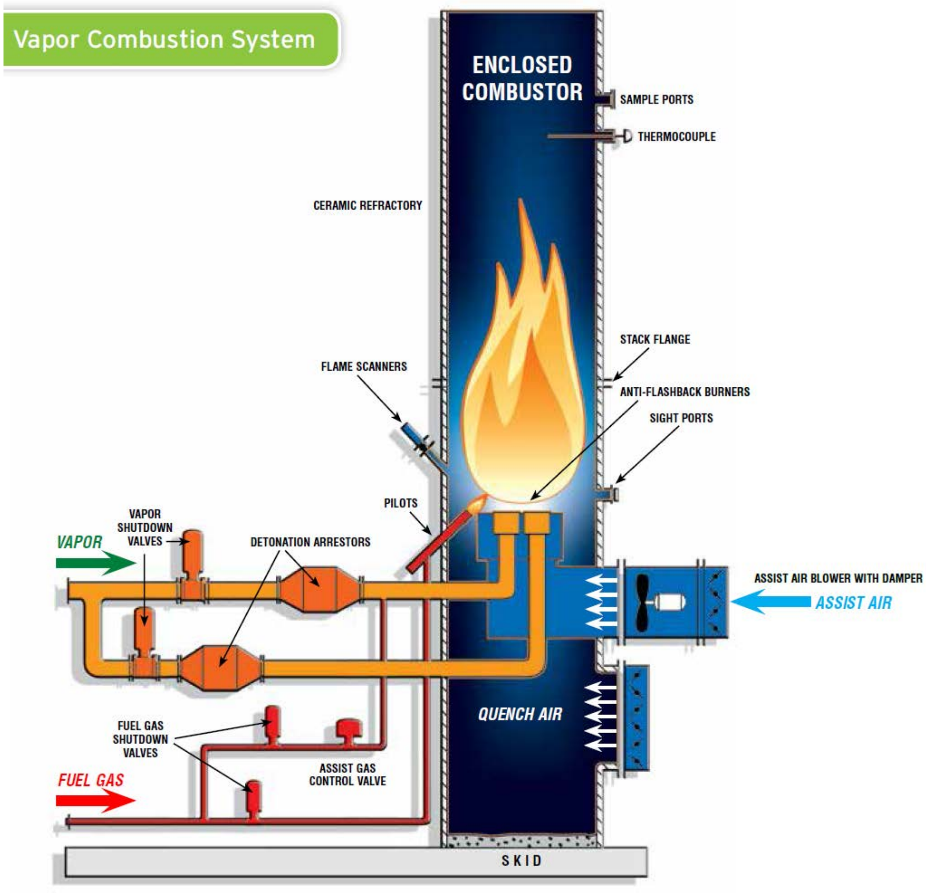
A common approach for marine loading at onshore terminals is the use of combustion to control displaced organic vapors. Combustion control for marine loading in the “transfer losses” source classification uses a vapor combustion unit (VCU).

Vapor capture systems are necessary for use of a VCU. For onshore terminals with fixed berths, dockside vapor collection hoses or arms are connected to the vessel’s inert gas vapor system on the deck of the ship to capture displaced loading loss vapors. The facility VCS must meet USCG safety requirements at 33 CFR Part 154, discussed in Section 3.1.3. The USCG regulations require safety protection devices to be as close as possible to the vessel’s connection with the facility VCS. Compliance with the safety device requirements is typically met at marine terminals with a DSU, an entire skid that includes the required detonation arrester, pressure control, oxygen analyzer, and inerting/enrichment equipment. Blowers/fans are utilized to pull the displaced vapors through the facility VCS and to the VCU, and for combustion air/quench air in the combustor control.

A VCU utilizes burners to add the heat energy required to raise the temperature in the enclosed combustor to the point that VOC chemical bonds are broken. However, the displaced vapor composition is not uniform and inerted. A VCU requires supplemental fuel, both to sustain a pilot flame for ignition, as well as assist gas necessary to enable combustion to sustain the high temperatures required for VOC destruction. For marine loading, assist gas is often required until the vessel is loaded to 85% of full capacity, or more. The VCU control utilizes a ceramic refractory to allow quick heating and sustain temperatures to improve VOC/HAP destruction.

The following figure presents a simplified VCU control system. A VCU requires a DSU, a large enclosed combustor with ceramic refractory, blowers and fans to both pull the displaced vapors through the facility VCS and sustain proper combustion control in the VCU, and a reliable, plentiful fuel source for pilot fuel and assist gas. When the space, power, and fuel requirements are available at an onshore marine terminal, VCUs can achieve VOC/HAP control of 99% of captured vapors.

Figure 5-1. Example Vapor Combustion System[122]



Flares are also a common combustion control device used in the “process vent or stack discharges” source classification. Flares require the same vapor capture components as a VCU (i.e., DSU and blowers/fans), as well as supplemental fuel supply. Combustion occurs at the tip of the stack, which is exposed to atmospheric disturbances and precipitation. Therefore, a flare has less residence time and control of combustion temperature in comparison to a VCU. The result is lower control efficiency, typically 98% control of captured vapors. As well, flares require operations that maintain tip velocity and a vapor stream with a net heating value of at least 270 Btu/scf.[123] As discussed for VCUs, the displaced vapors occurring during a majority of the loading time (~85% of full capacity) of marine vessels with crude oil will not sustain combustion. Supplemental fuel will also be required to sustain complete combustion in a flare. Without the insulation and radiative heating from an enclosed combustor, a flare will require more supplemental fuel and/or sustain lower VOC/HAP destruction efficiency.

In addition to sufficient space for installation of the required components, flares also require sufficient space for safe operation in consideration of the thermal radiation from the exposed flame.

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[122] https://www.johnzinkhamworthy.com/wp-content/uploads/vapor-combustion-systems.pdf

[123] AP-42, Chapter 13.5 Industrial Flares,02/18.

In comparison to a VCU, a flare has the same vapor capture system requirements, similar space requirements (would require a new platform), and additional non-air quality environmental, energy, and safety impacts with lower control efficiency. Therefore, BMOP has evaluated a hypothetical vapor combustion control technology alternative utilizing a VCU, because of its additional effectiveness, for the proposed Project.

A VCU control alternative would use floating vapor hoses (~1,500 feet long) to connect the VLCC to the CALM buoys, similar to the crude oil loading hoses, but for vapor return. The vapor hoses would be connected to the VLCC's vapor system to capture displaced vapors, instead of having them released through the vent mast riser. The CALM buoys would have to be modified to accommodate the additional vapor line with an additional swivel path, and vapor PLEMs would have to be constructed with under-buoy vapor hoses (~200 feet). A looped subsea vapor pipeline (~6,000 feet to CALM Buoy No. 2) would have to return the captured vapors to a new platform, where risers (~250 feet) would bring the captured vapor to a safety skid with detonation arresters, and then to three marine VCUs. There are few instances of subsea vapor pipelines utilized at nearshore berths to return collected vapors to shore. However, no subsea vapor pipelines have been demonstrated in operation at the water depth, distance, and vertical return up a riser to an offshore pipeline, as would be required for the proposed Project. Appendix D includes a schematic and plot of the VCU control alternative concept for BMOP.

The operation of any stationary vapor control system applied to the Project necessitates that the vapor collection system and subsea vapor lines successfully route the vapors from the VLCC back to a location that can support a VCU. A vapor capture system that is unreliable or unsafe will prevent a VCU from achieving up to 99% reduction in total hydrocarbons from the marine loading losses.[124] For the BMOP Project, there are additional unique considerations for applying VCU control with an undemonstrated vapor capture system.

First, while the Project includes use of the existing WC 509 Platform Complex to support VLCC loading, the existing platforms cannot support VCUs. The commissioned strength and fatigue analysis does not allow for the installation of three very large VCUs (14 feet in diameter, 90 feet tall) necessary for the control of emissions from crude oil loading into a VLCC at 80,000 bbl/hr. In addition to the modifications to add crude oil piping, meters, and ancillary equipment, the platform complex will continue to house natural gas separators and other equipment for natural gas service.

Accordingly, a new platform would need to be constructed, just to house the VCU controls. In this way, this control alternative is similar to considerations for other DWP applications closer to shore that are not proposing to construct an offshore platform.

Second, while the Project has the benefit of natural gas supply for basic utilities at the WC 509 complex, there is insufficient natural gas supply at WC 509 for the significant fuel consumption rates that would be required for VCUs – both for assist gas for control of captured vapors and for electrical generation to power the large blowers necessary to pull a vacuum on miles of vapor lines. A diesel generator and regular supply of diesel fuel would be required on the VCU platform, as would propane fuel for the pilot and assist gas for the VCUs.

In addition to the two basic VCU requirements of space and fuel/energy needs, there are many challenges impacting the ability to operate vapor capture and control at BMOP.

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[124] This analysis considers a VCU design capable of achieving a control efficiency of 99%, similar to onshore marine terminals, to ensure a conservative evaluation of HAP control.

5.1.1 Vapor Control Challenges Impacting Operations

The practical effectiveness of a VCU control alternative when applied to BMOP presents questions of feasibility, or at the minimum, would limit BMOP's ability to fulfill the Project purpose and design capacity. The vapor capture and control would impart operating constraints that would add significant risks, increase planned and unplanned downtime due to maintenance and additional operating activities, and require additional approval (USCG or Certifying Entity) for non-conforming design. BMOP has considered several challenges in the engineering analysis for the technical feasibility of VCU control on the proposed Project:

- Vapor Hose – reduced operating capacity due to floating vapor hose connections/disconnections and maintenance.
- Location of Safety Devices – physical design prohibits conforming to explicit USCG safety regulations and USCG has not deemed the operating requirements of the Project with vapor capture as safe.
- Vessel Tank Pressure Control Challenges – safe operating pressure for the vessel cargo tanks would be a delicate balance not previously demonstrated for the Project design and would significantly reduce the operating capacity.
- Liquid Condensation – reduced operating capacity for vapor line pigging, added maintenance, and draining of vapor hoses with customized support vessels.
- Substantial Fuel Requirements – added risks to safe operation for frequent fuel tank transit and replacement near large combustors and potential for reduction in operating capacity due to supply interruptions.

BMOP has also considered the operations and maintenance impacts as a result of these challenges. Leveraging the experience of VCU operation at the Nederland Terminal combined with offshore experience, BMOP has determined that even if unproven engineering solutions to overcome the technical difficulties of VCU operation for controlling VLCC loading 82 statute miles offshore could be operated successfully, the application of vapor control would limit the Project operating capacity by 52% of design, or more. The quantification of the operating capacity impact is delineated in Appendix D of this application, and addresses actual operation and availability at the Nederland Terminal applied to the proposed Project, as well as time estimates for specific practices and known maintenance events based on extensive offshore and marine experience.

5.1.1.1 Vapor Hose

To implement vapor capture, the CALM buoy would be modified, and additional floating and under buoy vapor hose(s) added. There would be two separate sets of hoses, one set for the crude oil and the other for the vapor return. The hose sets would require customized design to keep them bundled such that they do not separate – like spaghetti – and create obstacles both during the absence of vessel loading and when not attached to the buoy. The VLCCs to call at the DWP have limited crane capacity onboard. Lifting the floating hoses to the deck would need to occur in two separate operations for the crude oil hoses and the vapor hoses. The extra hose lifting and connection time, as well as disconnection time, directly adds time to a single vessel's loading operation and limits the ability to operate the Project at design capacity.

Further, with a customized hose bundling design, it is expected that hose replacement may be required more frequently with abrasion and regular impacts from the Meteorological and Oceanographic (MetOcean) environment at WC 509. The crude oil hoses and vapor hoses would have different diameters, lengths, and buoyancy, and would be affected differently by MetOcean conditions (seas, swell, current, and wind). The potential for damage or normal wear is increased, which would lead to loss of operating capacity for an increase in planned maintenance, and possible interruptions from unplanned maintenance.

5.1.1.2 Location of Safety Devices

As discussed in Section 3.1.3, the USCG has promulgated safety regulations specific to vapor control systems of marine loading. USCG's regulations do not require vapor capture and control, but explicitly state that when vapor capture is used, the system must comply with the requirements for *Marine Vapor Control Systems* (33 CFR 154 Subpart P).[125] For the proposed Project, it is not possible to implement a VCU control alternative that can meet the explicit USCG requirements for the location of necessary safety devices, as discussed below.

Originally promulgated in 1990 and most recently updated in 2015, the purpose of USCG's regulations is to offer protection for both the marine vessel and the marine terminal. To ensure protection, 33 CFR 154 Subpart P specifies necessary safety devices and required locations for design and operation.

Table 5-1. USCG Safety Device Location Requirements

USCG Reg.	Safety Device	Required Location from Ship Vapor Connection
§154.2105	Oxygen Analyzer	<6 meters (19.7 feet)
§154.2105	Detonation Arrester	<18 meters (59.1 feet)
§154.2106	Straight pipe run on either side of Detonation Arrester	>120 times the pipe diameter
§154.2107	Inerting, enriching, or diluting system	<22 meters (72.2 feet)
§154.2109	Vapor recovery or destruction	>30 meters (98.8 feet)

Source: 33 CFR 154 Subpart P.

The short distance requirements above minimize the at-risk components from increased line pressures due to blockages (e.g., condensate) or electrostatic charge accumulation. In addition to USCG requirements, the International Safety Guide for Oil Tankers and Terminals, (ISGOTT) also requires a detonation arrester to be located "in close proximity to the terminal vapor connection at the jetty head in order to provide primary protection against the transfer or propagation of a flame from ship to shore or shore to ship."[126] These safety requirements are met at fixed loading berths of existing marine terminals as the safety devices are located on the dock directly adjacent to the moored vessel.

It is not possible for BMOP to meet these fundamental vapor capture safety requirements for marine loading for a CALM buoy in exposed waters of the ocean. Of particular note is the requirement for "Straight pipe run on either side of Detonation Arrester >120 times the pipe diameter", which for 24" nominal pipe size would be equivalent to 240 feet. The floating vapor hose alone would be greater than 1,500 feet long. Even after the floating vapor hose, the CALM buoy does not have enough surface area to support each of the safety devices, and the DSU with these devices would have to be placed on the VCU platform. With the addition of the under-buoy vapor hoses, subsea vapor return line, and vapor riser to the VCU platform, the closest these safety devices could be located to the vapor connection at the VLCC would be ~8,000 feet. The unique setting and Project design criteria would lead to an exceedance of the safety device location requirements by more than a factor of 100 – exposing the ship to unprotected vapor lines two orders of magnitude outside of safety requirements.

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[125] 33 CFR §154.2000(h).

[126] ISGOTT, 5th Edition, Section 11.1.13.6.

BMOP cannot implement a vapor capture system that meets the explicit USCG requirements for safety device locations. If considered further, the VCU control alternative for BMOP would have to undergo scrutiny by the Assistant Commandant for Marine Safety, Security, and Environmental Protection to grant an exemption from the distance requirements for the safety devices. This exemption process, as delineated in 33 CFR §108, must demonstrate that:

- Compliance with the requirement is economically or physically impractical,
- No alternative procedures, methods, or equipment standards exist that would provide an equivalent level of safety and protection from pollution by oil or hazardous material, and
- The likelihood of oil or hazardous material being discharged is not substantially increased as a result of the exemption.

The safety device location is physically impractical any closer than a VCU platform and no known equipment exists to provide an equivalent level of safety and protection. Operating procedures and methods will be the only option to provide an equivalent level of safety. The operating procedures and methods would need to be made to address a series of hazard analyses conducted per 33 CFR §154.2020(d), and then a certifying entity would need to review the entire plan, calculations, and specifications, including the hazard and failure analysis.

The USCG has never granted an exemption for this magnitude of unprotected vapor lines. The furthest exemption USCG has granted for the location of the safety devices is less than 10% of the distance required for BMOP – meaning that the length of the floating vapor hose alone would be much longer than the USCG has ever previously determined is safe for marine vessel vapor capture and control.

Conservatively assuming that a first-of-its-kind USCG exemption were possible, it is expected that hazards would need to be mitigated through tightly bound-restrictions on operating conditions that would minimize variability and potential for hazards. These operating limitations could include the following:

- Constrained weather conditions to minimize temperature variability between ullage vapors and the sea floor to mitigate liquid drop-out and potential for overpressure and vacuum hazards;
- Constrained sea state conditions to mitigate dynamic conditions that could lead to leaks, vapor hose impairment and pressure fluctuations, etc.;
- Frequent interruptions to loading to inspect vapor hoses, CALM buoy components, and components to identify possible leaks in the vapor lines and mitigate air infiltration for the lines under negative pressure (much of the system will be under vacuum) that could lead to an explosive atmosphere or potential for electrostatic charge accumulation from entrained moisture;
- Shortened vapor hose replacement schedules; and
- Restricted loading rates and interruptions resulting from pressure variations.

Many of the example operating constraints are at odds with the Project location in exposed waters of the ocean at the existing WC 509 platform complex. These constraints and restricted operating practices would greatly impact BMOP's ability to efficiently load VLCCs at the Project capacity. Accordingly, consideration of the VCU control alternative for BMOP must consider the impacts of significant reduction in operating capacity.

5.1.1.3 Vessel Tank Pressure Control Challenges

A marine vessel tank structure is designed to carry certain loads, including the combined pressure from the liquid cargo and the tank ullage pressure. The tank ullage pressure is also a critical parameter for safe operation; positive pressure is required for inerted vessels to prevent ambient air (and oxygen) from entering the tank space. Operating the tank pressure within certain constraints is thus necessary to maintain the structural integrity and safety of the vessel. The USCG also requires elimination of potential overpressure and vacuum hazards, for this reason.[127]

Most crude oil carriers have a common tank vent and inert gas system. It is through this system that positive operating pressure is maintained, and also where vapors are piped to the mast riser during loading or overpressure events. The design of the marine vessel vapor system is regulated by the International Convention for the Safety of Life at Sea (SOLAS), regulation II-2/11.6 and 5. The design must utilize the following control mechanisms:

- Individual tank pressure/vacuum (P/V) valve
- Common P/V breaker.

Figure 5-2. Main Cargo Deck of a Crude Oil Tanker[128]

The P/V valve is the primary mechanism for protection from over pressure or too much vacuum. The design and operation of these valves is specified at ISO 5364:2000. The typical pressure setting for a P/V valve is 1,400 to 1,800 millimeters of water gauge (2 to 2.5 pounds per square inch, gauge [psig]). For an inert marine vessel tank, the USCG requires that the pressure be maintained greater than 0.2 psi, but less than 80% of the lowest setting of any of the vessel's pressure relief valves.[129] With a typical P/V pressure relief at 2 psi, the marine vessel's tanks must be maintained between 0.2 and 1.6 psi. When loading product without a vapor control system, the vessel can relieve pressure through the vent mast riser, maintaining

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[127] 33 CFR §154.2100(a).

[128] International Maritime Organization, "Technical Information on Systems and Operations to Assist Development of VOC Management Plans," July 27, 2009 (MEPC.1/Circ. 680).

[129] 33 CFR §1547.2103(b).

proper positive pressure (target to between 1.4 and 1.6 psi) to sustain an inerted atmosphere in the tanks, while maintaining VOC management practices.

However, when a vapor control system is utilized, the cargo tanks are no longer a self-contained system with a single point of onboard control during loading (vent overpressure through the mast riser). With vapor capture and control at the terminal, controlling the pressure is a multi-variable exercise that requires integrated function of the loading rate, facility vapor connection system blowers, and the vessel's valves and inerting requirements. For safety protection and minimization of operating variables, terminal vapor control systems utilize short-run, dockside controls.

Adding variables such as vertical elevation changes, temperature fluctuations, exaggerations of pressure ripples, liquid dropout, and inherent communication delays for system control design (overshoot versus slow response time) creates a very different operational challenge for the BMOP Project.

At 80,000 bbl/hr crude oil loading rate, the blowers on the vapor control system must have sufficient capacity to pull this volume ~8,000 feet and change in elevation of over 200 feet, twice (from the deck of the VLCC down to the sea floor, and then back up again to the VCU platform deck). Based on extensive experience for less complex dockside controls at the Nederland Terminal, BMOP's affiliates have identified vessel tank pressure control as an operability challenge for a vapor control system of the proposed Project that would result in both planned and unplanned downtime.

This pressure control would be exacerbated with dropout and collection of liquid in the vapor lines, vessel movement due to weather and wave conditions, and other variations in loading. Assuming that yet-to-be-demonstrated design specific to the BMOP Project can be engineered to meet USCG's requirements to eliminate overpressure and vacuum hazards from this system, use of vapor capture would significantly restrict the operating conditions to allow for proper pressure control, and require frequent liquids removal and maintenance of the vapor collection system to minimize inconsistencies in pressure drop.

5.1.1.4 Liquid Condensation

Vapor displaced during loading of a marine vessel will contain water entrained in the inert gas as well as condensable vapors. Use of a vapor capture system would undergo pressure differential and changes in temperature as the vapors leave a positive pressure, double-hull insulated vessel and travel ~8,000 feet in total, dropping to the sea floor 160 feet below the surface and then back up through a vertical riser more than 250 feet to the platform deck all while maintaining a significant vacuum in the system. The changes in temperature and pressure would lead to liquid condensation in the vapor capture system. The change in elevation would lead to liquids collecting at all low points in the system, including the floating hoses at the base of the risers to the CALM buoy and the seafloor at the base of the vertical riser at the VCU platform.

In the few instances of vapor capture with subsea vapor lines, the sloped subsea floors returned vapors to onshore terminals. For these unique locations, the velocity of the gas in the vapor capture system can be designed to carry condensed liquids up the slope to a liquid knockout drum prior to the VCU. It is not possible to create enough velocity to carry condensed liquids up a >250 feet vertical lift for the proposed Project.

The condensed liquids can be expected to pool in the floating hoses at the CALM buoy and at the bottom of the riser. With a flat seafloor, there would not be a single low point. As liquid pools in the pipelines, it creates flow restrictions and blockages leading to unsafe variations in the vessel cargo tank pressure control. The physical design requirements at the seafloor prevent simply adding a single sump to "eliminate any liquid condensate," at the CALM Buoy, and thus require other mechanisms to meet USCG requirements for condensate capture.[130] The engineering solution for this challenge is to build a looped subsea vapor line to enable pigging to remove the liquids. HYSYS Modeling was conducted by BMOP to evaluate the liquid drop-out for loading a VLCC at 80,000 bbl/hr. Depending on the ullage temperature and pressure compared to the vapor capture system temperature and pressure, ~30 bbl/day of liquid can condense and collect in the subsea vapor lines.[131] With this potential for liquid drop-out, vapor line pigging would be required after loading each vessel. While pigging the vapor line, loading would be interrupted and possibly incur demurrage fees.

Liquids would also condense in the floating vapor hoses, between the vessel and the CALM buoy. Because these hoses cannot be pigged, they would be periodically disconnected from the CALM buoy and lifted to drain using a customized support vessel to remove the collected liquids.

The frequent subsea vapor line pigging and added maintenance requirements relying on a customized support vessel to drain the floating vapor hoses would lead to significant interruptions to operations.

5.1.1.5 Substantial Fuel Requirements

The captured vapors from a VLCC are not uniform throughout loading. The inerted vessels arrive blanketed with inert gases to maintain oxygen concentration below 8% - specifically to make them noncombustible.[132] As well, hydrocarbon vapors are denser than air.

> *Because of its high density the gas forms a layer at the bottom of the tank which rises with the oil surface as the tank is filled. Once it has been formed the depth of the layer increases only slowly over the period of time normally required to fill a tank, although ultimately an equilibrium gas mixture is established throughout the ullage space.*
>
> *Above this layer the atmosphere originally present in the tank persists almost unchanged and it is this gas which in the early stages of loading enters the venting system. In an initially gas free tank, therefore, the gas vented at first is mainly air (or inert gas) with a hydrocarbon concentration below the Lower Explosive Limit (1 percent HC).*[133]

For the first half of loading a vessel, the displaced vapor requires supplemental fuel for combustion in a VCU. This fuel, assist gas, is necessary to sustain safe and effective vapor control until the layer of hydrocarbon vapors above the crude oil provides a sufficiently combustible mixture to allow combustion without assist gas. For the crude types considered for the proposed Project, propane assist gas would be needed until a VLCC was loaded over 85%. The assist gas requirements at startup would be ~ 800 standard cubic feet per minute (SCFM). At the beginning of load temperature control, the assist gas consumption would be 2,100 scfm. Using conservative VCU specifications for the crude types evaluated, over 17,000 gallons of propane would be consumed per VLCC loaded. With this much fuel consumption, very large propane storage would be required on the VCU platform, and replacement propane tanks would

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[130] 33 CFR §2100(h).

[131] HYSYS modeling based on a cargo pressure in the marine vessel tanks of up to 2.5 psig, a loading rate of 80,000 bbl/hr, a vessel temperature of 80°F, a sea surface temperature of 73°F, and a sea floor temperature of 62°F. At lower cargo pressures in the vessel, flowrates can increase due to hydrocarbon flashing.

[132] 33 CFR §154.2001.

[133] International Chamber of Shipping, *International Safety Guide for Oil Tankers and Terminals*, (ISGOTT), 2d Ed, London: Witherby & Co.

be constantly in transit to replenish the consumed fuel. BMOP anticipates that six 18,000-gallon propane tanks would be needed on the platform. The dimensions of each tank are 45 feet by 10 feet by 11.5 feet – the deck space required just for fuel storage is substantial, while adding safety risks for multiple fuel tanks near large combustion units.

In addition, six more propane tanks, each 18,000-gallon capacity, would be required to be in transit for refueling, which would occur more than once per week. The consumption of fuel, delivery of fuel, and propane tanks would add significant operating costs and labor for fuel management and replacement. The near constant deliveries of large volumes of propane would also be weather-dependent, potentially interrupting operations not only for bad weather at WC 509, but also throughout the transit route of fuel replenishment.

The safety risks to both ship and platform personnel that are inherent during lifting the large, heavy propane tanks from the deck of a transportation vessel onto the VCU platform and subsequently returning the emptied tanks to the vessel would be an ongoing, significant concern throughout the life of the DWP.

The operating challenges of assist gas are not a problem at onshore facilities, which have the space for fuel storage and/or access to plentiful natural gas supply. Onshore marine terminals, or even those offshore loading terminals that are within 2 miles of shore, do not have this operating challenge which would impact the efficiency and availability of BMOP.

5.1.2 Comparison to VCU control of SPM Loading at Ashkelon Oil Port

BMOP has learned that a terminal has recently retrofitted one of its SPM buoys with land based vapor capture and control as a pilot project at the Europe Asia Pipeline Company Ltd (EAPC) Ashkelon Oil Port in Israel. EAPC is an oil transportation Infrastructure Company that has two oil ports: Eilat Port on the Red Sea and Ashkelon Oil Port on the Mediterranean, each connected via a pipeline.

5.1.2.1 Background on Ashkelon Oil Port and Different Project Purpose and Operations

From 1968 to 1975 the Suez Canal was closed. During closure of Suez Canal from 1968 to 1975, oil was received at Eilat oil port, primarily Iranian oil and transported on pipeline to Ashkelon Oil Port. At the Ashkelon Oil Port, crude oil was loaded onto larger vessels using SPM buoys for delivery to European markets. In 1975, an agreement was reached between Israel and Egypt, and the Suez Canal was opened. Consequently, loading crude oil at Ashkelon for delivery to European markets stopped. Available information indicates that between 1975 and 1979 Iranian oil received at the Eilat Port was primarily used for local refineries.

After the Iranian Revolution, crude oil supply to Israel from Iran stopped. Israel and Egypt entered into an agreement in 1979 to transport local Egyptian-produced oil in the Red Sea. This continued for 15 years and ended in 1994. [134]

In 2003, Israel and Russia agreed to supply Asian markets with Russian oil. Tankers would unload oil at the Ashkelon Oil Port and then crude oil was transported to the Eilat Port by pipeline. The pipeline connecting Ashkelon Oil Port and Eilat Port was made bidirectional to enable this transfer. At Eilat Port, crude oil was

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[134] https://www.eapc.com/history and https://voxeu.org/article/1967-75-suez-canal-closure-lessons-trade#:~:text=I%20exploit%20a%20temporary%20shock,Egypt%20closed%20the%20Suez%20Canal

loaded onto large crude-carrying vessels for delivery to the far-East, bypassing the Suez Canal which cannot handle VLCCs. Eilat Port has a loading jetty and not a SPM.[135]

BMOP understands one of the two SPM buoys at Ashkelon Oil Port was retrofitted with a multi-pass buoy in 2016 and connected to a shore based vapor combustion unit on a pilot basis. Based on the operation history of oil flow on EAPC and the retrofit year of the SPM buoy to accommodate a vapor combustion unit, it does not appear there has been any significant amount of crude oil loading through this buoy. As well, Ashkelon Oil Port continues to operate three uncontrolled loading berths. Accordingly, the operation challenges of vapor capture and control that significantly reduce terminal capacity, operability, and impacts to availability do not inhibit all of Ashkelon Oil Port, and would not interrupt the purpose of the terminal to meet existing market conditions.

5.1.2.2 Ashkelon Oil Port Loading Berths

There are four berths at the port:

- Berth No. 1 is a multibuoy, fixed position berth (does not weathervane) for loading petroleum products from the onshore terminal fed by nearby refineries,
- Berth No. 2 is a multibuoy, fixed position berth (does not weathervane) for loading petroleum products from the onshore terminal fed by nearby refineries,
- Berth No. 3 is a SPM buoy, for unloading and loading crude oil, and
- Berth No. 4 is a SPM buoy, for unloading and loading crude oil, equipped with vapor capture.

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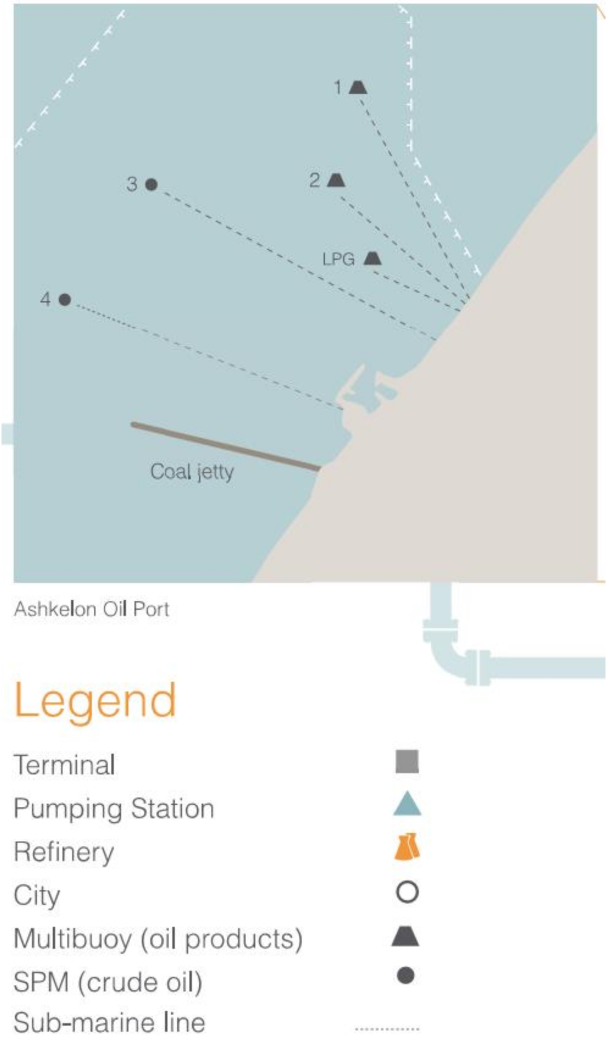
[135] https://www.gem.wiki/Trans-Israel_Oil_Pipeline

Figure 5-3. Ashkelon Offshore Port Facilities[136]



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[136] Extract from the Eilat Ashkelon Pipeline Company Ltd booklet.

Figure 5-4. Ashkelon Oil Port Berth No. 3 (top) and Berth No. 4 (bottom)

Berths No. 3 and 4 are in a water depth of greater than 90 feet and can accommodate tankers up to 250,000 DWT.[137] The berths are served by two subsea pipelines each, one for loading and the other for unloading. The SPMs have a maximum loading rate of 47,000 bbl/hr and are located 1.99 miles offshore from the Ashkelon Terminal.

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[137] https://www.eapc.com/the-crude-oil-system/oil-ports/

Figure 5-5. Ashkelon Oil Port Aerial

A VCU was installed to control vapors from loading at Berth No. 4 (Berth No. 3 operates without vapor capture and control).[138] Berths No. 3 and 4 were already in existence and operating. It is understood that the SPM was modified as part of a pilot project to accommodate a vapor return path, possibly by utilizing the second existing unloading pipeline for vapor capture. The VCU is located onshore, and vapor capture occurs through a hose connected to the tanker, routed through the SPM to subsea vapor return lines to shore.

There are several key differences to the operation at the Ashkelon Oil Port that permit effectiveness of the Ashkelon VCU, including:

- Short distance to shore results in resource accessibility and safety design that are closer in operations to an onshore terminal than BMOP,
- Shallow water depth results in engineering design that mitigates operating impacts from liquid dropout,
- Benign MetOcean conditions maximize loading availability with weather and wave operating constraints required by vapor capture, and
- Lower loading rate mitigates technical challenges of vapor capture and does not inhibit the port's capacity.

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[138] Europe Asia Pipeline Co., Operations Division, "APC Port of Ashkelon, Information, Operational Procedures and Regulations Handbook," May 2019.

These differences necessitate a different design of a vapor capture and control system, and thus cannot translate directly to BMOP's Project as confirmation that vapor capture is achievable. Assuming that engineering solutions are possible for the design at BMOP, these differences would still result in significantly greater impact to operations at BMOP than Ashkelon Oil Port – consistent with the quantified reduction in operating capacity by more than 50%, discussed previously.

5.1.2.3 Short Distance to Shore

Only 2 miles from shore, vapor capture and control – while still complex – has many resource advantages that simplify the engineering and permit greater effectiveness of control with less impact to project purpose, operations, and economics.

5.1.2.3.1 Ashkelon Has Greater Access to Resources Which Mitigate Design Challenges, Minimize Operating Impacts, and Minimize Costs

A key benefit is not having to construct a stand-alone platform just to house vapor controls: all vapor control equipment is located at the nearby onshore terminal. The terminal provides real estate to locate the VCU system (including straight runs of pipe on both sides of the detonation arrestor for safe operating practices), as well as ready-access to shore-based resources (i.e., safety equipment, sufficient fuel for pilot and assist gas, ongoing maintenance support, etc.). Logistics and costs for fuel delivery 82 statute miles into the open ocean is not necessary. Added safety risks to place three large incinerators adjacent to significant fuel storage plus handling large propane storage tanks on a manned VCU platform is also avoided.

The close access to shore, as well as a nearby pier for fixed berth loading and handling of cargo, simplifies the operations to drain collected liquids that drop-out in the vapor lines. Completing this draining operation by custom support vessel in the middle of the ocean is not necessary. This close to shore, floating vapor hoses can simply be exchanged and drained at the nearby onshore terminal.

5.1.2.3.2 Ashkelon Is Not Required to Satisfy USCG Safety Requirements

The precise location of safety devices (such as a detonation arrester) are not known. It could not be confirmed whether the vapor capture and control system has been certified by a Recognized Organization (RO) or Recognized Security Organization (RSO) as meeting international maritime conventions and codes. BMOP will have to meet USCG regulations with a Certifying Entity, which is not required for this international location.

5.1.2.3.3 Short Distance to Shore Results in Capability Closer to Onshore Terminals than BMOP

The vapor capture and control pilot at the Ashkelon Oil Port is notable because it utilizes a SPM buoy. However, the relatively short distance to shore provides the same resources as an onshore terminal, once the vapors are returned to shore. The Ashkelon Oil Port capabilities of vapor capture and control are closer to an onshore terminal than the Project location. Accordingly, the undemonstrated design in exposed water and the significant impacts to operating capacity inherent to vapor capture, discussed previously, are not resolved by Ashkelon's pilot control.

5.1.2.4 Shallow Water Depth Permits Design that Mitigates Operating Impacts from Liquid Dropout

While a subsea vapor line is utilized, a slow slope from ~90 feet of water depth back to a shore elevation is plausible to configure a blower/compressor design that sustains sufficient velocity to carry condensed liquids up a gradual slope and to a knock-out drum onshore. This would minimize the interruptions due to frequent vapor line pigging that is not possible with a riser that requires a dramatic vertical lift nearly three times the change in elevation (162 feet water depth + 94 feet elevation of platform = >250 feet vertical lift requirement) – see Section 5.1.1.4 for additional discussion regarding BMOP's need for frequent subsea vapor line pigging.

5.1.2.5 Benign MetOcean Conditions Maximize Loading Availability with Weather and Wave Constraints of Vapor Capture

The near-shore location of the Ashkelon Oil Port in the Mediterranean Sea has the benefit of predictably lesser MetOcean conditions. "The current off Ashkelon is usually weak," minimizing the impact to moored vessels and the wear on dual floating hose strings for crude oil and vapor return.[139] There are only seven days a year when seas exceed 10 feet wave height (~2%).

The design for BMOP considers the unique challenges of exposed water. The MetOcean environment requires design that accommodates an average of twelve named Atlantic tropical systems from June 1 to November 30, and a period of harsher winter weather conditions that typically occur between mid-October and the end of April. MetOcean data specific to WC 509 identify 35 days per year when seas exceed 10 feet wave height (~10% of the year). As well, MetOcean design conditions specify the maximum wave height of 68.0 feet, with 1-hour wind speeds of 94 miles per hour and current speeds of 5.2 feet per second. These are extreme conditions requiring a robust design. These conditions provide added stress and wear on floating vapor hoses and require significant structural loading considerations for custom, one-of-a-kind designs that have not yet been proven in an extreme environment. Standard CALM buoys with a Lazy S under-buoy hose configuration have been proven in hundreds of applications for safe design (see Project description in Section 2.3.2.1). Addition of vapor recovery will require buoy customization (possibly a 3rd swivel) and force a Chinese lantern under-buoy system to accommodate the additional under-buoy vapor hoses. With a 68.0 foot wave design requirement, unproven engineering with significant over-design is necessary, and this will still not mitigate the risks to operability, safety, and the environment.

The mild conditions of the Mediterranean Coast 2 miles offshore of Ashkelon provide a calm environment. The benign sea state is conducive for maximum loading availability, even when additional operational constraints (e.g., wave height limits during loading) are necessary to accommodate vapor capture and control. Ashkelon's location allows for control with less interruption using existing, demonstrated technologies. This minimal impact to availability does not translate to the exposed waters for the BMOP Project location.

5.1.2.6 Lower Loading Rate Mitigates Technical Challenges of Vapor Capture and Does Not Inhibit the Port's Capacity

The loading rate of the Ashkelon Oil Port is approximately 50% of the design capacity for BMOP. The flowrate of the displaced vapors would consequently be reduced by 50% and there would be less liquid drop-out potential. Lower loading rate would mitigate operating challenges of vessel cargo tank pressure control and minimize loading interruptions from liquids removal. The gradual slope to shore and lower volume of vapors could allow for engineered solutions for liquids collection in an onshore knockout drum as opposed to daily vapor line pigging. Ashkelon's pilot at low loading rates near shore does not confirm vapor capture at BMOP with twice the loading rate and larger vessels far from shore is feasible.

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[139] https://msi.nga.mil/api/publications/download?key=16694491/SFH00000/Pub132bk.pdf

As well, the design criteria for the Ashkelon Oil Port is not focused solely on crude oil export via VLCCs, as the maximum vessel capacity is 250,000 DWT (Suezmax). While the depth of the SPMs can accommodate a VLCC, the lower loading rates and multi-purpose functionality (unloading and loading, additional berth for refined products), confirm this operation serves primarily for managing a diverse mix of commodities, as the onshore terminal is also served by several pipelines. Also, as discussed in the Ashkelon Oil Port background section previously, EAPC utilizes the Eilat Port to load VLCCs, as the Suez Canal cannot accommodate a VLCC. Even if the vapor capture reduces the availability of Berth No. 4, the Ashkelon Oil Port continues to have three additional berths without vapor capture restrictions to enable the facility to avoid operating impacts as a result of the pilot control. Accordingly, lower loading rates, smaller vessel capacities, and fewer vessels loaded with vapor capture have far less of an operating impact on Ashkelon Oil Port than it would at BMOP. As discussed previously, applying vapor capture and control at BMOP would reduce operating capacity by greater than 50% as a result of the following operational impacts:

- Increased time without loading for connecting and disconnecting floating vapor hoses, and increased downtime due to more frequent planned and unplanned maintenance of floating vapor hoses.
- Restricted operating conditions for safe loading (presuming approval of yet-to-be defined constraints) minimizes availability for loading due to external factors (weather, waves, support vessel availability, etc.).
- Vessel cargo tank pressure control challenges requiring slower loading rates, loading interruptions, and frequent maintenance and repair of pressure monitoring and control systems.
- Loading interruptions for vapor line pigging, added maintenance, and draining of vapor hoses with customized support vessels.
- Downtime resulting from fuel supply interruptions due to significant fuel consumption of vapor controls and frequent fuel tank transit/replacement.

In direct contrast to BMOP's reduced operation from vapor control at the proposed CALM buoys, EAPC states that the addition of vapor capture and control *increases* the operating availability for the Ashkelon Oil Port, noting "The VCU enables continues [sic] loading of vessels without dependence of wind directions."[140]

Details of the actual emissions reduction at Ashkelon Oil Port were not available to BMOP. The near-shore location in calm waters, lower loading rates, and unaffected (or improved) primary business purpose identify that the operating conditions at the Ashkelon Oil Port are vastly different than at BMOP. The application of a VCU at the international location does indicate that the use of vapor capture may be possible with a SPM near shore, but this is consistent with prior understanding of onshore and near shore marine terminals. The Ashkelon Oil Port's location and business purpose provide the flexibility to accommodate vapor capture and control that does not translate to BMOP. The project-specific impacts and costs, addressed in the following subsection, confirm that a VCU is not a feasible control alternative for BMOP.

5.1.3 Non-Air Quality Health and Environmental Impacts

In determining the BTF requirement for MACT, one of the factors to be considered is "any non-air quality health and environmental impacts." This phrase is not defined in the regulation or in the statute.

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[140] Europe Asia Pipeline Co. Operations Division, "Port of Ashkelon, Information, Operational Procedures, and Regulations Handbook," May 2019.

A court case has spoken directly to the question of the meaning of this phrase. *Sierra Club v. EPA (02-1253)* challenged the MACT for primary copper smelters.[141] One challenge was regarding the meaning of this term, as Sierra Club and EPA took differing positions.

> *Sierra Club interprets this provision to require EPA to consider the "impacts of deposition, persistence, toxicity and bioaccumulation of metal HAP emissions on people, wildlife and the environment." Pet. Br. at 36. In other words, "non-air quality … impacts" are just like air quality impacts, except that the impact is not delivered directly through the air but instead, for example, by "deposition" — the eventual settling of HAPs on the ground.* [Sierra Club v. EPA (02-1253)]
>
> *EPA takes a different view — that 'non-air quality … impacts' refers to any health and environmental impacts that may result directly or indirectly from measures that will achieve the emission reductions." Resp. Br. at 31. In other words, "non-air quality … impacts" are those that result from the required efforts to control the air quality impacts of the underlying manufacturing process.* [Sierra Club v. EPA (02-1253)]

Thus, EPA's position was consistent with the approach under BACT. Non-air quality health and environmental impacts under MACT (and environmental impacts under PSD) are one of three factors to consider in evaluating control technologies (with the other two being energy and economic impacts). For both BACT and MACT, all three factors directly result from the efforts to control the air quality impacts.

The Court agreed with EPA's view, stating that the context

> *…strongly supports EPA's interpretation of "non-air quality … impacts" to mean the by-products of the control technology — just as additional cost or energy needs are by-products of controlling air quality impacts.* [Sierra Club v. EPA (02-1253)]

Further, in *Sierra Club v. EPA (02-1253)* the Court noted that Sierra Club's position is in direct conflict with the two-step approach of MACT required by Congress. The first step of MACT requires a technology-based approach. Then, eight years later, a risk-based approach is considered. For Case-by-Case MACT, only the technology-based approach is relevant, since Case-by-Case MACT only occurs in the absence of the initial Section 112(d) MACT standard.

Thus, as stated by the Court in *Sierra Club v. EPA (02-1253)*, non-air quality health and environmental impacts are:

> *… those that result from the required efforts to control the air quality impacts of the underlying manufacturing process.* [Sierra Club v. EPA (02-1253)]

For evaluation of a VCU as an alternate control technology for the Project, there are significant health and safety, environmental, and energy impacts that would result directly from the use of the control.

5.1.3.1 Additional Environmental Impacts Due to VCU Platform and Supporting Facility Construction

To accommodate a VCU, BMOP would essentially need to construct an entirely new offshore facility: a new 6-pile platform with supporting equipment and utilities (e.g., engine-driven generator, crane, fuel storage

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[141] *Sierra Club v. EPA* (02-1253).

and handling, frequent supply vessels, sump, waste collection, piping components, etc.). One of the current benefits of the project design is that it uses existing infrastructure and offshore facilities to minimize impacts from construction. A VCU control alternative would generate environmental impacts as a result of constructing a new platform, supporting equipment comprising an entirely new facility, and additional subsea vapor lines.

5.1.3.1.1 Added Waste Streams

Collected liquids would need to be managed. In an offshore setting as remote as BMOP's project location, since collected liquids cannot be loaded back into crude carriers, they present a byproduct stream with limited avenues for waste management other than to increase vessel traffic and return the waste to be managed onshore.

5.1.3.1.2 Substantial Energy Needs and Fuel Consumption

During operation, a VCU-specific platform would need to have a generator to provide the significant electrical needs for blowers large enough to pull vapors through approximately 8,000 feet of floating hoses and pipe, overcoming pressure drop and liquids dropout. This would require 1,800 hp, and approximately 100 gallons of diesel per hour of consumption at all times during vapor control. For continuous operation, this would result in nearly 1,000,000 gallons of diesel consumed per year.

Further, the VCU itself requires a significant amount of propane for assist gas necessary to ensure safe and efficient destruction throughout a load. With the propane required for the pilot and assist gas, the total propane consumption will be up to 17,245 gallons per VLCC loaded. If the Project were to achieve loading capacity with a VCU, this would result in over 6,000,000 gallons of propane consumed per year.

5.1.3.1.3 Safety Risks Due to Fuel Storage and Handling

The substantial amount of diesel and propane fuel consumption required for the VCU control alternative would require a large amount of fuel storage on the VCU platform. It is estimated that at least six (6) 18,000-gallon propane tanks would be required (size based on platform space and crane capacity, as well as supply vessel capability), with refilling needed more than once per week by supply vessel. This presents a significant safety risk for this quantity of fuel on a constrained platform deck with combustion devices as well as a significant safety risk to personnel charged with transferring the propane tanks. The environmental impact of frequent refueling supply vessel trips will also be attributed specifically to the control alternative. In addition to the platform safety risks, the inability to locate safety devices, such as detonation arresters, near the VLCC being loaded also introduce safety risks for the marine vessel. These safety impacts are a direct result of the VCU control alternative. Coincidentally, even California regulations equivalent to the Subpart Y limit for new "offshore loading terminals" confirm that their requirements do not force noncompliance with safety requirements:

> *Nothing in this rule shall be construed to require any act or omission that would be in violation of any regulation or other requirement of the United States Coast Guard, or to prevent any act or omission that is necessary to secure the safety of a vessel.*[142]

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[142] Santa Barbara County APCD Rule 327, December 16, 1985.

5.1.3.1.4 Vapor Capture and Control Creates a Major Air Pollution Source Otherwise Avoided

A VCU is not a passive device. In other words, the control of VOC results in a tradeoff that generates other pollutants not otherwise emitted. In addition, the supporting equipment on the VCU platform (e.g., combustors, generators, etc.) would result in a stand-alone major source of air pollution. BMOP has evaluated the additional pollution resulting from the VCU control alternative, with the following conservative approach:

- Because the VCU would restrict the Project operations to less than 50% of the design capacity, it is assumed that the vapor combustors, pilot fuel, assist gas, etc., would only operate at the same constraints of capacity (i.e., the VCU operation and fuel consumption was reduced by more than half).
- Only the combustors and diesel generator were quantified, and fuel storage, crane engines, sump, waste handling, piping components, etc. were not included.
- Low NO_X VCUs were assumed to be available, significantly reducing the NO_X rate.
- Only fuel supply vessels were required (at ~50% reduced fuel consumption) and would always travel from the nearest onshore port.

Even with all of these conservative approaches, the VCU platform, by itself, would be a new PSD major source for NO_X, CO, PM_{10}, $PM_{2.5}$, and GHG. The control alternative thus creates a significant source of air pollution for multiple pollutants not otherwise emitted.

Table 5-2. Added Emissions as a Result of the VCU Control Alternative

	NO_X (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (tpy)
Marine Vapor Combustion Units						
MVCU1	27.43	125.9	3.03	3.41	3.41	75,382
MVCU2	27.43	125.9	3.03	3.41	3.41	75,382
MVCU3	27.43	125.9	3.03	3.41	3.41	75,382
VCU Platform Sources						
Diesel Generator	46.08	4.05	2.72	0.46	0.46	4,384
Fuel Delivery Supply Vessels						
Main and Aux Engines	63.09	12.10	6.35	1.48	1.48	3,412
Total	191.5	394.0	18.17	12.16	12.16	233,941

5.1.4 Costs

BMOP has prepared an engineering cost estimate for the installation of a VCU control alternative at the proposed Project. The procurement, installation, and operating costs were considered, following the preamble for Subpart B:

> *What should be a factor is the uninstalled cost of controls plus the costs associated with installation and operation of those controls. Therefore, whenever costs are quantified, such costs should include the purchase price of controls plus the costs associated with installation and operation of those controls for the source in question.*[143]

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[143] 61 FR 68395, December 27, 1996.

A summary of the cost evaluation is provided here, with the detailed cost analysis in Appendix D, developed consistent with EPA's *Control Cost Manual*, Section 3.2, Chapter 2, Table 2.10, Seventh Edition, November 2017.

5.1.4.1 Procurement and Fabrication

The VCU control alternative would require multiple components to be added to the proposed Project. The following delineates equipment needed just for the VCU controls:

- Three VCUs achieving 99% DRE with estimated heat release of 218 MMBtu/hr, each, plus
  - Combustion stacks,
  - Stack refractory,
  - Anti-flashback vapor burners,
  - Quench air dampers,
  - Pilot gas system,
  - Combustion air blower with 500 hp motor and variable frequency drive,
  - Combustion air manifold, staging valves, and hydrocarbon analyzer,
  - Cooling air blower, and
  - Instrumentation.
- DSU skid
  - Pressure / vacuum relief valve,
  - Remotely operated cargo vapor shutoff valve,
  - Cartridge filter,
  - Detonation arrester,
  - Vapor piping system,
  - Instrumentation and instrument air header,
  - Oxygen analyzer system, and
  - Pressure test panel.
- Vapor blower unit
  - Vapor piping system for the VCUs,
  - Knockout vessel, and
  - Two vapor fans and variable frequency drives.
- Vapor safety unit
  - Liquid seal,
  - Vapor block / staging valves,
  - Detonation arrester,
  - Pilot system,
  - Assist gas system, and
  - Instrumentation.
- Control system

These systems are analogous to a dock-side control for an onshore or near shore fixed berth, but would be sized to accommodate a loading rate of 80,000 bbl/hr.

For this control system to be adapted to the proposed Project location, the following additional equipment is necessary:

- Facility vapor connection to VLCCs

    - Additional floating vapor hoses
    - Modified CALM buoys
    - Under buoy vapor hoses (connection between CALM buoys and PLEMs)
    - Two vapor PLEMS
    - Looped subsea vapor pipelines
    - Pig launchers and receivers
    - Risers to VCU platform
- New 6-pile platform
    - Jacket
    - Piling
    - Topsides structure
    - Bridge to WC 509 complex
- Platform utilities
    - Diesel generator (Caterpillar 3512C or similar)
    - Diesel storage tank
    - Six 18,000-gallon propane storage tanks
    - VCU platform crane
    - Nitrogen generator for pigging activities

The total purchased equipment costs are estimated to be $98,429,000, with an additional $65,350,000 for the new platform structure.

5.1.4.2 Installation

The installation of the vapor capture and control system and new VCU platform has been estimated for the Project location 82 statute miles offshore. The direct installation costs include electrical work, ductwork and piping, insulation, and painting. These direct installation costs were estimated using the default factors from the *Control Cost Manual*. In addition, the installation of a new platform requires site preparation on the sea floor, estimated for the Project as $2,460,000.

Indirect installation costs have also been estimated specifically for the proposed Project, including engineering, construction and field expenses, contractor fees, start-up, and performance testing. The project-specific estimates for indirect installation costs total $37,184,290.

The project-specific engineering cost estimate was provided with a +30% contingency, and the total capital investment is estimated to be $274,686,893 for the VCU control alternative – over a quarter of a billion dollars due to the unique design requirements for the Project and the location far offshore.

5.1.4.3 Operating Costs

Building on the experience and knowledge of operations management at the Nederland Terminal and the existing WC 509 platform complex, BMOP has developed operational expense estimates specific to the VCU control alternative for the proposed Project. The operating costs consider additional employees required for operating the vapor capture and control equipment, lease fees for the VCU platform location, routine maintenance for the vapor capture and control system, pigging operations, and annual average projected repair/replacement costs.

Additionally, propane consumption from the VCU pilot and assist gas, as well as diesel fuel for the generator required to operate the combustion fan blowers and the vapor system blower have been calculated using project specific modeling provided by the VCU vendor and Caterpillar. Based on the fuel consumption and anticipated maximum availability of the equipment, BMOP has included delivery costs on 63 supply boat deliveries per year.

The direct operating costs total $19,210,167 per year.

Indirect operating costs would have a substantial economic impact of the Project in order to accommodate the VCU control alternative. Overhead, administrative charges, and insurance have been calculated consistent with the factors in the *Control Cost Manual*. The capital recovery factor (CRF) has been calculated from the annuity equation provided in the *Control Cost Manual*, and project-specific considerations for the control equipment life and interest rate.

BMOP has also estimated the Project cost impact resulting from the VCU challenges that would adversely impact operations described previously in this report (i.e., floating vapor hose, vessel tank pressure control challenges, liquid condensation, etc.). These challenges would limit the loading capability of the Project, reducing capacity and utilization. As noted previously, BMOP has evaluated the specific operation of VCUs at the Nederland Terminal and applied the additional operational requirements to the Project location, estimating that the vapor capture and control system would reduce the loading capacity by 52% or more.

These outages result in direct costs borne by the project, such as demurrage fees and increased maintenance. Indirect costs would also be borne by the project including increases in operating costs compared to revenue as a result of longer loading times and increased outage duration. The capital recovery for the entire project would be reduced, resulting in opportunity cost and increased interest from longer project funding payback. The entire purpose of the project – safe and efficient export of crude oil – would be impacted, and it is anticipated that reverse lightering would supplant the lost capacity, with its higher costs and greater environmental impacts (see Appendix F of this application for evaluation of the environmental impacts of reverse lightering).

The total annualized cost for the VCU control alternative is $421,878,276 per year. With the decrease in loading capacity of the project and resulting decrease in VOC and HAP emissions, the project-specific cost effectiveness is:

- $41,125 per ton of VOC
- $733,955 per ton of HAP

EPA has previously evaluated the cost effectiveness for vapor capture and control of marine vessels. In the consideration of requiring a beyond-the-floor standard in the Subpart Y residual risk and technology review completed in 2011, EPA determined that a cost estimate of $485,000 per ton of HAP for offshore vapor recovery was not feasible.[144]

> *We agree with commenters that these costs are unreasonable.*[145]

A much higher cost is also unreasonable. The VCU control alternative is rejected as a result of the poor cost effectiveness and environmental, safety, and technical challenges. This result is consistent with EPA's determination for coastal, near-shore fixed loading berths in Subpart Y:

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[144] Letter from J.D. Bellows, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, "Technical Choices for Marine Vapor Controls on Loading Operations at Offshore Terminals, July 21, 1993, IV-D-136 of Docket A-90-44.

[145] 76 FR 22581, April 21, 2011.

> *Because of the poor cost effectiveness resulting from these significantly higher costs, as well as the environmental, safety, and technical challenges associated with requiring control more efficient than the MACT floor, the Agency has selected the MACT floor level of no control for offshore marine tank vessel loading operations.*[146]

5.2 Vapor Recovery Control

Another control alternative is use of a vapor recovery. Vapor recovery requires the same vapor capture system discussed in the vapor combustion control section, but instead of using a combustor to oxidize the captured hydrocarbons, a vapor recovery unit (VRU) uses one of the following control practices to recover the hydrocarbon as liquid:

- Refrigeration
    - Condense hydrocarbons out of the vapor stream by reducing the temperature below the dewpoint
    - Most effective on vapor-rich streams with low volumetric flow
    - Require significant energy for refrigeration cycle
    - Require storage tank for collection of recovered hydrocarbon liquids
- Adsorption
    - Adsorb hydrocarbons with use of activated carbon (or similar)
    - Require controlled temperature and pressure for effectiveness and safety
    - Carbon replacement requires frequent supply vessel trips and carbon changeout
- Absorption/Adsorption
    - Adsorb hydrocarbons with use of activated carbon (or similar)
    - Utilize two-stage vacuum system to regenerate one carbon bed while alternate carbon bed is controlling the vapor stream
    - Require controlled temperature and pressure for effectiveness and safety
    - Regeneration requires additional equipment including an absorption column and storage tank for lean oil recovered
    - Supply vessels for recovered lean oil or an additional subsea pipeline system would be required to pump lean oil to marine vessels

VRUs can achieve up to 99% control, similar to a VCU. A VRU also would require the addition of a new platform to house the equipment. Propane fuel would not be required for assist gas, but the VRU requires significant electrical power (in addition to the vapor blower). Accordingly, a diesel generator would be required. Storage tanks would be necessary for liquids recovered from the vapor stream, and frequent carbon replenishment would necessitate supply boats and added material consumption/waste.

The same challenges of a vapor capture and control system using combustion (e.g., VCU) would also apply to a control system using vapor recovery technologies (e.g., VRU). Specifically, the operability impacts of vapor capture that would limit the Project capacity by more than 52% of design – vapor hose, location of safety devices, vessel tank pressure control challenges, liquid condensation, and fuel requirements – would also apply to a VRU. As well, A VRU would have the following additional environmental, energy, and safety impacts:

- Marine impacts from construction of a new control-specific platform,
- Added waste streams from control platform operation, maintenance, and liquids collection,

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[146] 60 FR 48393, September 19, 1995.

- Substantial energy needs and fuel consumption for control platform diesel generator,
- Safety risks due to fuel and organic liquids storage and handling, and
- Air pollution not otherwise emitted (e.g., control platform diesel generator), control platform supply vessels.

Furthermore, the conclusion that a VCU is economically infeasible would also apply to a VRU. In comparison, "…the typical capital costs for a carbon based MVRU (a proven technology used by Hess at Port Reading) are about 2.5-3 times higher than for a combustor." In this example, Hess replaced the VRU with a VCU due to high costs and poor effectiveness.[147] The VRU control alternative would present the same or greater operability challenges as the VCU options for BMOP, but with increased costs, and thus must be rejected as unreasonable.

5.2.1 Comparison to VRU Control at Gaviota Interim Marine Terminal

BMOP has reviewed historical documents regarding a temporary loading operation in California in the mid-1990s that applied vapor capture and control to loading marine vessels with crude oil, referred to as the "Gaviota Interim Marine Terminal."

5.2.1.1 Background on Gaviota Interim Marine Terminal and Different Project Purpose and Operations

In 1981, Chevron discovered the Point Arguello oil field located on the Outer Continental Shelf offshore of Santa Barbara County, California. The Point Arguello oil field was the largest U.S. oil field at the time.[148] Three offshore platforms (Platform Hermosa, Platform Harvest, and Platform Hidalgo) in the Point Arguello field were built in 1985 and 1986 to send produced oil to onshore facilities in Gaviota, California. Processed crude oil was handled by the Gaviota Terminal Company built in 1988, operated at the time by Texaco (Chevron).[149] However, prior to 1996, there was insufficient pipeline capacity to transfer the produced oil to the destination refineries in Los Angeles operated by Texaco and Chevron.

With the largest domestic oil field known at the time, Chevron sought many options to transfer the produced oil to the local, domestic market. As originally proposed in the 1980s, Chevron planned to initially transport produced oil from the Gaviota Interim Marine Terminal to the Los Angeles refineries. Subsequently, crude would be transported by pipeline (pending construction of the Southern California Pipeline System (SCPS)). As well, a new consolidated marine terminal was proposed for offshore Las Flores Canyon. However, the onshore pipeline was delayed over concern of safety, and neither the onshore pipelines nor the consolidated marine terminal for Las Flores Canyon were built by 1990.

As of October 1990, production had not occurred. The three offshore drilling platforms, connecting pipelines to shore, and onshore treatment facility were constructed and ready since late 1987. $2.5 billion has already been spent, and 300 MMbbl of discovered, domestic oil was stranded because of 8 years of pipeline approval delays. The Department of Energy offered assistance in resolving the project conflicts

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[147] Comments of HOVENSA, L.L.C. on National Emission Standards for Hazardous Air Pollutants: Marine Tank Vessel Loading Operations, 75 FR 65067-65149, October 21, 2010 ("MTVLO MACT Proposal"), December 6, 2010, Page 16, ID: EPA-HQ-OAR-2010-0600-0280.

[148] U.S. Department of the Interior, Minerals Management Service, OCS Information Program, "OCS National Compendium, Outer Continental Shelf Oil & Gas Information through October 1990," page 118.

[149] DiEIsi, G. J. (1989, January 1). Principles of Marine Vapor Recovery. The Society of Naval Architects and Marine Engineers, page 40.

following the August 2, 1990 Iraqi invasion of Kuwait – leading to a rise in oil prices and heightened concern over reliance on foreign oil.[150]

The stranded assets, huge costs of the project, and magnitude of the crude oil field drove a need for a temporary solution to get crude oil to Los Angeles and trumped long-term economic concerns.

In an agreement with the California Coastal Commission and Santa Barbara County, Chevron was allowed temporary transit of oil from the onshore facility to Los Angeles refineries by marine vessel until January 1, 1996, or an onshore pipeline could be constructed, whichever occurred first.[151] The Gaviota Interim Marine Terminal was utilized for a short period of time, starting in August 1993 through January 1994 (suspended while waiting on approvals), and resuming in mid-1994 until permanently ceasing loading operations in 1995. Marine loading occurred for less than 24 months, at a volume of less than 1 MMbbl per month (less than 2% of the design rate of the proposed Project).[152] Subsequently, the crude oil was sent to the All American Pipeline for transport to various refining destinations.[153]

The Gaviota Interim Marine Terminal was driven by a need for company-owned stranded assets and huge project costs to find a temporary solution until the long-term project purpose could be realized. The Gaviota Interim Marine Terminal does not define long-term feasibility, reliability, or operability.

5.2.1.2 Gaviota Interim Marine Terminal Vapor Recovery System

While waiting for the onshore pipeline to be constructed and placed in service, the temporary transit to allow Point Arguello-produced oil to reach refineries consisted of the following:[154]

- A 6-point offshore fixed-position mooring location 3,500 feet from the shore in state waters near the Gaviota facility in water depth of 60 feet
- Two company-owned, dedicated “Chevron Oregon Class” double-hulled tankers averaging 40,000 dwt that were modified to work with the onshore facility’s vapor recovery system[155]
- Subsea pipelines for crude oil loading and vapor recovery
- The transfer of oil was limited only to Los Angeles area refineries

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[150] U.S. Department of the Interior, Minerals Management Service, OCS Information Program, “OCS National Compendium, Outer Continental Shelf Oil & Gas Information through October 1990,” page 121.

[151] Authorization to Issue Industrial Lease for Offshore Marine Terminal, Applicant: Gaviota Terminal Company (GTC) c/o Texaco Trading and Transportation, Inc., 04/28/93.

[152] United States Securities and Exchange Commission, Form 10-K, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fixcal year ended December 31, 1993, Chevron Corporation.

[153] Plains Exploration & Production Company, “Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half NW/4 of Lease OCS-P 0450, Accompanying Information Volume Gaviota Facilities,” October 2012.

[154] U.S. Department of the Interior Minerals Management Service OCS Informatino Program, “Pacific Update: August 1987 – November 1989, Outer Continental Shelf Oil& Gas Activities,” Page 51.

[155] California State Lands Commission, Authorization to Issue Industrial Lease for Offshore Marine Terminal, Work Order File, April 28, 1993.

5.2.1.2.1 Vessel Cargo Tank Pressure Control Design Unique to Gaviota

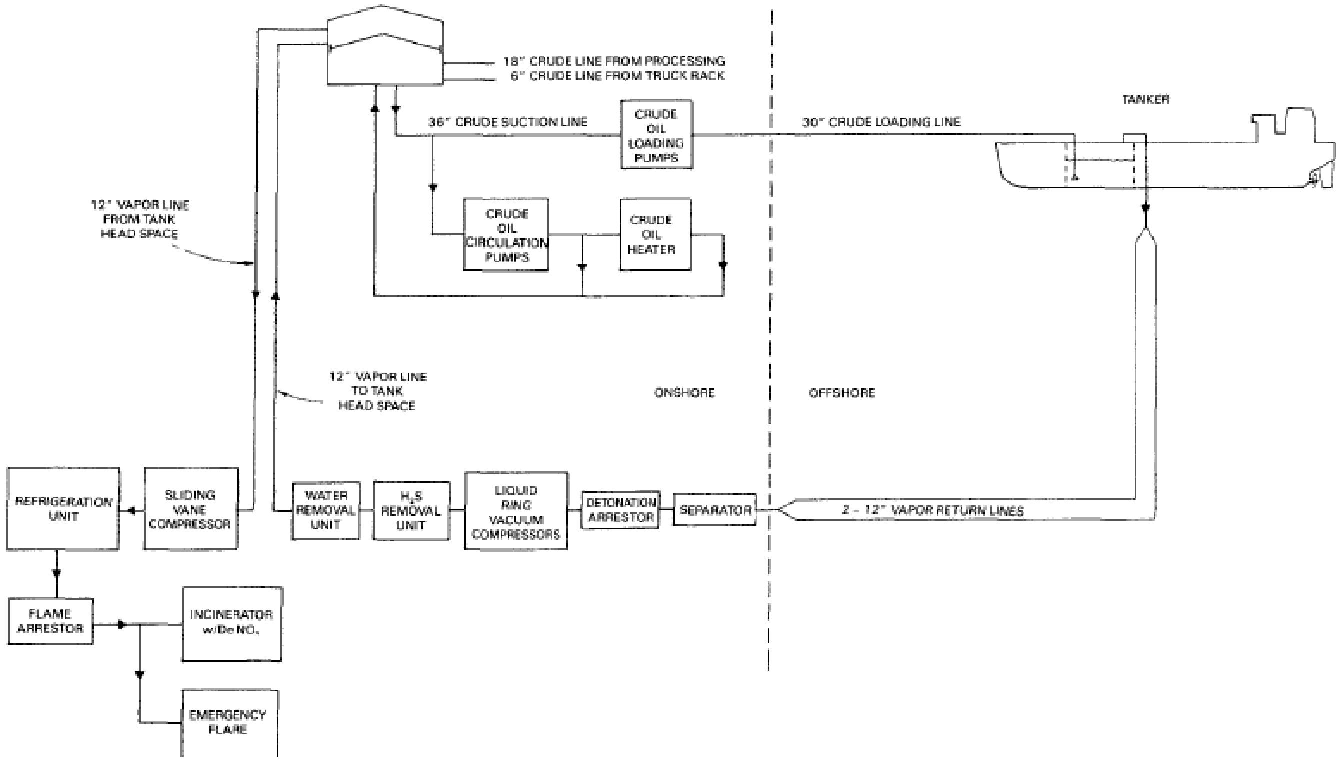
The vapor capture system at the Gaviota Marine Terminal was elaborate. Due to the length of underwater vapor return lines, onshore vapor gathering compressors were required. With the negative pressure, sophisticated monitoring was mapped with a control loop on each of the custom-modified vessels. The custom control “pedestal” was required to actively monitor the ship tank pressure, ship manifold pressure, and oxygen content of the vapor so that loading could be controlled within the safe operating limits of the vessel, or an emergency shutdown would be initiated. The monitoring and controls for loading pumps and vapor gathering compressors was on the ship itself – providing better control of the ship safety requirements. However, this pressure balancing act required custom vessels and ship control access and communications control that is only feasible with two dedicated vessels (owned by the same company). It is not technically feasible for the BMOP Project, as the fleet of international VLCCs are not customized with the sophisticated controls utilized at Gaviota. As well, BMOP will not give control of the pipeline to international ships not under the direct control of the marine terminal operator. Accordingly, the solutions employed by Gaviota to temporarily address the operability challenges for vessel cargo tank pressure control with subsea vapor lines is not transferrable to BMOP.

5.2.1.2.2 Gaviota Has Greater Access to Resources Which Mitigate Design Challenges, Minimize Operating Impacts, and Minimize Costs

Further, the pressure balance and variable vapor processing rate were navigated by utilizing the space above the floating roofs in the internal floating roof tanks at the onshore terminal, 3,500 feet away from the fixed berth loading operation. This provided an in-process inventory storage area for the vapors to help balance the loading, vapor collection, and ship vapors. However, this solution required access to large, onshore, internal floating roof tanks. This is not an option in BMOP’s setting 82 statute miles offshore (compared to a near-shore setting such as Gaviota).

Beyond the requirement for the vapor balance utilizing the onshore storage tanks, the vapor control system required numerous pieces of equipment onshore, including separator, detonation arrester (located 0.5 miles away from the vessel), liquid ring vacuum compressors, H_2S removal unit, water removal unit, sliding vane compressor, refrigeration unit, flame arrester, vapor combustion unit, and emergency flare, as shown in the following figure.

Figure 5-6. Gaviota Marine Terminal Vapor Capture and Control System Flow Diagram[156]



All of this equipment was only possible by relying on the nearby onshore terminal with the land area available to site this system.

5.2.1.2.3 Lower Loading Rate Mitigates Technical Challenges of Vapor Capture and Does Not Inhibit the Port's Capacity

Despite having the real estate for these numerous pieces of equipment, the vapor processing capability was limited to a loading rate of 10,000 bbl/hr.[157] Gaviota's design was 1/8th that of BMOP, and was loading into vessels with 1/8th the capacity of a VLCC. Furthermore, Gaviota loaded only three to four vessels per month – less than 2% of BMOP's design. The lower flowrate results in less liquid drop-out, and the infrequent vessel loading on a temporary basis is not impacted by the additional loading times of vapor capture and control. Vessel demurrage is not relevant for company-owned vessels. Accordingly, constrained lower loading rates, smaller vessel capacities, and fewer vessels loaded with vapor capture had far less of a "temporary" operating impact on Gaviota than they would at BMOP (as discussed previously, applying vapor capture and control at BMOP would reduce operating capacity by greater than 50%).

As a result of unique pressure controls not feasible for BMOP, near-shore location with access to extensive onshore equipment and internal floating roof tanks, lower loading rates, and unaffected temporary business need, the Gaviota Interim Marine Terminal vapor recovery system cannot be applied at BMOP.

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[156] DiEIsi, G. J. (1989, January 1). Principles of Marine Vapor Recovery. The Society of Naval Architects and Marine Engineers, page 41.

[157] Ibid, page 40.

5.3 Vapor Balancing

Vapor balancing is a passive measure for vapor capture, and potentially subsequent control of loading emissions. Displaced vapors are simply transferred to another tank or vessel, to subsequently be processed or combusted. While simple, it requires a storage tank with vapor space, or an idle vessel serving as a floating storage tank. The Marine Board identified the practical limitations of vapor balancing.

> *The technique known as vapor balancing can be used as an adjunct to vapor control to reduce instantaneous processing rates, or for other reasons. For example, at Exxon's offshore Hondo Field in California, loading emissions are pumped into a large tank vessel where they are retained for subsequent burning. The vessel acts as a buffer, permitting loading rates higher than could otherwise be accommodated by the vapor treatment facilities at the site. Vapors are drawn from the holding tanks at a constant rate, not dependent on instantaneous loading rates.*
>
> *But vapor balancing should not be regarded as a standard procedure. The roofs of many modern storage tanks are designed to float on the surface of the liquid, leaving no space for vapors. There may be applications for vapor balancing at specific sites.*[158]

5.3.1 Comparison to Vapor Balancing Control of the Santa Ynez Unit

Located nearby the Gaviota Interim Marine Terminal, but in federal waters offshore of Santa Barbara County, California, the Santa Ynez Unit operated at the offshore production Platform Hondo.[159]

5.3.1.1 Background on Santa Ynez Unit and Different Project Purpose and Operations

Produced oil from Platform Hondo was delivered locally to the California market. When obtaining the leases for offshore exploration and production, Exxon identified two alternatives to process and transport the oil produced by the platform:[160]

1. Preferred:
   Send the produced oil to an onshore facility via subsea pipeline, where it would be processed and stored, prior to shipment to Los Angeles refineries.
2. Alternative:
   If Exxon was unable to obtain permission and permits from California for the onshore facility, an offshore storage and treatment (OS&T) would be utilized in federal waters (just outside the state jurisdiction which extends only 3 miles), and the OS&T would transfer produced oil to marine vessels offshore for delivery to Los Angeles refineries.

In the 1980s, Exxon employed a floating OS&T vessel for the produced oil from Platform Hondo. The OS&T was a converted oil tanker that began operating in 1981, moored to a single anchor leg mooring (SALM) in federal waters approximately 3.2 miles from shore (Santa Barbara County, California is in the background of the following figure).

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[158] Marine Board, National Research Council, “Controlling Hydrocarbon Emissions from Tank Vessel Loading,” 1987, page 80. (Docket A-90-44, II-I-4)

[159] https://www.syu.exxonmobil.com/history

[160] Dennis M. Hughes, *California v. Kleppe: Who Regulates Air Quality Over the Outer Contintental Shelf?*, 29 Cath. U. L. Rev. 461 (1980).

Figure 5-7. Santa Ynez Unit OS&T

The floating OS&T was utilized while Exxon was negotiating permit terms for approval of an onshore processing facility.[161]

Following various agreements with Santa Barbara County and the California Coastal Commission, Exxon began construction in April 1988 of an onshore processing facility for the oil produced at Platform Hondo, with a subsea pipeline bringing the oil to shore.[162] Exxon completed construction and the onshore processing facility began service in December 1993, ceasing operation of the Santa Ynez Unit and offshore marine vessel loading.

The Santa Ynez Unit was a temporary production, processing, and loading operation for small volumes of produced oil. The location in federal waters offered operation while waiting for state approvals of the long-term business purpose – onshore processing. This was driven by a need for company-owned stranded assets and huge project costs to find a temporary solution until the long-term project purpose could be realized. The Santa Ynez Unit is not a comparable design to BMOP and does not define long-term feasibility, reliability, or operability of an export operation.

5.3.1.2 Santa Ynez Unit Vapor Balancing System

Until the pipeline and onshore processing facility were in service, a dedicated fleet of custom-modified tankers were loaded from the OS&T to deliver the produced crude to refineries, primarily in Los Angeles. Because the OS&T included the processing equipment and tanks for the produced crude, the custom tankers being loaded would transfer displaced vapor in their cargo back to the OS&T (vapor balancing), which would then process the vapor (similar to the produced gas from Platform Hondo), and use it as fuel for the onboard power generation turbines. The OS&T could only accommodate loading rates of 25,000 bbl/hr.

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[161] ExxonMobil Santa Ynez Unit (SYU) Offshore Power System Reliability – B Phase 2 Project, July 2014, Page 1-7.

[162] U.S. Department of the Interior Minerals Management Service OCS Informatino Program, “OCS National Compendium, Outer Continental Shelf Oil & Gas Information through October 1990,” Page 122.

The Santa Ynez Unit loaded a dedicated fleet of 5 tankers, each customized with cargo pumps, ballast water system, piping control, and tank alarms necessary for the unique vapor balancing and recovery system of the OS&T. Exxon reported that just the initial costs for tanker customization were extremely high, and an announcement was made that indicated a cost of $100 million at the beginning of the project. As well, the vapor control system relied on the already-present processing unit offshore. This practice stopped when Exxon completed the onshore processing facility.[163]

This control practice was technically feasible only because the OS&T provided a tank with a sufficient capacity for displaced vapors offshore (not possible with the higher rates of the proposed Project). The OS&T also consumed the vapor for onboard power generation necessary for continued processing operations.

BMOP does not fit the very specific criteria where vapor balancing would be a practical control alternative, as it adds the need for a vapor storage vessel without the ability to control the emissions – a VCU platform or other control system would still be needed, with the added complication of a storage vessel. Vapor balancing is not a viable control alternative for the proposed Project.

5.4 Vapor Control System Onboard VLCC

Countries engaged in crude oil loading from production platforms in the North Sea developed requirements for control of VOC emissions that initially required 78% reduction in VOCs from loading marine vessels. Purpose-built shuttle tankers operating in the North Sea were modified to have vapor recovery systems onboard. Recovered hydrocarbons are then bunkered and may be used as fuel for the onboard boilers or engines. The recovery of hydrocarbons requires additional safety consideration for the vessel, as well as customization to add the system on the deck.[164]

Figure 5-8. Vapor Recovery Onboard a North Sea Shuttle Tanker

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[163] DiEIsi, G. J. (1989, January 1). Principles of Marine Vapor Recovery. The Society of Naval Architects and Marine Engineers, page 42.

[164] International Maritime Organization, “Technical Information on Systems and Operations to Assist Development of VOC Management Plans,” July 27, 2009 (MEPC.1/Circ. 680).

Shuttle tankers are not the same as typical crude carriers, as they are designed and built for a specific purpose – to carry produced oil a short distance to a processing plant. Shuttle tankers are used when the depth or sea conditions of an offshore production area make pipelines to shore economically undesirable.

Shuttle tankers are designed for the North Sea environment and loading from production platforms or floating production, storage & offtake vessels (FPSO). The shuttle tankers are equipped with a bow loading system or a submerged turret loading system. They are equipped with dynamic positioning systems, which include azimuth and tunnel thrusters both forward and aft. North Sea shuttles also have twin-screw propulsion system for redundancy and dynamic positioning. Shuttle tankers also typically have large ballast tank volume to help with stability and positioning at the sacrifice of cargo-carrying efficiency. North Sea shuttle tankers have a capacity of less than half of a VLCC (<850,000 bbls).

Shuttle tankers are alternatives to pipelines and serve as short-run transport between limited receipt points and delivery points. The loading and discharging frequency are comparatively high, with less time in transit (up to 50 loads per year). Some shuttle tankers spend 50% of their life in loading mode in the field.[165] This high frequency of loading of produced oil (not weathered crude from a terminal) provides additional benefit for onboard recovery. In comparison, the VLCCs expected to call at the BMOP DWP will traverse the globe and will have longer hauls with fewer annual loading events. Thus, VLCCs are designed for efficiency of transit – and the larger size of their cargo is critical for this efficiency.

BMOP does not own VLCCs or other crude carrying vessels. The purpose of the project is to serve the existing fleet of international ships for export based on market conditions, not a purpose-built shuttle from the DWP to a few, nearby delivery points. A shuttle tanker does not meet the purpose of the project and cannot feasibly be implemented by BMOP as a single terminal in the international commodity market.

Requiring vapor control systems onboard VLCCs is not a viable control alternative for the proposed Project.

5.5 Vapor Control System Onboard Support Vessel

Barges have been used in the past to capture and control vapor displaced when loading vessels. The Barge Jovalan and Barge Olympic Spirit have been used at the Ellwood Marine Terminal (no longer in operation), and the Barge San Pedro was utilized at El Segundo Marine Terminal. The following operational constraints do not allow for application to BMOP:

- Loading Rate Limits. Each of these barges limited the loading capacity significantly. The largest of them, the Barge San Pedro, had a maximum loading rate of 15,000 bbl/hr (Ellwood was limited to a loading rate of 4,200 bbl/hr). This would not conform to the Project purpose, as it would take almost a week to fully load a VLCC.
- VOC Control Limits. The Barge San Pedro was only capable of accommodating gas-free tankers prior to loading – a unique requirement to El Segundo. The carbon canister capacity of the barge would be exceeded if not gas-free, even for vessels with 20% of the capacity of BMOP, and would not be able to accommodate a VLCC. This would require frequent interruption in loading to change out carbon canisters. The refrigeration design of the Barges Jovalan (56,000 bbl capacity) and Olympic Spirit (80,360 bbl capacity) was an onboard recovery, with return to the barge storage capacity (more than 25 times smaller than a VLCC).
- Sea State Limits. The onboard vapor recovery has only been utilized at fixed berth locations near shore in partially-protected coastal waters (Ellwood Marine Terminal was ~0.5 miles offshore Goleta, California

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[165] https://www.dnvgl.com/expert-story/maritime-impact/Shuttle-tankers-safe-flexible-efficient.html

in a water depth of 60 feet). This allows for a fendered barge to safely approach the port side of a moored vessel in a fixed position. In the exposed waters of the open ocean with more extreme weather, requiring a vessel to approach and remain tandem to the starboard or port side of a vessel free to weathervane introduces safety risks and further limits the permissible sea state conditions for operations. A smaller barge will react differently than a large VLCC from the impact of wind (size of vessel) and current (draft). Operations will therefore be dependent of restricted sea states and weather to ensure that a barge can safely approach and operate immediately adjacent to the VLCC.

The barges evaluated utilized carbon canisters and refrigeration. Other vapor recovery technologies on barges have been considered and rejected because of the significant equipment size. Chevron noted other vapor recovery technology "is not practicable because the equipment is too large to be installed on a workboat or barge."[166]

Finally, the costs of a custom barge with vapor control with sufficient capacity to accommodate VLCC loading will exceed the costs of the unreasonable VCU control alternative. For the operating barges noted above that did not require the same extensive robust engineering to accommodate VLCC loading in exposed waters, the estimated cost effectiveness was higher than the VCU control alternative.

> *The estimated cost of a barge-mounted simple refrigeration system is at least $10 million. Based on capital and operating costs, the cost-effectiveness of such a system would be approximately $50,000/ton of VOCs recovered.*[167]

A vapor control system onboard a support vessel is not a feasible control alternative for BMOP.

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[166] Letter from J.D. Bellows, Chevron Corporation, to Mr. David W. Markwordt, U.S. EPA, "Technical Choices for Marine Vapor Controls on Loading Operations at Offshore Terminals, July 21, 1993, IV-D-136 of Docket A-90-44.

[167] Ibid.

6. CASE-BY-CASE MACT DETERMINATION

BMOP has completed the MACT floor analysis for similar sources including consideration of technology transfer, and a beyond-the-floor consideration for control alternatives with cost, environmental, energy, and safety considerations specific to the proposed Project. The conclusion of the analysis is the MACT floor is the use of submerged fill loading and a VOC management plan. No control alternatives were feasible for the proposed Project. It is logical that the determination presented here is in alignment with other SPM buoy installations, but determined on a case-by-case basis specific to the proposed BMOP Project.

> *The MACT emission limitation will be "equivalent to the emission limitation that the source category would have been subject to if a relevant standard had been promulgated under Section 112(d) (or Section 112(h)).*[168]

In comparison to other recent projects for loading crude oil from SPMs, both LOOP and the Limetree Bay Terminal have added the capability to load VLCCs at SPMs since 2018. LOOP and Limetree Bay terminal utilize submerged fill for control of loading emissions, as neither have applied a VCU control alternative (BMOP's project-specific costs and operating impacts will be greater than either LOOP or Limetree Bay). BMOP's conclusion is consistent with these recent projects, EPA's case-by-case guidance, as well as the Marine Board's recommendation to align safety and environmental requirements to avoid local disparity, bifurcated design principles, and unfair competitive advantages.

BMOP has evaluated an appropriate emissions limit for the proposed Project utilizing the HAP data from 13 crude oil samples taken at the Nederland Terminal and EPA's recent approach to defining emissions limits for other Section 112(d) standards (e.g., Subpart DDDDD).

6.1 HAP Emission Limit

The following table presents a summary of Total HAP in the 13 crude oil samples evaluated for this Project.

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[168] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Guidelines for MACT Determinations under Section 112(j) Requirements, February 2002, EPA 453/R-02-001, page 1-2.

Table 6-1. Total HAP Identified in Nederland Terminal Crude Oil Samples

Crude Sample	Date of Sample	RVP (psi)	Total HAP (wt. %, liquid)
Kearl Heavy	5/19/2020	3.63	4.11
Bakken 1554	5/18/2020	6.76	4.14
WTI 1590	5/19/2020	4.76	3.92
SGC CHOPS	5/19/2020	4.06	1.83
Eaglebine Light	5/19/2020	6.56	2.83
Bakken 1552	5/29/2020	6.51	3.94
WTI 1594	5/29/2020	4.85	3.85
Cold Lake 1567	6/3/2020	3.06	2.17
WCS 1556	6/7/2020	2.52	2.10
WTI 1549	6/9/2020	4.71	3.01
Bakken 1558	6/9/2020	7.74	3.86
WTS 1530	6/13/2020	4.51	3.40
AWB 1566	6/13/2020	2.71	2.18

The following HAP species were identified and included in the Total HAP column:

- Hexane,
- Benzene,
- Toluene,
- Ethylbenzene,
- 1,2,4-Trimethylbenzene,
- 1,3—Dimethylbenzene,
- 1,4-Dimethylbenzene,
- 1,2-Dimethylbenzene, and
- Cumene

While not identified in any of the 13 samples, BMOP has also estimated emissions of biphenyl, cresols, naphthalene, and phenol, as other possible HAP emissions. As discussed in Section 2.4.1.2 of this application, the HAP emissions from this data were determined consistent with AP-42, Chapter 7.1.4 (06/2020), using Raoult's Law to determine the HAP content in the vapor phase of the crude oil from the HAP content in the liquid phase. For the purposes of a recommended emissions standard representative of the emissions that can be achieved in practice and also for which compliance can readily be demonstrated, the following considerations of variability have been applied to the weight percent in liquid for the HAP components. The same approach was also conducted for the vapor composition in Appendix C to inform the potential emissions.

Section 4.3 identified relevant case law informing the consideration of variability of emissions specific to the best controlled similar source. For this analysis, BMOP has applied the same methodology for determining appropriate variability as EPA has utilized for other recent Section 112(d) MACT determinations: the application of an upper prediction limit (UPL) to available source data.

The UPL is a value derived from widely accepted and commonly used statistical principles, and represents the upper end of a prediction interval.[169] EPA notes that the UPL is a statistical methodology used “as the primary tool to account for emissions variability when setting emissions standards.” The UPL calculates the average emissions limitation achieved over time by the best performing source.[170]

> *In the context of development of MACT floors, the UPL is a value, calculated from a dataset, that identifies the average emissions level that a source or group of sources is meeting and would be expected to meet a specified percent of the time that the source is operating.*
>
> *In other words, the 99 percent UPL is the level of emissions that we are 99 percent confident is achieved by the average source represented in a dataset over a long-term period based on its previous, measured performance history as reflected in short term stack test data.*
>
> *In sum, the UPL predicts the level of emissions that the sources upon which the floor is based are expected to meet over time, considering both the average emissions level achieved as well as emissions variability and the uncertainty that exists in the determination of emissions variability given the available, short-term data.*

Following EPA’s preferred approach to determining the MACT standard that can be met by a unit with emissions at the average level of the best performing source, BMOP has completed the calculation of the 99 percent UPL value for each individual HAP identified from the 13 crude oil samples. The following equation present the approach to the UPL calculations for a dataset with a lognormal distribution (Equation 2 from *EPA’s Response to Remand of the Record for Major Source Boilers, July 14, 2014*).

$$UPL_{100-(\alpha\times 100)} = e^{\hat{\mu}+\frac{\hat{\sigma}^2}{2}} + \frac{z_{(1-\alpha)}}{m}\sqrt{me^{2\hat{\mu}+\hat{\sigma}^2}\left(e^{\hat{\sigma}^2}-1\right)+m^2e^{2\hat{\mu}+\hat{\sigma}^2}\left(\frac{\hat{\sigma}^2}{n}+\frac{\hat{\sigma}^4}{2(n-1)}\right)}$$

Where: $\alpha =$ level of significance expressed as a decimal (e.g., 1% significance = 0.01); note that confidence level $= 100 - (\alpha \times 100)$;
$e =$ base of the natural logarithm ≈ 2.718282;
$\hat{\mu} =$ mean of the log transformed sample data $\left(= \frac{1}{n}\sum_{i=1}^{n} \ln{(x)_i}\right)$;
$\hat{\sigma}^2 =$ variance of the log transformed sample data $\left(= \frac{1}{n}\sum_{i=1}^{n}(\ln(x)_i - \hat{\mu})^2\right)$;
$z =$ z score, the one-tailed z value of the z distribution for a specific level of significance;
$m =$ number of sample values used to calculate the average;
$n =$ number of samples.

The results of the UPL is presented in the following table.

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[169] National Institute of Standards and Technology, *NIST/SEMATECH e-Handbook of Statistical Methods*, <http://www.itl.nist.gov/div898/software/dataplot/refman1/auxillar/predlimi.htm>.

[170] Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, U.S. EPA, to Docket ID No. EPA-HQ-OAR-2002-0058, “EPA’s Response to Remand of the Record for Major Source Boilers,” July 14, 2014.

Table 6-2. Summary of UPL by HAP

HAP	99% UPL (wt. %, liquid)
Hexane	3.09
Benzene	0.46
Toluene	1.10
Ethylbenzene	0.29
1,2,4-Trimethylbenzene	0.76
1,3—Dimethylbenzene	0.79
1,4-Dimethylbenzene	0.57
1,2-Dimethylbenzene	0.37
Cumene	0.08
Total HAP	**7.50**

BMOP recommends that the MACT emission standard is 7.50% (weight %, liquid) total HAP or less, annual average, based on EPA's preferred approach to developing standards under Section 112 of the Clean Air Act. The UPL calculations are detailed in Appendix C of this application.

6.2 Emission Standard and Control Requirements

The third "Principle of MACT determinations" for 40 CFR 63, Subpart B is provided as the following:

> *The applicant may recommend a specific design, equipment, work practice, or operational standard, or a combination thereof, and the permitting authority may approve such a standard if the permitting authority specifically determines that it is not feasible to prescribe or enforce an emission limitation under the criteria set forth in section 112(h)(2) of the Act.*[171]

The third principle identifies that a MACT requirement can be a work practice standard. For all the reasons discussed previously, the BMOP DWP should be required to load using submerged fill only, and in accordance with a VOC Best Management Plan (BMP), as presented in Appendix E of this application. The maximum total HAP weight percent (liquid) of crude oil should be limited to 7.50%. This represents the emission standard that will confirm compliance with the MACT analysis presented in this report.

The Project should also be limited to loading only crude oil with a maximum TVP of 10.99 psia, at a maximum throughput of 80,000 bbl/hr.

6.3 Compliance Assurance

The following monitoring, recordkeeping, and reporting requirements are proposed to provide compliance assurance with the emission standard and control requirements for marine vessel loading of crude oil at the BMOP DWP.

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[171] 40 CFR §63.43(d)(3).

6.3.1 Monitoring

- BMOP will monitor adherence to the terminal VOC BMP, which includes the use of submerged fill loading of crude carrying vessels and communication with the vessel being loaded.
- BMOP will sample and analyze crude oil at the onshore Nederland Pump Station, at least once per year.
  - The sampling method will follow American Society for Testing and Methods (ASTM) D4057
  - The samples will be analyzed per D6377 to provide the true vapor pressure
  - The samples will be analyzed per D7900 to provide the weight percent in the liquid for HAP
  - The sum of the HAP (weight %, in liquid) will be compared to the emission standard to confirm compliance
- BMOP will monitor the crude oil loading operations
  - Monitoring the crude oil loading rate with a flow meter.
  - Compliance is demonstrated when:
    - The loading rate, averaged over each vessel's loading duration, is 80,000 bbl/hr or less.
    - The rolling 12-month total crude oil loaded is 700,800,000 bbls or less.
    - The rolling 12-month total vessels loaded is 365 vessels or less.
  - Start and end loading time, duration per vessel monitored
  - Limited to 700,800,000 Bbl/yr, on a 12-month rolling total basis
  - Limited to 365 vessels fully loaded on a 12-month rolling total basis.

6.3.2 Recordkeeping

- BMOP will maintain analytical results of each crude oil sample
  - The sum of all HAP identified in each sample, weight % in liquid
  - Comparison of the total HAP composition to the emission standard of 7.50%, weight % in liquid
- For each vessel loaded, BMOP will maintain the following records
  - The vessel IMO registry number
  - Confirmation that loading utilized submerged fill
  - Confirmation of adherence to the VOC BMP
  - The date and time loading of each vessel commences
  - The date and time loading of each vessel completes
  - The total crude oil loaded into each vessel (bbls)
  - The average hourly loading rate of crude oil (bbl/hr)
- BMOP will maintain the following calculation of emissions
  - HAP emissions from each loading operation, utilizing the most recent crude oil sample results and total volume loaded
  - 12-month rolling total HAP emissions, as the sum of the HAP emissions calculated for each vessel loaded in the prior 12-month rolling period

6.3.3 Reporting

- BMOP will submit a Notification of Compliance Status (NOCS) in accordance with 40 CFR §63.9(h)
- BMOP will submit a semiannual report in accordance with 40 CFR §63.10(e)(3)(vi)

APPENDIX A. APPLICATION REQUIREMENTS FOR A CASE-BY-CASE MACT DETERMINATION

This document provides or references the information required for applications for a case-by-case MACT determination at 40 CFR §63.43(e)(2).

Section 63.43(e)(2)(i)

> *The name and address (physical location) of the major source to be constructed or reconstructed.*

Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM). The BMOP deep water port (DWP) will be located in federal waters within Outer Continental Shelf (OCS) West Cameron Lease Blocks 509 (WC 509), 508 and East Cameron Block 263. The crude oil will be metered on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline End Manifolds (PLEMs) located on the seafloor below two Catenary Anchor Leg Mooring (CALM) Buoys located in WC 508 and in East Cameron Block 263 (EC 263).

Table A-3. DWP Components for Offshore Loading

Component	Latitude (N) (degrees minutes seconds)	Longitude (W) (degrees minutes seconds)	Water Depth (feet)
WC 509 Platform Complex [a]	28° 26' 00.01”	93° 00' 15.23”	162
CALM Buoy No. 1 and PLEM (WC 508)	28° 26’ 47.33”	93° 00’ 13.30”	156
CALM Buoy No. 2 and PLEM (EC 263)	28° 26’ 34.37”	92° 59’ 19.21”	159

a. Riser #1.

The DWP site will be approximately 82 statute miles off the coast of Cameron Parish, Louisiana.

Section 63.43(e)(2)(ii)

> *A brief description of the major source to be constructed or reconstructed and an identification of any listed source category or categories in which it is included.*

Two new CALM buoys with floating, flexible crude loading hoses, two new crude oil loading lines, and Pipeline End Manifolds (PLEMs) will be constructed. Crude oil will be pumped from an onshore pump station through the existing Stingray pipeline to the existing WC 509 platform complex. The crude will be metered at the WC 509B platform, and then will be directed through new subsea crude oil loading lines, up the PLEMs, and through the floating, flexible crude loading hoses to load very large crude carriers (VLCCs) and other large crude carrying vessels moored at the CALM buoys. The BMOP loading capacity of the vessels is 80,000 barrels per hour (bbl/hr). Up to 365 vessels will be loaded each year.

The proposed major source marine loading of crude oil for export at a DWP is not a similar source to any listed source category with a promulgated NESHAP subpart.

Section 63.43(e)(2)(iii)

> *The expected commencement date for the construction or reconstruction of the major source;*

The on-site installation of the crude oil subsea pipelines, PLEMs, and CALM buoy systems is expected to commence in December 2022.

Section 63.43(e)(2)(iv)

> *The expected completion date for construction or reconstruction of the major source;*

The expected completion date of construction is May 2023.

Section 63.43(e)(2)(v)

> *The anticipated date of start-up for the constructed or reconstructed major source;*

Commissioning is planned to occur in May, June, and July 2023, with the anticipated date of startup as August 5, 2023.

Section 63.43(e)(2)(vi)

> *The HAP emitted by the constructed or reconstructed major source, and the estimated emission rate for each such HAP, to the extent this information is needed by the permitting authority to determine MACT;*

Section 2.4.1.2 provides the estimate emission rate for each HAP expected to be emitted from the BMOP DWP. The methodology for calculating mass emissions is provided in Section 2.4.1.2. The specific HAP were identified in thirteen samples of crude oil from the Nederland Terminal in May and June 2020. The calculation of vapor weight percent of each HAP, as well as the methodology for determining observed variability in the samples is described in Section 6 of the application, with the detail included in Appendices B and C.

Section 63.43(e)(2)(vii)

> *Any federally enforceable emission limitations applicable to the constructed or reconstructed major source;*

BMOP is proposing to construct a new DWP. There are no existing federally enforceable emissions limits. Through this application, and the concurrent PSD application, emissions limits are proposed to represent MACT and BACT, respectively.

Section 63.43(e)(2)(viii)

> *The maximum and expected utilization of capacity of the constructed or reconstructed major source, and the associated uncontrolled emission rates for that source, to the extent this information is needed by the permitting authority to determine MACT;*

BMOP is designing the Project to accommodate a loading rate of 80,000 bbl/hr. At this rate, a VLCC can be fully loaded in approximately 25 hours. With two CALM buoys, the Project is designed to continuously load into VLCCs or other crude carriers (while a VLCC is loading at one CALM buoy, another VLCC can arrive, get moored, and prep for loading at the second CALM buoy). The maximum annual capacity of the BMOP DWP is 700,800,000 bbl/yr. The HAP emissions estimates in this application are based on full utilization of the proposed DWP.

Section 63.43(e)(2)(ix)

> *The controlled emissions for the constructed or reconstructed major source in tons/yr at expected and maximum utilization of capacity, to the extent this information is needed by the permitting authority to determine MACT;*

The presented emissions are based on the identified MACT floor of submerged fill, which represents approximately 60% control of loading losses. Additional vapor capture and control is not feasible. The BTF analysis in Section 5 presents the HAP emissions controlled in an evaluation of the feasibility of a VCU.

Section 63.43(e)(2)(x)

> *A recommended emission limitation for the constructed or reconstructed major source consistent with the principles set forth in paragraph (d) of this section;*

A recommended emission limitation is presented in Section 6 for the BMOP DWP.

Section 63.43(e)(2)(xi)

> *The selected control technology to meet the recommended MACT emission limitation, including technical information on the design, operation, size, estimated control efficiency of the control technology (and the manufacturer's name, address, telephone number, and relevant specifications and drawings, if requested by the permitting authority);*

Control by use of submerged fill, which represents approximately 60% control of loading losses, is the selected control technology to meet the recommended MACT emission limitation, with operational procedures identified in the VOC Best Management Plan, as presented in Appendix E.

Section 63.43(e)(2)(xii)

> *Supporting documentation including identification of alternative control technologies considered by the applicant to meet the emission limitation, and analysis of cost and non-air quality health environmental impacts or energy requirements for the selected control technology;*

Section 5 of the application reviews alternative control technologies considered in the BTF analysis. The cost and non-air quality health and environmental or energy requirements are presented in detail for a VCU. The VCU was determined to have unacceptable cost and environmental impacts, and thus was not a feasible control for BTF. Other alternate controls require similar configuration to the VCU, but higher relative costs. Because these alternate controls would have the same conclusion as a VCU, detailed cost analyses were not necessary.

Additional alternative control technologies were considered, such as custom vessels. These alternatives are not congruous with the project purpose or stationary source requirements.

Though not an alternate control technology, a no-action alternative is considered in Appendix F for crude oil loading into VLCCs through reverse lightering, at an equivalent volume to the proposed capacity of the BMOP DWP.

Section 63.43(e)(2)(xiii)

> *Any other relevant information required pursuant to subpart A.*

BMOP is proposing to monitor the crude oil throughput rate, and the cargo vapor pressure during loading (See Section 6).

APPENDIX B. CRUDE OIL ANALYSES

Kearl Heavy Analysis

Crude Oil Type: Kearl Heavy
Date of Sample: May 19, 2020
Location of Sample: Nederland Terminal; T-1571 Bayou Bridge Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF
Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900
Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE
Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16
Sample Wt: 5.09
Sample Den: 0.83

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	10.42	13.20	11.37
I-Paraffins:	10.33	12.61	9.74
Olefins:	0.00	0.00	0.00
Naphthenes:	9.15	9.86	8.34
Aromatics:	2.90	2.76	2.57
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.38	0.45	0.28

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	1.68(Mass%)	1.60(Vol%)

Average Molecular Weight: 84.49

Relative Density: 0.65

Reid Vapor Pressure @ 100F: 3.63psi - 25.01kPa

Calculated Octane Number: 64.9

Motor Octane Number (Jenkins Calculation): 62.3

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	155.71	T50	T90	FBP
BP by Vol (Deg F)	10.90	155.71	T50	T90	FBP

Percent Carbon: 84.95 Percent Hydrogen: 15.05

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	8.16
Light Ends (C2s-C5s Vol %)	8.40

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE
Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16
Sample Wt: 5.09 Sample Den: 0.83

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.05	0.63
C6	85.23	0.69
C7	98.49	0.73
C8	112.13	0.75
C9	126.07	0.76
C10	141.83	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	84.50	0.65

Octane Number

Research Octane Number: 64.9

Motor Octane Number: 62.3

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE
Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16
Sample Wt: 5.09 Sample Den: 0.83

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.25	0.00	0.00	0.00	0.00	0.00	0.25
C4	1.18	0.25	0.00	0.00	0.00	0.00	1.43
C5	2.54	1.73	0.00	0.22	0.00	0.00	4.48
C6	1.96	2.02	0.00	1.88	0.22	0.00	6.07
C7	1.58	1.63	0.00	3.12	0.65	0.00	6.97
C8	1.19	1.84	0.00	2.21	1.02	0.02	6.27
C9	0.92	1.70	0.00	1.42	0.95	0.09	5.08
C10	0.81	1.16	0.00	0.32	0.05	0.28	2.61
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	10.42	10.33	0.00	9.15	2.90	0.38	32.79

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.38
Grand Total: 33.18

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.41	0.00	0.00	0.00	0.00	0.00	0.41
C4	1.69	0.38	0.00	0.00	0.00	0.00	2.06
C5	3.35	2.31	0.00	0.24	0.00	0.00	5.90
C6	2.45	2.54	0.00	2.03	0.21	0.00	7.23
C7	1.91	1.96	0.00	3.39	0.62	0.00	7.88
C8	1.40	2.17	0.00	2.37	0.98	0.02	6.93
C9	1.06	1.95	0.00	1.50	0.91	0.11	5.52
C10	0.91	1.30	0.00	0.33	0.05	0.33	2.92
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	13.20	12.61	0.00	9.86	2.76	0.45	38.43

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.45
Grand Total: 38.88

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE
Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16
Sample Wt: 5.09 Sample Den: 0.83

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.52	0.00	0.00	0.00	0.00	0.00	0.52
C4	1.88	0.40	0.00	0.00	0.00	0.00	2.28
C5	3.25	2.22	0.00	0.28	0.00	0.00	5.75
C6	2.10	2.16	0.00	2.06	0.26	0.00	6.58
C7	1.45	1.50	0.00	2.93	0.65	0.00	6.54
C8	0.96	1.49	0.00	1.82	0.89	0.01	5.17
C9	0.66	1.22	0.00	1.04	0.73	0.07	3.72
C10	0.52	0.75	0.00	0.21	0.03	0.20	1.72
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.37	9.74	0.00	8.34	2.57	0.28	32.02

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.28	Grand Total:	32.31

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6946	200.0000	P2	ethane	0.0109	0.0265	0.0335	-127.480	-88.600	XXX
6.9529	300.0000	P3	propane	0.2476	0.4092	0.5186	-43.672	-42.040	XXX
7.3576	367.6000	I4	i-butane	0.2540	0.3772	0.4037	10.904	-11.720	XXX
7.7046	400.0000	P4	n-butane	1.1802	1.6868	1.8757	31.100	-0.500	XXX
7.8796	414.5400	I5	2,2-dimethylpropane	0.0129	0.0181	0.0166	49.100	9.500	XXX
8.9762	475.2300	I5	i-pentane	1.7181	2.2938	2.1997	82.112	27.840	XXX
9.6640	500.0000	P5	n-pentane	2.5353	3.3490	3.2458	96.908	36.060	XXX
10.9681	535.0300	I6	2,2-dimethylbutane	0.0451	0.0574	0.0483	121.514	49.730	XXX
12.3484	562.0900	N5	cyclopentane	0.2163	0.2401	0.2849	120.650	49.250	XXX
12.4207	563.3200	I6	2,3-dimethylbutane	0.1370	0.1714	0.1469	136.364	57.980	XXX
12.6417	566.9900	I6	2-methylpentane	1.1374	1.4405	1.2191	140.468	60.260	XXX
13.5443	580.6900	I6	3-methylpentane	0.6965	0.8673	0.7466	145.886	63.270	XXX
15.0504	600.0000	P6	n-hexane	1.9559	2.4536	2.0965	155.714	68.730	XXX
18.3808	627.9000	I7	2,2-dimethylpentane	0.0340	0.0417	0.0313	174.542	79.190	XXX
18.7558	630.5300	N6	methylcyclopentane	0.9427	1.0417	1.0347	161.240	71.800	XXX
19.3508	634.5400	I7	2,4-dimethylpentane	0.0765	0.0940	0.0705	176.882	80.490	XXX
20.2233	640.0900	I7	2,2,3-trimethylbutane	0.0085	0.0102	0.0079	177.584	80.880	XXX
22.7391	654.3100	A6	benzene	0.2215	0.2085	0.2620	176.162	80.090	XXX
23.8139	659.7200	I7	3,3-dimethylpentane	0.0228	0.0271	0.0210	186.908	86.060	XXX
24.5076	663.0300	N6	cyclohexane	0.9344	0.9929	1.0256	177.296	80.720	XXX
26.4917	671.8400	I7	2-methylhexane	0.5566	0.6785	0.5131	194.090	90.050	XXX
26.8180	673.2000	I7	2,3-dimethylpentane	0.1974	0.2349	0.1820	193.604	89.780	XXX
27.3875	675.5300	N7	1,1-dimethylcyclopentane	0.1489	0.1633	0.1401	189.464	87.480	XXX
28.4586	679.7500	I7	3-methylhexane	0.6752	0.8129	0.6224	197.330	91.850	XXX
29.8880	685.0600	N7	1c,3-dimethylcyclopentane	0.2915	0.3237	0.2742	195.386	90.770	XXX
30.5703	687.4800	N7	1t,3-dimethylcyclopentane	0.2648	0.2926	0.2492	197.096	91.720	XXX
30.9452	688.7800	I7	3-ethylpentane	0.0547	0.0648	0.0504	200.246	93.470	XXX
31.2198	689.7200	N7	1t,2-dimethylcyclopentane	0.4632	0.5099	0.4358	197.366	91.870	XXX
34.4318	700.0000	P7	n-heptane	1.5775	1.9087	1.4542	209.156	98.420	XXX
38.6433	724.4100	N7	1c,2-dimethylcyclopentane	0.0397	0.0448	0.0373	211.154	99.530	XXX
38.8056	725.2900	N7	methylcyclohexane	1.7923	1.9269	1.6861	213.674	100.930	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
39.5917	729.4600	I8	2,2-dimethylhexane	0.1751	0.2083	0.1416	224.312	106.840	XXX
41.5076	739.2400	N7	ethylcyclopentane	0.1150	0.1242	0.1082	218.246	103.470	XXX
41.9471	741.4100	I8	2,5-dimethylhexane	0.0707	0.0844	0.0572	228.398	109.110	XXX
42.3545	743.4000	I8	2,4-dimethylhexane	0.0927	0.1095	0.0750	228.974	109.430	XXX
43.4749	748.7400	N8	1c,2t,4-trimethylcyclopentane	0.1797	0.1947	0.1479	242.132	116.740	XXX
43.8072	750.3000	I8	3,3-dimethylhexane	0.0299	0.0348	0.0242	233.546	111.970	XXX
45.0631	756.0500	N8	1t,2c,3-trimethylcyclopentane	0.2006	0.2154	0.1651	230.738	110.410	XXX
45.6882	758.8400	I8	2,3,4-trimethylpentane	0.0117	0.0134	0.0094	236.246	113.470	XXX
46.4402	762.1400	A7	toluene	0.6526	0.6227	0.6542	231.134	110.630	XXX
48.0847	769.1500	I8	2,3-dimethylhexane	0.1319	0.1532	0.1066	240.098	115.610	XXX
48.3207	770.1300	I8	2-methyl-3-ethylpentane	0.0331	0.0385	0.0268	240.098	115.610	XXX
49.3990	774.5500	I8	2-methylheptane	0.6135	0.7272	0.4961	243.770	117.650	XXX
49.6912	775.7300	I8	4-methylheptane	0.1997	0.2344	0.1615	243.878	117.710	XXX
49.8416	776.3300	I8	3-methyl-3-ethylpentane	0.0233	0.0270	0.0188	240.098	115.610	XXX
49.9851	776.9100	I8	3,4-dimethylhexane	0.0349	0.0401	0.0282	243.914	117.730	XXX
50.3983	778.5500		unknown	0.0171	0.0203	0.0139	243.914	117.730	XXX
50.4501	778.7500	N8	1c,3-dimethylcyclohexane	0.0187	0.0203	0.0154	246.848	119.360	XXX
50.9185	780.5900	I8	3-methylheptane	0.3565	0.4178	0.2883	246.074	118.930	XXX
51.0816	781.2300	N8	1c,2t,3-trimethylcyclopentane	0.5550	0.5959	0.4568	243.500	117.500	XXX
51.2050	781.7100	I8	3-ethylhexane	0.0673	0.0780	0.0544	245.372	118.540	XXX
51.4620	782.7000	N8	1t,4-dimethylcyclohexane	0.2012	0.2182	0.1656	246.848	119.360	XXX
52.5562	786.8800	N8	1,1-dimethylcyclohexane	0.0731	0.0775	0.0602	247.190	119.550	XXX
53.3183	789.7300	N8	3t-ethylmethylcyclopentane	0.0517	0.0557	0.0425	249.980	121.100	XXX
53.7344	791.2600	N8	3c-ethylmethylcyclopentane	0.0481	0.0519	0.0396	249.980	121.100	XXX
53.9800	792.1600	N8	2t-ethylmethylcyclopentane	0.1175	0.1264	0.0967	250.160	121.200	XXX
54.3696	793.5800	N8	1,1-methylethylcyclopentane	0.0192	0.0203	0.0158	250.754	121.530	XXX
54.9098	795.5300	N8	1t,2-dimethylcyclohexane	0.2446	0.2608	0.2014	254.174	123.430	XXX
56.1715	800.0000	P8	n-octane	1.1861	1.3967	0.9592	258.224	125.680	XXX
56.2858	800.7700	N8	i-propylcyclopentane	0.1268	0.1351	0.1044	259.574	126.430	XXX
57.6961	810.1700	I9	2,4,4-trimethylhexane	0.0256	0.0287	0.0184	32.000	0.000	XXX
58.7932	817.3100		unknown	0.0178	0.0210	0.0128	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
59.2010	819.9300	I9	2,3,4-trimethylhexane	0.0142	0.0159	0.0102	282.308	139.060	XXX
59.5544	822.1800	I9	2,2,3,4-tetramethylpentane	0.0156	0.0174	0.0112	271.454	133.030	XXX
59.8377	823.9700	N8	N8-[1]	0.0207	0.0219	0.0170	271.454	133.030	XXX
60.5993	828.7400	N8	1c,2-dimethylcyclohexane	0.1155	0.1200	0.0951	265.532	129.740	XXX
60.7563	829.7200	I9	2,3,5-trimethylhexane	0.0204	0.0234	0.0147	268.430	131.350	XXX
60.8924	830.5600	I9	2,2-dimethylheptane	0.0070	0.0081	0.0050	270.860	132.700	XXX
61.0949	831.8100	N8	N8-[2]	0.0057	0.0060	0.0047	270.860	132.700	XXX
61.4642	834.0800		unknown	0.0342	0.0404	0.0281	270.860	132.700	XXX
61.5674	834.7100	N9	1,1,4-trimethylcyclohexane	0.4057	0.4346	0.2968	275.000	135.000	XXX
61.7398	835.7600	I9	2,2,3-trimethylhexane	0.2000	0.2313	0.1440	271.220	132.900	XXX
62.1348	838.1600	I9	2,4-dimethylheptane	0.0137	0.0159	0.0099	271.220	132.900	XXX
62.5248	840.5100	N8	n-propylcyclopentane	0.2307	0.2458	0.1899	267.728	130.960	XXX
62.9005	842.7600	I9	2,5-dimethylheptane	0.1424	0.1644	0.1026	276.800	136.000	XXX
63.1001	843.9500	N9	*1c,3c,5-trimethylcyclohexane	0.0193	0.0207	0.0141	281.174	138.430	XXX
63.1776	844.4100	I9	3,3-dimethylheptane	0.0126	0.0144	0.0091	278.636	137.020	XXX
63.4018	845.7400	I9	3,5-dimethylheptane	0.0245	0.0280	0.0176	276.800	136.000	XXX
63.6208	847.0300	I9	2,6-dimethylheptane	0.0308	0.0360	0.0222	275.396	135.220	XXX
63.6818	847.3900		unknown	0.0170	0.0201	0.0123	275.396	135.220	XXX
63.8810	848.5600	N9	1,1,3-trimethylcyclohexane	0.0219	0.0230	0.0160	295.862	146.590	XXX
64.6165	852.8500	N9	1c,3c,5c-trimethylcyclohexane	0.0143	0.0152	0.0105	32.000	0.000	XXX
64.7236	853.4700	A8	ethylbenzene	0.1258	0.1200	0.1094	277.160	136.200	XXX
64.8244	854.0500	N9	1c,2t,4t-trimethylcyclohexane	0.0698	0.0740	0.0511	32.000	0.000	XXX
65.1763	856.0800	I9	I9-[1]	0.1285	0.1456	0.0925	32.000	0.000	XXX
65.5577	858.2600	N9	N9-[1]	0.0136	0.0144	0.0099	32.000	0.000	XXX
65.8213	859.7600	N9	N9-[2]	0.0101	0.0107	0.0074	32.000	0.000	XXX
66.1915	861.8500	A8	1,3-dimethylbenzene	0.4295	0.4111	0.3737	282.416	139.120	XXX
66.3900	862.9700	A8	1,4-dimethylbenzene	0.2874	0.2761	0.2500	281.048	138.360	XXX
66.7266	864.8500	I9	3,4-dimethylheptane	0.0261	0.0296	0.0188	285.080	140.600	XXX
66.8658	865.6300	N9	N9-[3]	0.0308	0.0327	0.0226	285.080	140.600	XXX
67.2085	867.5400	I9	4-ethylheptane	0.0822	0.0944	0.0592	288.392	142.440	XXX
67.6932	870.2100	I9	4-methyloctane	0.1787	0.2052	0.1287	288.392	142.440	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
67.8583	871.1200	I9	2-methyloctane	0.2162	0.2507	0.1557	289.904	143.280	XXX
68.5037	874.6400	I9	3-ethylheptane	0.0225	0.0256	0.0162	289.400	143.000	XXX
68.7479	875.9600	I9	3,3-diethylpentane	0.0492	0.0537	0.0354	270.842	132.690	XXX
68.9570	877.0900	I9	3-methyloctane	0.3192	0.3664	0.2299	291.614	144.230	XXX
69.2433	878.6300	N9	1c,2t,4c-trimethylcyclohexane	0.0207	0.0222	0.0152	275.000	135.000	XXX
69.4467	879.7200		unknown	0.0208	0.0246	0.0152	275.000	135.000	XXX
69.7307	881.2300	N9	1,1,2-trimethylcyclohexane	0.0227	0.0235	0.0166	293.360	145.200	XXX
69.9226	882.2500	A8	1,2-dimethylbenzene	0.1795	0.1687	0.1562	291.974	144.430	XXX
70.0795	883.0900	I9	I9-[2]	0.0365	0.0414	0.0263	291.974	144.430	XXX
70.1803	883.6200	I9	I9-[3]	0.0170	0.0192	0.0122	291.974	144.430	XXX
70.5175	885.4000	N9	N9-[4]	0.0070	0.0074	0.0051	291.974	144.430	XXX
70.8594	887.1900	N9	N9-[5]	0.0831	0.0881	0.0608	291.974	144.430	XXX
71.0709	888.2900	N9	N9-[6]	0.1786	0.1894	0.1307	291.974	144.430	XXX
71.4497	890.2600	I9	I9-[4]	0.0788	0.0893	0.0568	291.974	144.430	XXX
71.5083	890.5600	I9	I9-[5]	0.0294	0.0333	0.0212	291.974	144.430	XXX
71.8427	892.2900	N9	i-butylcyclopentane	0.0092	0.0098	0.0067	298.346	147.970	XXX
72.0583	893.4000	N9	N9-[7]	0.0146	0.0155	0.0107	298.346	147.970	XXX
73.1556	898.9800	I9	I9-[6]	0.0082	0.0093	0.0059	298.346	147.970	XXX
73.3561	900.0000	P9	n-nonane	0.9179	1.0581	0.6611	303.476	150.820	XXX
73.5457	901.4600	N9	1,1-methylethylcyclohexane	0.0381	0.0391	0.0279	305.924	152.180	XXX
73.7416	902.9800	N9	N9-[8]	0.0156	0.0163	0.0114	305.924	152.180	XXX
74.0659	905.4800	N9	N9-[9]	0.1259	0.1318	0.0921	305.924	152.180	XXX
74.5124	908.9000	N9	N9-[10]	0.0340	0.0356	0.0248	305.924	152.180	XXX
75.1447	913.7000	A9	i-propylbenzene	0.0294	0.0282	0.0226	306.338	152.410	XXX
75.2711	914.6500		unknown	0.0052	0.0062	0.0151	306.338	152.410	XXX
75.4731	916.1800	I10	I10-[1]	0.0227	0.0258	0.0148	306.338	152.410	XXX
75.7597	918.3300	N9	N9-[11]	0.0949	0.0994	0.0694	306.338	152.410	XXX
76.0123	920.2200	I10	I10-[2]	0.0736	0.0834	0.0478	306.338	152.410	XXX
76.2860	922.2600	I10	2,4-dimethyloctane	0.0555	0.0632	0.0360	312.620	155.900	XXX
76.6551	925.0000	N9	N9-[12]	0.0124	0.0130	0.0091	312.620	155.900	XXX
76.7256	925.5200		unknown	0.0307	0.0363	0.0224	312.620	155.900	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
77.1589	928.7100	I10	2,6-dimethyloctane	0.0130	0.0148	0.0084	320.738	160.410	XXX
77.3243	929.9200	I10	2,5-dimethyloctane	0.0659	0.0747	0.0428	317.300	158.500	XXX
77.5843	931.8300	N9	n-butylcyclopentane	0.1765	0.1861	0.1292	313.916	156.620	XXX
77.8654	933.8700		unknown	0.0243	0.0287	0.0178	313.916	156.620	XXX
77.9245	934.3000	I10	I10-[3]	0.0273	0.0309	0.0177	313.916	156.620	XXX
78.1216	935.7400	N10	N10-[1]	0.0630	0.0651	0.0415	313.916	156.620	XXX
78.3404	937.3200	I10	I10-[4]	0.0169	0.0192	0.0110	313.916	156.620	XXX
78.6274	939.3900	I10	3,3-dimethyloctane	0.1977	0.2213	0.1283	322.160	161.200	XXX
78.8508	940.9900		unknown	0.0451	0.0533	0.0293	322.160	161.200	XXX
79.0732	942.5900		unknown	0.0131	0.0154	0.0085	322.160	161.200	XXX
79.2391	943.7700		unknown	0.0324	0.0383	0.0210	322.160	161.200	XXX
79.4511	945.2800		unknown	0.0147	0.0174	0.0096	322.160	161.200	XXX
79.5449	945.9500	N10	N10-[2]	0.0763	0.0789	0.0503	322.160	161.200	XXX
79.7300	947.2600	A9	n-propylbenzene	0.1436	0.1378	0.1104	318.632	159.240	XXX
80.0553	949.5600		unknown	0.0168	0.0199	0.0129	318.632	159.240	XXX
80.2282	950.7800	N10	N10-[3]	0.0251	0.0260	0.0165	318.632	159.240	XXX
80.3968	951.9700		unknown	0.0126	0.0149	0.0083	318.632	159.240	XXX
80.6251	953.5700	A9	1,3-methylethylbenzene	0.1225	0.1172	0.0941	322.394	161.330	XXX
80.9210	955.6300	A9	1,4-methylethylbenzene	0.0791	0.0760	0.0608	323.618	162.010	XXX
81.4621	959.3900		unknown	0.0137	0.0162	0.0105	323.618	162.010	XXX
81.5534	960.0300	N10	N10-[4]	0.0338	0.0350	0.0223	323.618	162.010	XXX
81.6839	960.9300	A9	1,3,5-trimethylbenzene	0.2270	0.2170	0.1744	328.532	164.740	XXX
81.9829	962.9900	I10	I10-[5]	0.0158	0.0176	0.0102	328.532	164.740	XXX
82.1788	964.3300	I10	I10-[6]	0.0196	0.0220	0.0128	328.532	164.740	XXX
82.2701	964.9600	I10	5-methylnonane	0.0540	0.0609	0.0350	329.180	165.100	XXX
82.5141	966.6300	I10	4-methylnonane	0.1866	0.2086	0.1212	32.000	0.000	XXX
82.8681	969.0400	A9	1,2-methylethylbenzene	0.1180	0.1108	0.0907	329.324	165.180	XXX
83.1194	970.7400	I10	2-methylnonane	0.0518	0.0590	0.0337	332.654	167.030	XXX
83.3559	972.3400	I10	3-ethyloctane	0.0239	0.0268	0.0155	331.700	166.500	XXX
83.7735	975.1500	I10	3-methylnonane	0.1204	0.1358	0.0781	334.040	167.800	XXX
83.9451	976.3100		unknown	0.0335	0.0395	0.0217	334.040	167.800	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:12:28 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-1-D7900.0001.CDF Acquired: 05/19/20 08:03:34
Sample: 20-NEDR-0814-1-D7900 Analyzed: 5/19/2020 12:12:28 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1571 BAYOU BRIDGE LINE Yield: 33.18
Int Std: MEK
Int Std Amt: 0.16

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.09 Sample Den: 0.83

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
84.0366	976.9200	N10	N10-[5]	0.0252	0.0261	0.0166	334.040	167.800	XXX
84.4155	979.4500	I10	I10-[7]	0.0380	0.0425	0.0247	334.040	167.800	XXX
84.8078	982.0600	I10	I10-[8]	0.0086	0.0096	0.0056	334.040	167.800	XXX
85.1851	984.5500	A9	1,2,4-trimethylbenzene	0.2320	0.2192	0.1783	336.884	169.380	XXX
85.3548	985.6700	N10	i-butylcyclohexane	0.0828	0.0860	0.0545	340.340	171.300	XXX
85.5676	987.0700	I10	I10-[9]	0.0565	0.0631	0.0367	340.340	171.300	XXX
85.7659	988.3700	I10	I10-[10]	0.0837	0.0936	0.0544	340.340	171.300	XXX
85.9633	989.6600	I10	I10-[11]	0.0196	0.0219	0.0127	340.340	171.300	XXX
86.2081	991.2500	N10	N10-[6]	0.0101	0.0104	0.0066	340.340	171.300	XXX
86.3383	992.1000		unknown	0.0188	0.0222	0.0124	340.340	171.300	XXX
86.5206	993.2800	I10	I10-[12]	0.0082	0.0092	0.0053	340.340	171.300	XXX
86.9570	996.1100	A10	i-butylbenzene	0.0154	0.0150	0.0106	343.022	172.790	XXX
87.2038	997.7000	A10	sec-butylbenzene	0.0331	0.0318	0.0228	344.012	173.340	XXX
87.3275	998.4900		unknown	0.0149	0.0176	0.0103	344.012	173.340	XXX
87.5623	1000.0000	P10	n-decane	0.8065	0.9139	0.5236	345.470	174.150	XXX

Bakken 1554 Analysis

Crude Oil Type: Bakken
Date of Sample: May 18, 2020
Location of Sample: Nederland Terminal; T-1554 DAPL Line

Sample ID: 2020-NEDR-000814-003 Product: BAKKEN T-1554, DAPL Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: T-1554. DAPL Line

Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.08 Sample Den: 0.81

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	12.34	15.41	14.11
I-Paraffins:	12.40	14.53	11.26
Olefins:	0.00	0.00	0.00
Naphthenes:	11.19	11.75	10.11
Aromatics:	3.22	2.99	2.82
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.88	1.01	0.80

Oxygenates:

Total: 0.00(Mass%) 0.00(Vol%)

Total Oxygen Content: 0.00(Mass%)

Multisubstituted Aromatics: 2.15(Mass%) 2.00(Vol%)

Average Molecular Weight: 87.73

Relative Density: 0.66

Reid Vapor Pressure @ 100F: 6.76psi - 46.60kPa

Calculated Octane Number: 64.9

Motor Octane Number (Jenkins Calculation): 62.1

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	-43.67	155.71	T50	T90	FBP
BP by Vol (Deg F)	-43.67	155.71	T50	T90	FBP

Percent Carbon: 84.93 Percent Hydrogen: 15.07

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	8.30
Light Ends (C2s-C5s Vol %)	8.50

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: T-1554. DAPL Line

Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.08 Sample Den: 0.81

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	72.04	0.63
C6	85.31	0.69
C7	98.82	0.72
C8	112.44	0.75
C9	125.92	0.77
C10	141.80	0.75
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	87.70	0.66

Octane Number

Research Octane Number: 64.9

Motor Octane Number: 62.1

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line
Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.08 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.06	0.00	0.00	0.00	0.00	0.00	0.06
C3	0.63	0.00	0.00	0.00	0.00	0.00	0.63
C4	1.68	0.33	0.00	0.00	0.00	0.00	2.01
C5	2.28	1.07	0.00	0.19	0.00	0.00	3.53
C6	2.04	2.00	0.00	1.64	0.19	0.00	5.88
C7	1.95	1.96	0.00	3.50	0.43	0.00	7.84
C8	1.54	2.61	0.00	3.21	1.00	0.03	8.39
C9	1.15	2.55	0.00	2.12	1.53	0.27	7.62
C10	1.02	1.89	0.00	0.52	0.07	0.58	4.08
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.34	12.40	0.00	11.19	3.22	0.88	39.16

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.88 Grand Total: 40.03

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.14	0.00	0.00	0.00	0.00	0.00	0.14
C3	1.02	0.00	0.00	0.00	0.00	0.00	1.02
C4	2.34	0.47	0.00	0.00	0.00	0.00	2.81
C5	2.93	1.39	0.00	0.20	0.00	0.00	4.53
C6	2.50	2.45	0.00	1.75	0.18	0.00	6.87
C7	2.30	2.31	0.00	3.73	0.40	0.00	8.74
C8	1.76	3.00	0.00	3.36	0.93	0.04	9.08
C9	1.29	2.85	0.00	2.19	1.42	0.31	8.05
C10	1.12	2.07	0.00	0.53	0.07	0.67	4.45
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	15.41	14.53	0.00	11.75	2.99	1.01	44.68

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 1.01 Grand Total: 45.69

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line
Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.08 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.19	0.00	0.00	0.00	0.00	0.00	0.19
C3	1.36	0.00	0.00	0.00	0.00	0.00	1.36
C4	2.73	0.53	0.00	0.00	0.00	0.00	3.26
C5	2.98	1.40	0.00	0.25	0.00	0.00	4.63
C6	2.24	2.19	0.00	1.84	0.24	0.00	6.51
C7	1.84	1.85	0.00	3.37	0.44	0.00	7.50
C8	1.27	2.16	0.00	2.70	0.89	0.03	7.04
C9	0.85	1.88	0.00	1.59	1.20	0.31	5.82
C10	0.67	1.25	0.00	0.35	0.05	0.47	2.79
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	14.11	11.26	0.00	10.11	2.82	0.80	38.29

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.80	Grand Total:	39.09

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6905	200.0000	P2	ethane	0.0594	0.1409	0.1865	-127.480	-88.600	XXX
6.9499	300.0000	P3	propane	0.6346	1.0225	1.3587	-43.672	-42.040	XXX
7.3548	367.6700	I4	i-butane	0.3268	0.4730	0.5309	10.904	-11.720	XXX
7.7019	400.0000	P4	n-butane	1.6796	2.3403	2.7285	31.100	-0.500	XXX
7.8782	414.6500	I5	2,2-dimethylpropane	0.0036	0.0049	0.0047	49.100	9.500	XXX
8.9735	475.2800	I5	i-pentane	1.0665	1.3882	1.3957	82.112	27.840	XXX
9.6601	500.0000	P5	n-pentane	2.2752	2.9303	2.9775	96.908	36.060	XXX
10.9615	534.9800	I6	2,2-dimethylbutane	0.0201	0.0250	0.0220	121.514	49.730	XXX
12.3437	562.1000	N5	cyclopentane	0.1865	0.2018	0.2511	120.650	49.250	XXX
12.4142	563.3000	I6	2,3-dimethylbutane	0.1079	0.1315	0.1182	136.364	57.980	XXX
12.6359	566.9800	I6	2-methylpentane	1.1142	1.3759	1.2208	140.468	60.260	XXX
13.5394	580.7000	I6	3-methylpentane	0.7565	0.9185	0.8289	145.886	63.270	XXX
15.0444	600.0000	P6	n-hexane	2.0406	2.4958	2.2358	155.714	68.730	XXX
18.3798	627.9300	I7	2,2-dimethylpentane	0.0265	0.0318	0.0250	174.542	79.190	XXX
18.7479	630.5100	N6	methylcyclopentane	1.0460	1.1269	1.1735	161.240	71.800	XXX
19.3467	634.5400	I7	2,4-dimethylpentane	0.0780	0.0935	0.0735	176.882	80.490	XXX
20.2243	640.1300	I7	2,2,3-trimethylbutane	0.0038	0.0044	0.0036	177.584	80.880	XXX
22.7356	654.3100	A6	benzene	0.1950	0.1789	0.2357	176.162	80.090	XXX
23.8132	659.7300	I7	3,3-dimethylpentane	0.0196	0.0228	0.0185	186.908	86.060	XXX
24.5101	663.0500	N6	cyclohexane	0.5984	0.6199	0.6713	177.296	80.720	XXX
26.4912	671.8400	I7	2-methylhexane	0.6018	0.7152	0.5671	194.090	90.050	XXX
26.8177	673.2100	I7	2,3-dimethylpentane	0.2652	0.3077	0.2499	193.604	89.780	XXX
27.3829	675.5200	N7	1,1-dimethylcyclopentane	0.1846	0.1973	0.1775	189.464	87.480	XXX
28.4576	679.7400	I7	3-methylhexane	0.8818	1.0350	0.8309	197.330	91.850	XXX
29.8864	685.0400	N7	1c,3-dimethylcyclopentane	0.4326	0.4684	0.4160	195.386	90.770	XXX
30.5669	687.4600	N7	1t,3-dimethylcyclopentane	0.4068	0.4382	0.3912	197.096	91.720	XXX
30.9450	688.7700	I7	3-ethylpentane	0.0837	0.0967	0.0789	200.246	93.470	XXX
31.2249	689.7300	N7	1t,2-dimethylcyclopentane	0.7929	0.8510	0.7625	197.366	91.870	XXX
34.4376	700.0000	P7	n-heptane	1.9492	2.2993	1.8367	209.156	98.420	XXX
38.6642	724.4900	N7	1c,2-dimethylcyclopentane	0.0854	0.0941	0.0821	211.154	99.530	XXX
38.8079	725.2600	N7	methylcyclohexane	1.4554	1.5256	1.3996	213.674	100.930	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
39.5900	729.4200	I8	2,2-dimethylhexane	0.2933	0.3402	0.2424	224.312	106.840	XXX
41.5080	739.2100	N7	ethylcyclopentane	0.1463	0.1540	0.1407	218.246	103.470	XXX
41.9467	741.3800	I8	2,5-dimethylhexane	0.0772	0.0898	0.0638	228.398	109.110	XXX
42.3531	743.3600	I8	2,4-dimethylhexane	0.1319	0.1519	0.1090	228.974	109.430	XXX
43.4763	748.7200	N8	1c,2t,4-trimethylcyclopentane	0.3510	0.3708	0.2953	242.132	116.740	XXX
43.8119	750.2900	I8	3,3-dimethylhexane	0.0372	0.0423	0.0308	233.546	111.970	XXX
45.0624	756.0100	N8	1t,2c,3-trimethylcyclopentane	0.3840	0.4020	0.3231	230.738	110.410	XXX
45.6938	758.8300	I8	2,3,4-trimethylpentane	0.0112	0.0126	0.0093	236.246	113.470	XXX
46.4428	762.1200	A7	toluene	0.4310	0.4009	0.4416	231.134	110.630	XXX
48.0890	769.1400	I8	2,3-dimethylhexane	0.1995	0.2260	0.1649	240.098	115.610	XXX
48.3201	770.1000	I8	2-methyl-3-ethylpentane	0.0577	0.0654	0.0477	240.098	115.610	XXX
49.4012	774.5300	I8	2-methylheptane	0.7929	0.9163	0.6554	243.770	117.650	XXX
49.6980	775.7300	I8	4-methylheptane	0.2946	0.3372	0.2435	243.878	117.710	XXX
49.8575	776.3700	I8	3-methyl-3-ethylpentane	0.0471	0.0534	0.0390	240.098	115.610	XXX
49.9804	776.8600	I8	3,4-dimethylhexane	0.0664	0.0745	0.0549	243.914	117.730	XXX
50.3933	778.5000		unknown	0.0307	0.0353	0.0254	243.914	117.730	XXX
50.4599	778.7600	N8	1c,3-dimethylcyclohexane	0.0257	0.0272	0.0216	246.848	119.360	XXX
50.9284	780.6000	I8	3-methylheptane	0.4912	0.5612	0.4060	246.074	118.930	XXX
51.0847	781.2100	N8	1c,2t,3-trimethylcyclopentane	0.7390	0.7737	0.6218	243.500	117.500	XXX
51.2343	781.7900	I8	3-ethylhexane	0.1104	0.1247	0.0912	245.372	118.540	XXX
51.4746	782.7200	N8	1t,4-dimethylcyclohexane	0.2395	0.2534	0.2016	246.848	119.360	XXX
52.5528	786.8400	N8	1,1-dimethylcyclohexane	0.0744	0.0769	0.0626	247.190	119.550	XXX
53.0953	788.8700	I9	2,2,5-trimethylhexane	0.0026	0.0030	0.0019	255.362	124.090	XXX
53.3204	789.7100	N8	3t-ethylmethylcyclopentane	0.0817	0.0859	0.0687	249.980	121.100	XXX
53.7410	791.2600	N8	3c-ethylmethylcyclopentane	0.0742	0.0780	0.0624	249.980	121.100	XXX
53.9826	792.1500	N8	2t-ethylmethylcyclopentane	0.1918	0.2011	0.1613	250.160	121.200	XXX
54.3756	793.5800	N8	1,1-methylethylcyclopentane	0.0295	0.0305	0.0249	250.754	121.530	XXX
54.9087	795.5000	N8	1t,2-dimethylcyclohexane	0.3137	0.3261	0.2640	254.174	123.430	XXX
56.1792	800.0000	P8	n-octane	1.5363	1.7637	1.2698	258.224	125.680	XXX
56.2883	800.7300	N8	i-propylcyclopentane	0.1946	0.2021	0.1637	259.574	126.430	XXX
57.6203	809.6200		unknown	0.0090	0.0104	0.0076	259.574	126.430	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
57.7048	810.1800	I9	2,4,4-trimethylhexane	0.0432	0.0471	0.0318	32.000	0.000	XXX
58.1613	813.1700		unknown	0.0032	0.0037	0.0024	32.000	0.000	XXX
58.3822	814.6000		unknown	0.0080	0.0093	0.0237	32.000	0.000	XXX
58.7958	817.2700		unknown	0.0318	0.0366	0.0937	32.000	0.000	XXX
59.2066	819.9100	I9	2,3,4-trimethylhexane	0.0215	0.0235	0.0158	282.308	139.060	XXX
59.5470	822.0800	I9	2,2,3,4-tetramethylpentane	0.0245	0.0267	0.0180	271.454	133.030	XXX
59.8410	823.9400	N8	N8-[1]	0.0204	0.0211	0.0172	271.454	133.030	XXX
60.6023	828.7100	N8	1c,2-dimethylcyclohexane	0.1483	0.1502	0.1248	265.532	129.740	XXX
60.7711	829.7500	I9	2,3,5-trimethylhexane	0.0436	0.0487	0.0321	268.430	131.350	XXX
60.9083	830.6000	I9	2,2-dimethylheptane	0.0185	0.0210	0.0136	270.860	132.700	XXX
61.1262	831.9500	N8	N8-[2]	0.0177	0.0183	0.0149	270.860	132.700	XXX
61.4808	834.1300		unknown	0.0717	0.0826	0.0603	270.860	132.700	XXX
61.5763	834.7100	N9	1,1,4-trimethylcyclohexane	0.4371	0.4566	0.3270	275.000	135.000	XXX
61.7482	835.7600	I9	2,2,3-trimethylhexane	0.2772	0.3125	0.2040	271.220	132.900	XXX
62.1424	838.1500	I9	2,4-dimethylheptane	0.0473	0.0534	0.0349	271.220	132.900	XXX
62.5350	840.5200	N8	n-propylcyclopentane	0.3274	0.3402	0.2755	267.728	130.960	XXX
62.9077	842.7500	I9	2,5-dimethylheptane	0.1841	0.2072	0.1355	276.800	136.000	XXX
63.0992	843.8900	N9	*1c,3c,5-trimethylcyclohexane	0.0312	0.0327	0.0233	281.174	138.430	XXX
63.1777	844.3600	I9	3,3-dimethylheptane	0.0164	0.0183	0.0121	278.636	137.020	XXX
63.4017	845.6800	I9	3,5-dimethylheptane	0.0519	0.0580	0.0382	276.800	136.000	XXX
63.6295	847.0300	I9	2,6-dimethylheptane	0.0677	0.0770	0.0498	275.396	135.220	XXX
63.7041	847.4700		unknown	0.0257	0.0296	0.0189	275.396	135.220	XXX
63.8909	848.5700	N9	1,1,3-trimethylcyclohexane	0.0443	0.0453	0.0331	295.862	146.590	XXX
64.6266	852.8500	N9	1c,3c,5c-trimethylcyclohexane	0.0241	0.0250	0.0181	32.000	0.000	XXX
64.7299	853.4500	A8	ethylbenzene	0.0920	0.0856	0.0819	277.160	136.200	XXX
64.8431	854.1000	N9	1c,2t,4t-trimethylcyclohexane	0.1477	0.1528	0.1105	32.000	0.000	XXX
65.1795	856.0400	I9	I9-[1]	0.2113	0.2335	0.1556	32.000	0.000	XXX
65.5728	858.2900	N9	N9-[1]	0.0199	0.0205	0.0148	32.000	0.000	XXX
65.8374	859.7900	N9	N9-[2]	0.0129	0.0134	0.0097	32.000	0.000	XXX
66.1957	861.8200	A8	1,3-dimethylbenzene	0.4187	0.3908	0.3724	282.416	139.120	XXX
66.4061	863.0000	A8	1,4-dimethylbenzene	0.2809	0.2631	0.2498	281.048	138.360	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
66.7417	864.8800	I9	3,4-dimethylheptane	0.0438	0.0484	0.0323	285.080	140.600	XXX
66.8784	865.6400	N9	N9-[3]	0.0541	0.0560	0.0405	285.080	140.600	XXX
67.2193	867.5400	I9	4-ethylheptane	0.1020	0.1142	0.0751	288.392	142.440	XXX
67.2925	867.9400	I9	I9-[2]	0.0160	0.0177	0.0118	288.392	142.440	XXX
67.5779	869.5200		unknown	0.0097	0.0112	0.0072	288.392	142.440	XXX
67.7019	870.2000	I9	4-methyloctane	0.2538	0.2842	0.1869	288.392	142.440	XXX
67.8715	871.1300	I9	2-methyloctane	0.2756	0.3116	0.2029	289.904	143.280	XXX
68.3659	873.8300	N9	1c,2t,3c-trimethylcyclohexane	0.0118	0.0126	0.0089	304.160	151.200	XXX
68.5065	874.6000	I9	3-ethylheptane	0.0267	0.0296	0.0197	289.400	143.000	XXX
68.7534	875.9300	I9	3,3-diethylpentane	0.0860	0.0915	0.0633	270.842	132.690	XXX
68.9641	877.0700	I9	3-methyloctane	0.4978	0.5573	0.3665	291.614	144.230	XXX
69.2640	878.6800	N9	1c,2t,4c-trimethylcyclohexane	0.0321	0.0336	0.0240	275.000	135.000	XXX
69.4616	879.7400		unknown	0.0423	0.0487	0.0316	275.000	135.000	XXX
69.7452	881.2500	N9	1,1,2-trimethylcyclohexane	0.0381	0.0384	0.0285	293.360	145.200	XXX
69.9311	882.2400	A8	1,2-dimethylbenzene	0.2056	0.1883	0.1828	291.974	144.430	XXX
70.0815	883.0300	I9	I9-[3]	0.0421	0.0465	0.0310	291.974	144.430	XXX
70.1514	883.4000	I9	I9-[4]	0.0246	0.0272	0.0181	291.974	144.430	XXX
70.2624	883.9900		unknown	0.0124	0.0142	0.0091	291.974	144.430	XXX
70.5214	885.3500	N9	N9-[4]	0.0127	0.0131	0.0095	291.974	144.430	XXX
70.8726	887.2000	N9	N9-[5]	0.1621	0.1676	0.1213	291.974	144.430	XXX
71.0748	888.2500	N9	N9-[6]	0.2611	0.2700	0.1953	291.974	144.430	XXX
71.4551	890.2300	I9	I9-[5]	0.1271	0.1405	0.0936	291.974	144.430	XXX
71.5423	890.6800	I9	I9-[6]	0.0318	0.0352	0.0234	291.974	144.430	XXX
71.8492	892.2600	N9	i-butylcyclopentane	0.0294	0.0304	0.0220	298.346	147.970	XXX
72.0790	893.4400		unknown	0.0328	0.0378	0.0246	298.346	147.970	XXX
72.1589	893.8500	N9	N9-[7]	0.0095	0.0098	0.0071	298.346	147.970	XXX
72.3113	894.6300		unknown	0.0130	0.0149	0.0097	298.346	147.970	XXX
73.0833	898.5600		unknown	0.0058	0.0066	0.0170	298.346	147.970	XXX
73.2093	899.1900	I9	I9-[7]	0.0123	0.0136	0.0091	298.346	147.970	XXX
73.3688	900.0000	P9	n-nonane	1.1502	1.2926	0.8467	303.476	150.820	XXX
73.5543	901.4300	N9	1,1-methylethylcyclohexane	0.0966	0.0966	0.0722	305.924	152.180	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
73.7565	903.0000	N9	N9-[8]	0.0427	0.0436	0.0319	305.924	152.180	XXX
74.0782	905.4700	N9	N9-[9]	0.2053	0.2096	0.1535	305.924	152.180	XXX
74.2868	907.0700		unknown	0.0055	0.0063	0.0162	305.924	152.180	XXX
74.5274	908.9100	N9	N9-[10]	0.0459	0.0468	0.0343	305.924	152.180	XXX
75.1697	913.7900	A9	i-propylbenzene	0.0356	0.0333	0.0280	306.338	152.410	XXX
75.2693	914.5400		unknown	0.0052	0.0060	0.0153	306.338	152.410	XXX
75.4882	916.1900	I10	I10-[1]	0.0371	0.0410	0.0246	306.338	152.410	XXX
75.7710	918.3100	N9	N9-[11]	0.1513	0.1545	0.1132	306.338	152.410	XXX
76.0219	920.1900	I10	I10-[2]	0.0938	0.1037	0.0623	306.338	152.410	XXX
76.3014	922.2700	I10	2,4-dimethyloctane	0.0598	0.0663	0.0397	312.620	155.900	XXX
76.3755	922.8200		unknown	0.0131	0.0151	0.0087	312.620	155.900	XXX
76.6308	924.7100	N9	N9-[12]	0.0245	0.0250	0.0183	312.620	155.900	XXX
76.7210	925.3800		unknown	0.0306	0.0353	0.0229	312.620	155.900	XXX
76.8809	926.5600	N9	N9-[13]	0.0075	0.0077	0.0056	312.620	155.900	XXX
77.1617	928.6300	I10	2,6-dimethyloctane	0.0166	0.0184	0.0110	320.738	160.410	XXX
77.3404	929.9400	I10	2,5-dimethyloctane	0.0869	0.0959	0.0576	317.300	158.500	XXX
77.5946	931.8000	N9	n-butylcyclopentane	0.2208	0.2270	0.1651	313.916	156.620	XXX
77.8282	933.5000		unknown	0.0368	0.0424	0.0275	313.916	156.620	XXX
77.9417	934.3300	I10	I10-[3]	0.0392	0.0433	0.0260	313.916	156.620	XXX
78.1376	935.7500	N10	N10-[1]	0.1118	0.1127	0.0753	313.916	156.620	XXX
78.3563	937.3300	I10	I10-[4]	0.0412	0.0456	0.0274	313.916	156.620	XXX
78.6470	939.4200	I10	3,3-dimethyloctane	0.2845	0.3104	0.1888	322.160	161.200	XXX
78.8509	940.8900		unknown	0.0701	0.0808	0.0465	322.160	161.200	XXX
79.0782	942.5200		unknown	0.0145	0.0167	0.0096	322.160	161.200	XXX
79.2542	943.7700		unknown	0.0619	0.0713	0.0411	322.160	161.200	XXX
79.4499	945.1700		unknown	0.0195	0.0225	0.0130	322.160	161.200	XXX
79.5565	945.9200	N10	N10-[2]	0.0950	0.0958	0.0640	322.160	161.200	XXX
79.7326	947.1700	A9	n-propylbenzene	0.2434	0.2277	0.1912	318.632	159.240	XXX
80.0783	949.6200		unknown	0.0413	0.0475	0.0324	318.632	159.240	XXX
80.2470	950.8100	N10	N10-[3]	0.0456	0.0460	0.0307	318.632	159.240	XXX
80.3903	951.8100		unknown	0.0235	0.0271	0.0158	318.632	159.240	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:21:54 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
80.6275	953.4800	A9	1,3-methylethylbenzene	0.1626	0.1517	0.1277	322.394	161.330	XXX
80.9279	955.5800	A9	1,4-methylethylbenzene	0.1017	0.0952	0.0799	323.618	162.010	XXX
81.4883	959.4700		unknown	0.0314	0.0362	0.0247	323.618	162.010	XXX
81.5758	960.0700	N10	N10-[4]	0.0580	0.0585	0.0391	323.618	162.010	XXX
81.6924	960.8800	A9	1,3,5-trimethylbenzene	0.3673	0.3424	0.2885	328.532	164.740	XXX
82.0121	963.0800	I10	I10-[5]	0.0419	0.0457	0.0278	328.532	164.740	XXX
82.2096	964.4400	I10	I10-[6]	0.0477	0.0520	0.0317	328.532	164.740	XXX
82.2821	964.9300	I10	5-methylnonane	0.0824	0.0907	0.0547	329.180	165.100	XXX
82.4191	965.8700		unknown	0.0275	0.0317	0.0182	329.180	165.100	XXX
82.5263	966.6000	I10	4-methylnonane	0.3256	0.3548	0.2160	32.000	0.000	XXX
82.8834	969.0300	A9	1,2-methylethylbenzene	0.1782	0.1632	0.1400	329.324	165.180	XXX
83.1288	970.7000	I10	2-methylnonane	0.0968	0.1075	0.0643	332.654	167.030	XXX
83.3683	972.3200	I10	3-ethyloctane	0.0608	0.0663	0.0404	331.700	166.500	XXX
83.6028	973.9000	N10	N10-[5]	0.0124	0.0125	0.0084	331.700	166.500	XXX
83.7893	975.1500	I10	3-methylnonane	0.2079	0.2286	0.1380	334.040	167.800	XXX
83.9655	976.3300		unknown	0.0597	0.0688	0.0396	334.040	167.800	XXX
84.0593	976.9600	N10	N10-[6]	0.0512	0.0517	0.0345	334.040	167.800	XXX
84.2474	978.2200		unknown	0.0197	0.0227	0.0133	334.040	167.800	XXX
84.4393	979.5000	I10	I10-[7]	0.0396	0.0432	0.0263	334.040	167.800	XXX
84.4750	979.7300		unknown	0.0313	0.0361	0.0208	334.040	167.800	XXX
84.8243	982.0500	I10	I10-[8]	0.0139	0.0151	0.0092	334.040	167.800	XXX
84.9997	983.2100	I10	I10-[9]	0.0044	0.0048	0.0029	334.040	167.800	XXX
85.1984	984.5200	A9	1,2,4-trimethylbenzene	0.4387	0.4040	0.3446	336.884	169.380	XXX
85.3672	985.6400	N10	i-butylcyclohexane	0.1319	0.1336	0.0888	340.340	171.300	XXX
85.5822	987.0500	I10	I10-[10]	0.1185	0.1291	0.0786	340.340	171.300	XXX
85.7814	988.3500	I10	I10-[11]	0.1365	0.1488	0.0906	340.340	171.300	XXX
85.9830	989.6700	I10	I10-[12]	0.0358	0.0391	0.0238	340.340	171.300	XXX
86.0576	990.1600		unknown	0.0149	0.0172	0.0099	340.340	171.300	XXX
86.2236	991.2400	N10	N10-[7]	0.0144	0.0145	0.0097	340.340	171.300	XXX
86.3536	992.0900		unknown	0.0381	0.0439	0.0257	340.340	171.300	XXX
86.5430	993.3100	I10	I10-[13]	0.0160	0.0174	0.0106	340.340	171.300	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-3-D7900.0001.CDF Acquired: 05/18/20 23:28:40
Sample: 20-NEDR-0814-3-D7900 Analyzed: 5/19/2020 3:29:01 AM
Processed 193 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1554. DAPL Line Yield: 40.03
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.08 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
86.8590	995.3600		unknown	0.0174	0.0201	0.0514	340.340	171.300	XXX
86.9786	996.1300	A10	i-butylbenzene	0.0255	0.0241	0.0179	343.022	172.790	XXX
87.2143	997.6500	A10	sec-butylbenzene	0.0478	0.0447	0.0336	344.012	173.340	XXX
87.3567	998.5600		unknown	0.0178	0.0205	0.0125	344.012	173.340	XXX
87.5802	1000.0000	P10	n-decane	1.0154	1.1218	0.6738	345.470	174.150	XXX

WTI 1590 Analysis

Crude Oil Type: West Texas Intermediate (WTI)
Date of Sample: May 19, 2020
Location of Sample: Nederland Terminal; T-1590

Sample ID: 2020-NEDR-000814-005 Product: WTI T-1590 Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.00 Sample Den: 0.81

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	10.23	12.74	11.39
I-Paraffins:	10.21	12.10	9.47
Olefins:	0.00	0.00	0.00
Naphthenes:	11.86	12.49	10.90
Aromatics:	2.98	2.78	2.68
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.59	0.68	0.52

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	1.63(Mass%)	1.52(Vol%)

Average Molecular Weight: 86.19

Relative Density: 0.66

Reid Vapor Pressure @ 100F: 4.76psi - 32.84kPa

Calculated Octane Number: 65.8

Motor Octane Number (Jenkins Calculation): 62.9

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	161.24	T50	T90	FBP
BP by Vol (Deg F)	-43.67	161.24	T50	T90	FBP

Percent Carbon: 84.99 Percent Hydrogen: 15.01

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	7.08
Light Ends (C2s-C5s Vol %)	7.32

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.00
Sample Den: 0.81

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	72.02	0.63
C6	85.06	0.70
C7	98.44	0.74
C8	112.26	0.75
C9	126.12	0.76
C10	141.83	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	86.20	0.66

Octane Number

Research Octane Number:	65.8
Motor Octane Number:	62.9

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.00
Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.43	0.00	0.00	0.00	0.00	0.00	0.43
C4	1.30	0.25	0.00	0.00	0.00	0.00	1.55
C5	1.93	1.25	0.00	0.22	0.00	0.00	3.41
C6	1.79	1.89	0.00	2.35	0.25	0.00	6.28
C7	1.63	1.64	0.00	4.16	0.69	0.00	8.12
C8	1.27	2.01	0.00	2.89	0.96	0.02	7.16
C9	0.98	1.93	0.00	1.88	1.02	0.22	6.03
C10	0.87	1.25	0.00	0.35	0.05	0.35	2.86
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	10.23	10.21	0.00	11.86	2.98	0.59	35.28

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.59
Grand Total: 35.86

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.08	0.00	0.00	0.00	0.00	0.00	0.08
C3	0.69	0.00	0.00	0.00	0.00	0.00	0.69
C4	1.82	0.36	0.00	0.00	0.00	0.00	2.18
C5	2.50	1.63	0.00	0.24	0.00	0.00	4.37
C6	2.20	2.32	0.00	2.49	0.23	0.00	7.24
C7	1.93	1.93	0.00	4.43	0.64	0.00	8.93
C8	1.46	2.31	0.00	3.03	0.90	0.02	7.73
C9	1.11	2.17	0.00	1.95	0.95	0.25	6.42
C10	0.96	1.37	0.00	0.35	0.05	0.40	3.13
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.74	12.10	0.00	12.49	2.78	0.68	40.10

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.68
Grand Total: 40.78

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.00
Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C3	0.91	0.00	0.00	0.00	0.00	0.00	0.91
C4	2.09	0.40	0.00	0.00	0.00	0.00	2.50
C5	2.50	1.62	0.00	0.30	0.00	0.00	4.42
C6	1.94	2.05	0.00	2.61	0.30	0.00	6.90
C7	1.52	1.53	0.00	3.96	0.70	0.00	7.71
C8	1.04	1.64	0.00	2.41	0.85	0.02	5.96
C9	0.71	1.41	0.00	1.39	0.80	0.24	4.55
C10	0.57	0.82	0.00	0.23	0.04	0.26	1.92
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.39	9.47	0.00	10.90	2.68	0.52	34.44

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.52	Grand Total:	34.96

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.00
Sample Den: 0.81

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6923	200.0000	P2	ethane	0.0327	0.0778	0.1016	-127.480	-88.600	XXX
6.9513	300.0000	P3	propane	0.4270	0.6904	0.9053	-43.672	-42.040	XXX
7.3562	367.6400	I4	i-butane	0.2495	0.3622	0.4012	10.904	-11.720	XXX
7.7033	400.0000	P4	n-butane	1.3024	1.8206	2.0947	31.100	-0.500	XXX
7.8760	414.3700	I5	2,2-dimethylpropane	0.0037	0.0050	0.0048	49.100	9.500	XXX
8.9750	475.2600	I5	i-pentane	1.2478	1.6294	1.6167	82.112	27.840	XXX
9.6621	500.0000	P5	n-pentane	1.9318	2.4960	2.5030	96.908	36.060	XXX
10.9618	534.9400	I6	2,2-dimethylbutane	0.0298	0.0371	0.0323	121.514	49.730	XXX
12.3458	562.1000	N5	cyclopentane	0.2230	0.2420	0.2972	120.650	49.250	XXX
12.4165	563.3000	I6	2,3-dimethylbutane	0.1129	0.1381	0.1225	136.364	57.980	XXX
12.6383	566.9900	I6	2-methylpentane	1.0389	1.2870	1.1270	140.468	60.260	XXX
13.5418	580.7100	I6	3-methylpentane	0.7065	0.8605	0.7664	145.886	63.270	XXX
15.0463	600.0000	P6	n-hexane	1.7903	2.1967	1.9421	155.714	68.730	XXX
18.3829	627.9400	I7	2,2-dimethylpentane	0.0270	0.0324	0.0252	174.542	79.190	XXX
18.7518	630.5300	N6	methylcyclopentane	1.0864	1.1742	1.2067	161.240	71.800	XXX
19.3495	634.5600	I7	2,4-dimethylpentane	0.0668	0.0804	0.0623	176.882	80.490	XXX
20.2311	640.1600	I7	2,2,3-trimethylbutane	0.0058	0.0068	0.0054	177.584	80.880	XXX
22.7348	654.3000	A6	benzene	0.2534	0.2333	0.3033	176.162	80.090	XXX
23.7995	659.6600	I7	3,3-dimethylpentane	0.0214	0.0250	0.0200	186.908	86.060	XXX
24.5027	663.0200	N6	cyclohexane	1.2629	1.3125	1.4028	177.296	80.720	XXX
26.4875	671.8300	I7	2-methylhexane	0.5323	0.6346	0.4966	194.090	90.050	XXX
26.8168	673.2100	I7	2,3-dimethylpentane	0.2063	0.2401	0.1925	193.604	89.780	XXX
27.3828	675.5200	N7	1,1-dimethylcyclopentane	0.1961	0.2102	0.1867	189.464	87.480	XXX
28.4573	679.7500	I7	3-methylhexane	0.7039	0.8289	0.6567	197.330	91.850	XXX
29.8896	685.0700	N7	1c,3-dimethylcyclopentane	0.3915	0.4253	0.3728	195.386	90.770	XXX
30.5629	687.4600	N7	1t,3-dimethylcyclopentane	0.3653	0.3948	0.3478	197.096	91.720	XXX
30.9467	688.7900	I7	3-ethylpentane	0.0718	0.0833	0.0670	200.246	93.470	XXX
31.2218	689.7300	N7	1t,2-dimethylcyclopentane	0.6942	0.7475	0.6609	197.366	91.870	XXX
34.4318	700.0000	P7	n-heptane	1.6332	1.9327	1.5237	209.156	98.420	XXX
38.6517	724.4500	N7	1c,2-dimethylcyclopentane	0.0660	0.0730	0.0629	211.154	99.530	XXX
38.8099	725.3100	N7	methylcyclohexane	2.2896	2.4078	2.1800	213.674	100.930	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900 Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.00 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
39.5809	729.4100	I8	2,2-dimethylhexane	0.2435	0.2833	0.1992	224.312	106.840	XXX
41.5011	739.2100	N7	ethylcyclopentane	0.1595	0.1684	0.1519	218.246	103.470	XXX
41.9440	741.3900	I8	2,5-dimethylhexane	0.0734	0.0856	0.0601	228.398	109.110	XXX
42.3502	743.3700	I8	2,4-dimethylhexane	0.0960	0.1109	0.0785	228.974	109.430	XXX
43.4764	748.7500	N8	1c,2t,4-trimethylcyclopentane	0.2479	0.2627	0.2065	242.132	116.740	XXX
43.8120	750.3200	I8	3,3-dimethylhexane	0.0269	0.0307	0.0220	233.546	111.970	XXX
45.0590	756.0300	N8	1t,2c,3-trimethylcyclopentane	0.3066	0.3220	0.2554	230.738	110.410	XXX
45.6875	758.8300	I8	2,3,4-trimethylpentane	0.0083	0.0094	0.0068	236.246	113.470	XXX
46.4357	762.1200	A7	toluene	0.6859	0.6401	0.6959	231.134	110.630	XXX
48.0831	769.1400	I8	2,3-dimethylhexane	0.1510	0.1716	0.1236	240.098	115.610	XXX
48.3156	770.1100	I8	2-methyl-3-ethylpentane	0.0389	0.0442	0.0318	240.098	115.610	XXX
49.3952	774.5300	I8	2-methylheptane	0.6753	0.7830	0.5527	243.770	117.650	XXX
49.6939	775.7400	I8	4-methylheptane	0.2024	0.2325	0.1657	243.878	117.710	XXX
49.8509	776.3700	I8	3-methyl-3-ethylpentane	0.0283	0.0321	0.0231	240.098	115.610	XXX
49.9773	776.8700	I8	3,4-dimethylhexane	0.0324	0.0364	0.0265	243.914	117.730	XXX
50.3809	778.4800		unknown	0.0214	0.0248	0.0175	243.914	117.730	XXX
50.4630	778.8000	N8	1c,3-dimethylcyclohexane	0.0185	0.0197	0.0154	246.848	119.360	XXX
50.9212	780.6000	I8	3-methylheptane	0.3385	0.3880	0.2770	246.074	118.930	XXX
51.0813	781.2200	N8	1c,2t,3-trimethylcyclopentane	0.7121	0.7479	0.5932	243.500	117.500	XXX
51.2075	781.7200	I8	3-ethylhexane	0.0938	0.1063	0.0767	245.372	118.540	XXX
51.4623	782.7000	N8	1t,4-dimethylcyclohexane	0.2417	0.2565	0.2013	246.848	119.360	XXX
52.5521	786.8600	N8	1,1-dimethylcyclohexane	0.0860	0.0891	0.0716	247.190	119.550	XXX
53.3133	789.7000	N8	3t-ethylmethylcyclopentane	0.0743	0.0784	0.0619	249.980	121.100	XXX
53.7306	791.2400	N8	3c-ethylmethylcyclopentane	0.0676	0.0713	0.0563	249.980	121.100	XXX
53.9784	792.1500	N8	2t-ethylmethylcyclopentane	0.1774	0.1867	0.1478	250.160	121.200	XXX
54.3675	793.5700	N8	1,1-methylethylcyclopentane	0.0241	0.0249	0.0201	250.754	121.530	XXX
54.9055	795.5100	N8	1t,2-dimethylcyclohexane	0.3186	0.3322	0.2654	254.174	123.430	XXX
56.1729	800.0000	P8	n-octane	1.2681	1.4605	1.0378	258.224	125.680	XXX
56.2850	800.7500	N8	i-propylcyclopentane	0.1527	0.1591	0.1272	259.574	126.430	XXX
57.6267	809.7100		unknown	0.0117	0.0135	0.0097	259.574	126.430	XXX
57.6985	810.1800	I9	2,4,4-trimethylhexane	0.0278	0.0304	0.0203	32.000	0.000	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900 Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.00 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
58.7790	817.2100		unknown	0.0244	0.0282	0.0713	32.000	0.000	XXX
59.2057	819.9500	I9	2,3,4-trimethylhexane	0.0137	0.0150	0.0100	282.308	139.060	XXX
59.5372	822.0600	I9	2,2,3,4-tetramethylpentane	0.0229	0.0251	0.0167	271.454	133.030	XXX
59.8400	823.9700	N8	N8-[1]	0.0135	0.0140	0.0113	271.454	133.030	XXX
60.6025	828.7500	N8	1c,2-dimethylcyclohexane	0.1172	0.1191	0.0977	265.532	129.740	XXX
60.7557	829.7000	I9	2,3,5-trimethylhexane	0.0305	0.0342	0.0222	268.430	131.350	XXX
60.8591	830.3400	I9	2,2-dimethylheptane	0.0107	0.0121	0.0078	270.860	132.700	XXX
61.1264	832.0000	N8	N8-[2]	0.0105	0.0109	0.0087	270.860	132.700	XXX
61.4625	834.0600		unknown	0.0483	0.0559	0.0403	270.860	132.700	XXX
61.5669	834.7000	N9	1,1,4-trimethylcyclohexane	0.5361	0.5617	0.3970	275.000	135.000	XXX
61.7411	835.7600	I9	2,2,3-trimethylhexane	0.2656	0.3004	0.1936	271.220	132.900	XXX
62.1360	838.1600	I9	2,4-dimethylheptane	0.0256	0.0290	0.0187	271.220	132.900	XXX
62.5234	840.5000	N8	n-propylcyclopentane	0.3248	0.3385	0.2706	267.728	130.960	XXX
62.9033	842.7700	I9	2,5-dimethylheptane	0.1392	0.1572	0.1015	276.800	136.000	XXX
63.3922	845.6800	I9	3,5-dimethylheptane	0.0354	0.0396	0.0258	276.800	136.000	XXX
63.6199	847.0200	I9	2,6-dimethylheptane	0.0464	0.0529	0.0338	275.396	135.220	XXX
63.6883	847.4200		unknown	0.0199	0.0230	0.0145	275.396	135.220	XXX
63.8809	848.5500	N9	1,1,3-trimethylcyclohexane	0.0354	0.0364	0.0262	295.862	146.590	XXX
64.6208	852.8700	N9	1c,3c,5c-trimethylcyclohexane	0.0255	0.0265	0.0189	32.000	0.000	XXX
64.7142	853.4100	A8	ethylbenzene	0.1489	0.1390	0.1311	277.160	136.200	XXX
64.8301	854.0800	N9	1c,2t,4t-trimethylcyclohexane	0.1088	0.1129	0.0806	32.000	0.000	XXX
65.1716	856.0400	I9	I9-[1]	0.1730	0.1917	0.1261	32.000	0.000	XXX
65.5630	858.2800	N9	N9-[1]	0.0224	0.0232	0.0166	32.000	0.000	XXX
65.8142	859.7100	N9	N9-[2]	0.0113	0.0117	0.0083	32.000	0.000	XXX
66.1884	861.8200	A8	1,3-dimethylbenzene	0.4018	0.3762	0.3538	282.416	139.120	XXX
66.3900	862.9600	A8	1,4-dimethylbenzene	0.2437	0.2290	0.2146	281.048	138.360	XXX
66.7390	864.9100	I9	3,4-dimethylheptane	0.0238	0.0264	0.0174	285.080	140.600	XXX
66.8743	865.6700	N9	N9-[3]	0.0301	0.0312	0.0223	285.080	140.600	XXX
67.2038	867.5000	I9	4-ethylheptane	0.0761	0.0855	0.0555	288.392	142.440	XXX
67.2813	867.9300	I9	I9-[2]	0.0197	0.0218	0.0144	288.392	142.440	XXX
67.5382	869.3500		unknown	0.0142	0.0164	0.0104	288.392	142.440	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900 Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.00 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
67.6898	870.1800	I9	4-methyloctane	0.1633	0.1834	0.1190	288.392	142.440	XXX
67.8608	871.1200	I9	2-methyloctane	0.2077	0.2356	0.1514	289.904	143.280	XXX
68.3598	873.8500		unknown	0.0102	0.0118	0.0298	289.904	143.280	XXX
68.5064	874.6400	I9	3-ethylheptane	0.0329	0.0367	0.0240	289.400	143.000	XXX
68.7581	876.0100	I9	3,3-diethylpentane	0.0528	0.0563	0.0385	270.842	132.690	XXX
68.9551	877.0700	I9	3-methyloctane	0.3595	0.4037	0.2620	291.614	144.230	XXX
69.2577	878.7000	N9	1c,2t,4c-trimethylcyclohexane	0.0277	0.0291	0.0205	275.000	135.000	XXX
69.4427	879.6900		unknown	0.0321	0.0372	0.0238	275.000	135.000	XXX
69.7399	881.2700	N9	1,1,2-trimethylcyclohexane	0.0315	0.0319	0.0233	293.360	145.200	XXX
69.9179	882.2200	A8	1,2-dimethylbenzene	0.1690	0.1554	0.1488	291.974	144.430	XXX
70.0744	883.0500	I9	I9-[3]	0.0399	0.0443	0.0291	291.974	144.430	XXX
70.1488	883.4400		unknown	0.0224	0.0259	0.0163	291.974	144.430	XXX
70.2501	883.9800	I9	I9-[4]	0.0107	0.0118	0.0078	291.974	144.430	XXX
70.4977	885.2800	N9	N9-[4]	0.0109	0.0113	0.0081	291.974	144.430	XXX
70.8592	887.1800	N9	N9-[5]	0.1167	0.1210	0.0864	291.974	144.430	XXX
71.0670	888.2600	N9	N9-[6]	0.2414	0.2504	0.1788	291.974	144.430	XXX
71.4508	890.2600	I9	I9-[5]	0.1072	0.1188	0.0781	291.974	144.430	XXX
71.5183	890.6100	I9	I9-[6]	0.0356	0.0394	0.0259	291.974	144.430	XXX
71.8386	892.2600	N9	i-butylcyclopentane	0.0243	0.0252	0.0180	298.346	147.970	XXX
72.0704	893.4500		unknown	0.0259	0.0299	0.0192	298.346	147.970	XXX
72.1286	893.7500	N9	N9-[7]	0.0105	0.0109	0.0078	298.346	147.970	XXX
72.2778	894.5100		unknown	0.0087	0.0101	0.0064	298.346	147.970	XXX
73.2095	899.2500	I9	I9-[7]	0.0128	0.0141	0.0093	298.346	147.970	XXX
73.3583	900.0000	P9	n-nonane	0.9801	1.1051	0.7144	303.476	150.820	XXX
73.5459	901.4500	N9	1,1-methylethylcyclohexane	0.0650	0.0652	0.0481	305.924	152.180	XXX
73.7376	902.9300	N9	N9-[8]	0.0239	0.0245	0.0177	305.924	152.180	XXX
74.0690	905.4800	N9	N9-[9]	0.1648	0.1688	0.1220	305.924	152.180	XXX
74.5142	908.8900	N9	N9-[10]	0.0396	0.0405	0.0293	305.924	152.180	XXX
75.1396	913.6400	A9	i-propylbenzene	0.0389	0.0365	0.0302	306.338	152.410	XXX
75.4624	916.0800	I10	I10-[1]	0.0229	0.0254	0.0151	306.338	152.410	XXX
75.7524	918.2600	N9	N9-[11]	0.1330	0.1363	0.0985	306.338	152.410	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF
Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900
Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE
Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.00
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
76.0092	920.1800	I10	I10-[2]	0.0951	0.1055	0.0625	306.338	152.410	XXX
76.2948	922.3100	I10	2,4-dimethyloctane	0.0363	0.0405	0.0239	312.620	155.900	XXX
76.3425	922.6600		unknown	0.0152	0.0175	0.0100	312.620	155.900	XXX
76.6496	924.9400	N9	N9-[12]	0.0111	0.0113	0.0082	312.620	155.900	XXX
76.7184	925.4500		unknown	0.0237	0.0274	0.0175	312.620	155.900	XXX
77.1550	928.6600	I10	2,6-dimethyloctane	0.0094	0.0104	0.0062	320.738	160.410	XXX
77.3208	929.8800	I10	2,5-dimethyloctane	0.0633	0.0702	0.0416	317.300	158.500	XXX
77.5837	931.8000	N9	n-butylcyclopentane	0.2091	0.2157	0.1549	313.916	156.620	XXX
77.8256	933.5700		unknown	0.0281	0.0324	0.0208	313.916	156.620	XXX
77.9226	934.2700	I10	I10-[3]	0.0269	0.0298	0.0177	313.916	156.620	XXX
78.1243	935.7400	N10	N10-[1]	0.0732	0.0740	0.0488	313.916	156.620	XXX
78.3561	937.4100	I10	I10-[4]	0.0244	0.0271	0.0161	313.916	156.620	XXX
78.6323	939.4000	I10	3,3-dimethyloctane	0.2463	0.2696	0.1618	322.160	161.200	XXX
78.8369	940.8800		unknown	0.0453	0.0523	0.0297	322.160	161.200	XXX
79.2378	943.7400		unknown	0.0408	0.0471	0.0268	322.160	161.200	XXX
79.4500	945.2600		unknown	0.0127	0.0147	0.0084	322.160	161.200	XXX
79.5443	945.9300	N10	N10-[2]	0.0799	0.0808	0.0532	322.160	161.200	XXX
79.7243	947.2000	A9	n-propylbenzene	0.1721	0.1615	0.1338	318.632	159.240	XXX
80.0611	949.5900		unknown	0.0231	0.0268	0.0180	318.632	159.240	XXX
80.2251	950.7400	N10	N10-[3]	0.0302	0.0305	0.0201	318.632	159.240	XXX
80.3968	951.9500		unknown	0.0152	0.0175	0.0101	318.632	159.240	XXX
80.6156	953.4800	A9	1,3-methylethylbenzene	0.1223	0.1145	0.0952	322.394	161.330	XXX
80.9146	955.5700	A9	1,4-methylethylbenzene	0.0917	0.0862	0.0713	323.618	162.010	XXX
81.4545	959.3200		unknown	0.0117	0.0135	0.0091	323.618	162.010	XXX
81.5525	960.0000	N10	N10-[4]	0.0321	0.0325	0.0214	323.618	162.010	XXX
81.6634	960.7700	A9	1,3,5-trimethylbenzene	0.2572	0.2406	0.2001	328.532	164.740	XXX
81.9988	963.0800	I10	I10-[5]	0.0212	0.0232	0.0139	328.532	164.740	XXX
82.1602	964.1900	I10	I10-[6]	0.0354	0.0387	0.0233	328.532	164.740	XXX
82.2721	964.9500	I10	5-methylnonane	0.0466	0.0514	0.0306	329.180	165.100	XXX
82.4208	965.9700		unknown	0.0231	0.0267	0.0152	329.180	165.100	XXX
82.5153	966.6200	I10	4-methylnonane	0.1907	0.2085	0.1253	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/19/2020 4:09:39 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-5-D7900.0001.CDF Acquired: 05/19/20 05:54:54
Sample: 20-NEDR-0814-5-D7900 Analyzed: 5/19/2020 4:09:39 PM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1590 LINE Yield: 35.86
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.00 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
82.8666	969.0100	A9	1,2-methylethylbenzene	0.1148	0.1055	0.0893	329.324	165.180	XXX
83.1189	970.7200	I10	2-methylnonane	0.0553	0.0616	0.0363	332.654	167.030	XXX
83.3585	972.3400	I10	3-ethyloctane	0.0218	0.0239	0.0144	331.700	166.500	XXX
83.7786	975.1700	I10	3-methylnonane	0.1185	0.1307	0.0778	334.040	167.800	XXX
83.9510	976.3300		unknown	0.0407	0.0470	0.0267	334.040	167.800	XXX
84.0401	976.9200	N10	N10-[5]	0.0336	0.0339	0.0224	334.040	167.800	XXX
84.4139	979.4200	I10	I10-[7]	0.0320	0.0350	0.0210	334.040	167.800	XXX
84.4789	979.8500		unknown	0.0138	0.0160	0.0091	334.040	167.800	XXX
84.8039	982.0100	I10	I10-[8]	0.0073	0.0080	0.0048	334.040	167.800	XXX
84.9792	983.1700	I10	I10-[9]	0.0037	0.0040	0.0024	334.040	167.800	XXX
85.1819	984.5100	A9	1,2,4-trimethylbenzene	0.2269	0.2096	0.1765	336.884	169.380	XXX
85.3517	985.6300	N10	i-butylcyclohexane	0.0948	0.0963	0.0632	340.340	171.300	XXX
85.5698	987.0600	I10	I10-[10]	0.0706	0.0771	0.0464	340.340	171.300	XXX
85.7677	988.3600	I10	I10-[11]	0.0946	0.1035	0.0622	340.340	171.300	XXX
85.9631	989.6400	I10	I10-[12]	0.0140	0.0154	0.0092	340.340	171.300	XXX
86.0258	990.0500		unknown	0.0039	0.0045	0.0026	340.340	171.300	XXX
86.2002	991.1800	N10	N10-[6]	0.0058	0.0059	0.0039	340.340	171.300	XXX
86.3404	992.1000		unknown	0.0191	0.0221	0.0127	340.340	171.300	XXX
86.5293	993.3200	I10	I10-[13]	0.0098	0.0107	0.0065	340.340	171.300	XXX
86.8444	995.3600		unknown	0.0102	0.0117	0.0297	340.340	171.300	XXX
86.9620	996.1200	A10	i-butylbenzene	0.0199	0.0189	0.0139	343.022	172.790	XXX
87.2095	997.7100	A10	sec-butylbenzene	0.0312	0.0293	0.0217	344.012	173.340	XXX
87.3051	998.3300		unknown	0.0206	0.0238	0.0143	344.012	173.340	XXX
87.5651	1000.0000	P10	n-decane	0.8663	0.9602	0.5692	345.470	174.150	XXX

SGC CHOPS Analysis

Crude Oil Type: Southern Green Canyon (SGC)
Date of Sample: May 19, 2020
Location of Sample: Nederland Terminal; T-1543 Cameron Highway Oil Pipeline System (CHOPS) Line

Sample ID: 2020-NEDR-000814-002 Product: SGC T-1543, CHOPS Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF
Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900
Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE
Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.02
Sample Den: 0.89

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	6.51	9.01	7.25
I-Paraffins:	5.95	7.75	5.36
Olefins:	0.00	0.00	0.00
Naphthenes:	3.96	4.56	3.41
Aromatics:	1.29	1.32	1.06
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.17	0.21	0.11

Oxygenates:

Total: 0.00(Mass%) 0.00(Vol%)

Total Oxygen Content: 0.00(Mass%)

Multisubstituted Aromatics: 0.85(Mass%) 0.87(Vol%)

Average Molecular Weight: 76.93

Relative Density: 0.61

Reid Vapor Pressure @ 100F: 4.06psi - 28.02kPa

Calculated Octane Number: 62.1

Motor Octane Number (Jenkins Calculation): 60.8

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	231.13	T50	T90	FBP
BP by Vol (Deg F)	-43.67	231.13	T50	T90	FBP

Percent Carbon: 84.80 Percent Hydrogen: 15.20

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	5.65
Light Ends (C2s-C5s Vol %)	5.76

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE
Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.02 Sample Den: 0.89

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.05	0.63
C6	85.52	0.68
C7	99.03	0.72
C8	112.35	0.74
C9	126.02	0.76
C10	141.87	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	76.90	0.61

Octane Number

Research Octane Number:	62.1
Motor Octane Number:	60.8

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18

Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM

Processed 122 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: T-1543, CHOPS LINE

Yield: 17.88

Int Std: MEK

Int Std Amt: 0.15

Sample Wt: 5.02 Sample Den: 0.89

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.44	0.00	0.00	0.00	0.00	0.00	0.44
C4	1.06	0.24	0.00	0.00	0.00	0.00	1.30
C5	1.19	0.77	0.00	0.10	0.00	0.00	2.06
C6	1.01	1.12	0.00	0.72	0.05	0.00	2.90
C7	0.87	0.97	0.00	1.13	0.16	0.00	3.13
C8	0.71	1.01	0.00	1.03	0.47	0.00	3.21
C9	0.61	0.96	0.00	0.75	0.59	0.04	2.96
C10	0.60	0.88	0.00	0.23	0.03	0.12	1.85
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	6.51	5.95	0.00	3.96	1.29	0.17	17.71

Oxygenates 0.00

Total C14+: 0.00

Total Unknowns: 0.17

Grand Total: 17.88

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.09	0.00	0.00	0.00	0.00	0.00	0.09
C3	0.77	0.00	0.00	0.00	0.00	0.00	0.77
C4	1.62	0.38	0.00	0.00	0.00	0.00	2.00
C5	1.69	1.10	0.00	0.11	0.00	0.00	2.90
C6	1.36	1.51	0.00	0.83	0.05	0.00	3.75
C7	1.12	1.25	0.00	1.32	0.16	0.00	3.85
C8	0.89	1.27	0.00	1.18	0.48	0.00	3.82
C9	0.75	1.18	0.00	0.85	0.60	0.06	3.45
C10	0.72	1.06	0.00	0.26	0.03	0.15	2.22
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.01	7.75	0.00	4.56	1.32	0.21	22.64

Oxygenates 0.00

Total C14+: 0.00

Total Unknowns: 0.21

Grand Total: 22.85

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE
Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.02 Sample Den: 0.89

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C3	0.89	0.00	0.00	0.00	0.00	0.00	0.89
C4	1.63	0.37	0.00	0.00	0.00	0.00	1.99
C5	1.47	0.96	0.00	0.12	0.00	0.00	2.55
C6	1.05	1.16	0.00	0.76	0.06	0.00	3.03
C7	0.77	0.86	0.00	1.03	0.15	0.00	2.82
C8	0.55	0.79	0.00	0.82	0.39	0.00	2.55
C9	0.43	0.67	0.00	0.53	0.44	0.04	2.10
C10	0.37	0.55	0.00	0.15	0.02	0.08	1.17
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	7.25	5.36	0.00	3.41	1.06	0.11	17.08

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.11	Grand Total:	17.20

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.02 Sample Den: 0.89

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6915	200.0000	P2	ethane	0.0328	0.0856	0.0975	-127.480	-88.600	XXX
6.9502	300.0000	P3	propane	0.4371	0.7736	0.8851	-43.672	-42.040	XXX
7.3549	367.6500	I4	i-butane	0.2397	0.3810	0.3682	10.904	-11.720	XXX
7.7021	400.0000	P4	n-butane	1.0584	1.6196	1.6258	31.100	-0.500	XXX
8.9744	475.2800	I5	i-pentane	0.7719	1.1034	0.9552	82.112	27.840	XXX
9.6615	500.0000	P5	n-pentane	1.1919	1.6858	1.4748	96.908	36.060	XXX
10.9663	535.0500	I6	2,2-dimethylbutane	0.0100	0.0137	0.0104	121.514	49.730	XXX
12.3460	562.1100	N5	cyclopentane	0.0962	0.1143	0.1225	120.650	49.250	XXX
12.4180	563.3300	I6	2,3-dimethylbutane	0.0983	0.1316	0.1019	136.364	57.980	XXX
12.6398	567.0100	I6	2-methylpentane	0.5713	0.7747	0.5918	140.468	60.260	XXX
13.5430	580.7200	I6	3-methylpentane	0.4442	0.5923	0.4602	145.886	63.270	XXX
15.0465	600.0000	P6	n-hexane	1.0103	1.3571	1.0467	155.714	68.730	XXX
18.3908	628.0000	I7	2,2-dimethylpentane	0.0107	0.0140	0.0095	174.542	79.190	XXX
18.7526	630.5400	N6	methylcyclopentane	0.3889	0.4601	0.4125	161.240	71.800	XXX
19.3453	634.5300	I7	2,4-dimethylpentane	0.0450	0.0592	0.0401	176.882	80.490	XXX
22.7397	654.3400	A6	benzene	0.0492	0.0496	0.0563	176.162	80.090	XXX
24.5074	663.0500	N6	cyclohexane	0.3268	0.3718	0.3467	177.296	80.720	XXX
26.4871	671.8400	I7	2-methylhexane	0.2955	0.3857	0.2633	194.090	90.050	XXX
26.8160	673.2200	I7	2,3-dimethylpentane	0.1578	0.2011	0.1406	193.604	89.780	XXX
27.3789	675.5200	N7	1,1-dimethylcyclopentane	0.0368	0.0433	0.0335	189.464	87.480	XXX
28.4557	679.7500	I7	3-methylhexane	0.4164	0.5367	0.3710	197.330	91.850	XXX
29.8911	685.0800	N7	1c,3-dimethylcyclopentane	0.0943	0.1121	0.0857	195.386	90.770	XXX
30.5683	687.4900	N7	1t,3-dimethylcyclopentane	0.0875	0.1035	0.0795	197.096	91.720	XXX
30.9300	688.7400	I7	3-ethylpentane	0.0422	0.0535	0.0376	200.246	93.470	XXX
31.2203	689.7400	N7	1t,2-dimethylcyclopentane	0.1617	0.1906	0.1471	197.366	91.870	XXX
34.4270	700.0000	P7	n-heptane	0.8667	1.1227	0.7722	209.156	98.420	XXX
38.8015	725.2900	N7	methylcyclohexane	0.6784	0.7809	0.6168	213.674	100.930	XXX
39.5731	729.3900	I8	2,2-dimethylhexane	0.0431	0.0549	0.0337	224.312	106.840	XXX
41.4940	739.2000	N7	ethylcyclopentane	0.0754	0.0871	0.0686	218.246	103.470	XXX
41.9367	741.3800	I8	2,5-dimethylhexane	0.0419	0.0536	0.0328	228.398	109.110	XXX
42.3460	743.3800	I8	2,4-dimethylhexane	0.0686	0.0868	0.0536	228.974	109.430	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.02 Sample Den: 0.89

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
43.4723	748.7500	N8	1c,2t,4-trimethylcyclopentane	0.0570	0.0661	0.0453	242.132	116.740	XXX
43.8066	750.3200	I8	3,3-dimethylhexane	0.0121	0.0151	0.0095	233.546	111.970	XXX
45.0546	756.0300	N8	1t,2c,3-trimethylcyclopentane	0.0646	0.0743	0.0514	230.738	110.410	XXX
45.6728	758.7900	I8	2,3,4-trimethylpentane	0.0196	0.0242	0.0153	236.246	113.470	XXX
46.4406	762.1600	A7	toluene	0.1597	0.1631	0.1547	231.134	110.630	XXX
48.0822	769.1600	I8	2,3-dimethylhexane	0.0816	0.1015	0.0638	240.098	115.610	XXX
48.3192	770.1400	I8	2-methyl-3-ethylpentane	0.0395	0.0491	0.0308	240.098	115.610	XXX
49.3960	774.5600	I8	2-methylheptane	0.3498	0.4439	0.2734	243.770	117.650	XXX
49.6929	775.7500	I8	4-methylheptane	0.1089	0.1369	0.0851	243.878	117.710	XXX
50.9194	780.6200	I8	3-methylheptane	0.2445	0.3068	0.1911	246.074	118.930	XXX
51.0830	781.2500	N8	1c,2t,3-trimethylcyclopentane	0.2475	0.2845	0.1969	243.500	117.500	XXX
51.4667	782.7400	N8	1t,4-dimethylcyclohexane	0.0837	0.0972	0.0666	246.848	119.360	XXX
52.5477	786.8600	N8	1,1-dimethylcyclohexane	0.0296	0.0335	0.0235	247.190	119.550	XXX
53.3131	789.7200	N8	3t-ethylmethylcyclopentane	0.0367	0.0424	0.0292	249.980	121.100	XXX
53.7259	791.2500	N8	3c-ethylmethylcyclopentane	0.0326	0.0377	0.0260	249.980	121.100	XXX
53.9838	792.1900	N8	2t-ethylmethylcyclopentane	0.0770	0.0887	0.0612	250.160	121.200	XXX
54.9074	795.5400	N8	1t,2-dimethylcyclohexane	0.1085	0.1239	0.0863	254.174	123.430	XXX
56.1671	800.0000	P8	n-octane	0.7078	0.8924	0.5532	258.224	125.680	XXX
56.2742	800.7200	N8	i-propylcyclopentane	0.0838	0.0956	0.0667	259.574	126.430	XXX
59.5460	822.1400	I9	2,2,3,4-tetramethylpentane	0.0129	0.0154	0.0090	271.454	133.030	XXX
60.5910	828.7100	N8	1c,2-dimethylcyclohexane	0.0780	0.0868	0.0621	265.532	129.740	XXX
61.4883	834.2500		unknown	0.0440	0.0557	0.0350	265.532	129.740	XXX
61.5675	834.7300	N9	1,1,4-trimethylcyclohexane	0.2073	0.2378	0.1466	275.000	135.000	XXX
61.7435	835.8000	I9	2,2,3-trimethylhexane	0.1285	0.1591	0.0894	271.220	132.900	XXX
62.5279	840.5500	N8	n-propylcyclopentane	0.1318	0.1504	0.1049	267.728	130.960	XXX
62.9000	842.7800	I9	2,5-dimethylheptane	0.1073	0.1326	0.0747	276.800	136.000	XXX
63.1014	843.9800	N9	*1c,3c,5-trimethylcyclohexane	0.0307	0.0353	0.0217	281.174	138.430	XXX
63.4105	845.8100	I9	3,5-dimethylheptane	0.0154	0.0189	0.0107	276.800	136.000	XXX
63.6132	847.0000	I9	2,6-dimethylheptane	0.0247	0.0309	0.0172	275.396	135.220	XXX
63.8816	848.5800	N9	1,1,3-trimethylcyclohexane	0.0217	0.0244	0.0153	295.862	146.590	XXX
64.7259	853.5000	A8	ethylbenzene	0.0717	0.0733	0.0603	277.160	136.200	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 12:18:27 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.02 Sample Den: 0.89

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
64.8364	854.1300	N9	1c,2t,4t-trimethylcyclohexane	0.0380	0.0432	0.0269	32.000	0.000	XXX
65.1776	856.1000	I9	I9-[1]	0.0522	0.0633	0.0363	32.000	0.000	XXX
66.1994	861.9000	A8	1,3-dimethylbenzene	0.1271	0.1303	0.1069	282.416	139.120	XXX
66.4051	863.0600	A8	1,4-dimethylbenzene	0.1877	0.1931	0.1578	281.048	138.360	XXX
66.7433	864.9500	I9	3,4-dimethylheptane	0.0054	0.0065	0.0037	285.080	140.600	XXX
67.2156	867.5800	I9	4-ethylheptane	0.0470	0.0578	0.0327	288.392	142.440	XXX
67.6947	870.2300	I9	4-methyloctane	0.1214	0.1493	0.0845	288.392	142.440	XXX
67.8657	871.1600	I9	2-methyloctane	0.1451	0.1802	0.1010	289.904	143.280	XXX
68.7490	875.9700	I9	3,3-diethylpentane	0.0253	0.0295	0.0176	270.842	132.690	XXX
68.9573	877.1000	I9	3-methyloctane	0.2141	0.2632	0.1490	291.614	144.230	XXX
69.6891	881.0100	N9	1,1,2-trimethylcyclohexane	0.0058	0.0064	0.0041	293.360	145.200	XXX
69.9271	882.2800	A8	1,2-dimethylbenzene	0.0785	0.0790	0.0660	291.974	144.430	XXX
70.8684	887.2300	N9	N9-[1]	0.0609	0.0691	0.0431	291.974	144.430	XXX
71.0733	888.3000	N9	N9-[2]	0.0972	0.1103	0.0687	291.974	144.430	XXX
71.4467	890.2400	I9	I9-[2]	0.0579	0.0703	0.0403	291.974	144.430	XXX
71.8501	892.3300	N9	i-butylcyclopentane	0.0121	0.0137	0.0086	298.346	147.970	XXX
73.3572	900.0000	P9	n-nonane	0.6112	0.7544	0.4255	303.476	150.820	XXX
73.5335	901.3600	N9	1,1-methylethylcyclohexane	0.0166	0.0182	0.0117	305.924	152.180	XXX
74.0682	905.4800	N9	N9-[3]	0.0668	0.0749	0.0472	305.924	152.180	XXX
74.5137	908.8900	N9	N9-[4]	0.0215	0.0241	0.0152	305.924	152.180	XXX
75.1549	913.7500	A9	i-propylbenzene	0.0195	0.0201	0.0145	306.338	152.410	XXX
75.4799	916.2000	I10	I10-[1]	0.0173	0.0210	0.0108	306.338	152.410	XXX
75.7727	918.4000	N9	N9-[5]	0.0504	0.0565	0.0356	306.338	152.410	XXX
76.0231	920.2700	I10	I10-[2]	0.0502	0.0609	0.0315	306.338	152.410	XXX
76.2986	922.3200	I10	2,4-dimethyloctane	0.0548	0.0668	0.0344	312.620	155.900	XXX
76.7075	925.3500	N9	N9-[6]	0.0242	0.0272	0.0171	312.620	155.900	XXX
77.1532	928.6300	I10	2,6-dimethyloctane	0.0162	0.0198	0.0102	320.738	160.410	XXX
77.3320	929.9400	I10	2,5-dimethyloctane	0.0436	0.0529	0.0274	317.300	158.500	XXX
77.5075	931.2200		unknown	0.0182	0.0231	0.0114	317.300	158.500	XXX
77.5956	931.8600	N9	n-butylcyclopentane	0.1005	0.1135	0.0711	313.916	156.620	XXX
77.9416	934.3800	I10	I10-[3]	0.0162	0.0197	0.0102	313.916	156.620	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-2-D7900.0001.CDF Acquired: 05/19/20 10:12:18
Sample: 20-NEDR-0814-2-D7900 Analyzed: 5/19/2020 12:18:27 PM
Processed 122 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1543, CHOPS LINE Yield: 17.88
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.02 Sample Den: 0.89

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
78.1268	935.7200	N10	N10-[1]	0.0416	0.0461	0.0265	313.916	156.620	XXX
78.6372	939.4000	I10	3,3-dimethyloctane	0.1564	0.1874	0.0981	322.160	161.200	XXX
78.8431	940.8800		unknown	0.0442	0.0559	0.0277	322.160	161.200	XXX
79.0710	942.5100		unknown	0.0196	0.0248	0.0123	322.160	161.200	XXX
79.2410	943.7300		unknown	0.0173	0.0218	0.0108	322.160	161.200	XXX
79.4489	945.2100		unknown	0.0126	0.0159	0.0079	322.160	161.200	XXX
79.5496	945.9200	N10	N10-[2]	0.0583	0.0645	0.0371	322.160	161.200	XXX
79.7325	947.2200	A9	n-propylbenzene	0.1138	0.1170	0.0846	318.632	159.240	XXX
80.0669	949.5800		unknown	0.0095	0.0120	0.0070	318.632	159.240	XXX
80.6274	953.5100	A9	1,3-methylethylbenzene	0.0692	0.0709	0.0514	322.394	161.330	XXX
80.9293	955.6200	A9	1,4-methylethylbenzene	0.0472	0.0485	0.0351	323.618	162.010	XXX
81.5632	960.0200	N10	N10-[3]	0.0375	0.0415	0.0239	323.618	162.010	XXX
81.6649	960.7200	A9	1,3,5-trimethylbenzene	0.1125	0.1152	0.0836	328.532	164.740	XXX
82.2745	964.9100	I10	5-methylnonane	0.0559	0.0676	0.0351	329.180	165.100	XXX
82.5207	966.5900	I10	4-methylnonane	0.1411	0.1689	0.0886	32.000	0.000	XXX
82.8731	968.9800	A9	1,2-methylethylbenzene	0.1056	0.1062	0.0784	329.324	165.180	XXX
83.1168	970.6400	I10	2-methylnonane	0.0820	0.1000	0.0515	332.654	167.030	XXX
83.3612	972.2900	I10	3-ethyloctane	0.0307	0.0367	0.0193	331.700	166.500	XXX
83.7839	975.1300	I10	3-methylnonane	0.1224	0.1478	0.0768	334.040	167.800	XXX
84.0482	976.9000	N10	N10-[4]	0.0397	0.0439	0.0253	334.040	167.800	XXX
85.1898	984.4800	A9	1,2,4-trimethylbenzene	0.1244	0.1258	0.0924	336.884	169.380	XXX
85.3537	985.5500	N10	i-butylcyclohexane	0.0435	0.0484	0.0277	340.340	171.300	XXX
85.5773	987.0200	I10	I10-[4]	0.0472	0.0565	0.0296	340.340	171.300	XXX
85.7764	988.3300	I10	I10-[5]	0.0434	0.0520	0.0273	340.340	171.300	XXX
86.3497	992.0600	N10	N10-[5]	0.0101	0.0112	0.0064	340.340	171.300	XXX
86.9681	996.0600	A10	i-butylbenzene	0.0099	0.0103	0.0066	343.022	172.790	XXX
87.2130	997.6300	A10	sec-butylbenzene	0.0186	0.0191	0.0124	344.012	173.340	XXX
87.5704	999.9200	P10	n-decane	0.5950	0.7219	0.3734	345.470	174.150	XXX

Eaglebine Light Analysis

Crude Oil Type: Eaglebine Light
Date of Sample: May 19, 2020
Location of Sample: Nederland Terminal; T-1553 Eagle “R” Line

Sample ID: 2020-NEDR-000814-004 Product: EAGLEBINE LIGHT T-1553, Eagle "R" Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF
Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900
Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line
Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.02
Sample Den: 0.82

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	9.45	12.39	11.08
I-Paraffins:	8.35	10.25	7.71
Olefins:	0.00	0.00	0.00
Naphthenes:	8.25	8.86	7.10
Aromatics:	2.34	2.22	1.93
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.57	0.67	0.46

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	

Multisubstituted Aromatics:	1.51(Mass%)	1.43(Vol%)

Average Molecular Weight: 80.02

Relative Density: 0.64

Reid Vapor Pressure @ 100F: 6.56psi - 45.24kPa

Calculated Octane Number: 69.8

Motor Octane Number (Jenkins Calculation): 66.7

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	-43.67	161.24	T50	T90	FBP
BP by Vol (Deg F)	-43.67	161.24	T50	T90	FBP

Percent Carbon: 84.88 Percent Hydrogen: 15.12

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	9.59
Light Ends (C2s-C5s Vol %)	9.79

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF
Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900
Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line
Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.02
Sample Den: 0.82

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.01	0.63
C6	85.24	0.70
C7	98.50	0.73
C8	112.04	0.75
C9	125.94	0.77
C10	141.79	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	80.00	0.64

Octane Number

Research Octane Number:	69.8
Motor Octane Number:	66.7

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line
Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.02 Sample Den: 0.82

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.50	0.00	0.00	0.00	0.00	0.00	0.50
C4	3.00	0.79	0.00	0.00	0.00	0.00	3.79
C5	1.35	1.10	0.00	0.18	0.00	0.00	2.63
C6	1.18	1.33	0.00	1.46	0.09	0.00	4.06
C7	1.01	1.15	0.00	2.76	0.41	0.00	5.32
C8	0.90	1.46	0.00	2.17	0.88	0.01	5.42
C9	0.76	1.47	0.00	1.36	0.91	0.15	4.65
C10	0.71	1.06	0.00	0.32	0.05	0.41	2.55
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.45	8.35	0.00	8.25	2.34	0.57	28.38

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.57 Grand Total: 28.96

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.08	0.00	0.00	0.00	0.00	0.00	0.08
C3	0.82	0.00	0.00	0.00	0.00	0.00	0.82
C4	4.28	1.16	0.00	0.00	0.00	0.00	5.44
C5	1.77	1.47	0.00	0.20	0.00	0.00	3.44
C6	1.48	1.66	0.00	1.58	0.09	0.00	4.81
C7	1.22	1.38	0.00	2.99	0.39	0.00	5.98
C8	1.06	1.71	0.00	2.31	0.84	0.02	5.94
C9	0.88	1.68	0.00	1.44	0.86	0.17	5.03
C10	0.80	1.19	0.00	0.33	0.05	0.48	2.85
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.39	10.25	0.00	8.86	2.22	0.67	33.72

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.67 Grand Total: 34.40

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18

Sample: 20-NEDR-0814-4-D7900

Analyzed: 5/19/2020 4:32:48 AM

Processed 194 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: T-1553, Eagle "R" Line

Yield: 28.96

Int Std: MEK

Int Std Amt: 0.31

Sample Wt: 10.02

Sample Den: 0.82

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C3	1.00	0.00	0.00	0.00	0.00	0.00	1.00
C4	4.56	1.19	0.00	0.00	0.00	0.01	5.76
C5	1.65	1.35	0.00	0.23	0.00	0.00	3.23
C6	1.21	1.36	0.00	1.53	0.11	0.00	4.21
C7	0.89	1.01	0.00	2.48	0.39	0.00	4.77
C8	0.70	1.13	0.00	1.71	0.73	0.01	4.27
C9	0.53	1.01	0.00	0.95	0.67	0.15	3.31
C10	0.44	0.66	0.00	0.20	0.03	0.29	1.63
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.08	7.71	0.00	7.10	1.93	0.46	27.82

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.46	Grand Total:	28.28

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6909	200.0000	P2	ethane	0.0343	0.0831	0.1006	-127.480	-88.600	XXX
6.9502	300.0000	P3	propane	0.4986	0.8215	0.9988	-43.672	-42.040	XXX
7.3550	367.6300	I4	i-butane	0.7861	1.1633	1.1945	10.904	-11.720	XXX
7.5856	390.4700		unknown	0.0021	0.0025	0.0059	10.904	-11.720	XXX
7.7024	400.0000	P4	n-butane	3.0030	4.2783	4.5633	31.100	-0.500	XXX
7.8758	414.4200	I5	2,2-dimethylpropane	0.0042	0.0059	0.0051	49.100	9.500	XXX
8.9750	475.2800	I5	i-pentane	1.0988	1.4624	1.3451	82.112	27.840	XXX
9.6619	500.0000	P5	n-pentane	1.3463	1.7728	1.6481	96.908	36.060	XXX
10.9637	534.9900	I6	2,2-dimethylbutane	0.0217	0.0275	0.0222	121.514	49.730	XXX
12.3448	562.0900	N5	cyclopentane	0.1837	0.2032	0.2313	120.650	49.250	XXX
12.4166	563.3100	I6	2,3-dimethylbutane	0.0858	0.1069	0.0879	136.364	57.980	XXX
12.6380	566.9900	I6	2-methylpentane	0.7160	0.9040	0.7338	140.468	60.260	XXX
13.5404	580.6900	I6	3-methylpentane	0.5032	0.6246	0.5157	145.886	63.270	XXX
15.0455	600.0000	P6	n-hexane	1.1846	1.4814	1.2141	155.714	68.730	XXX
18.3860	627.9600	I7	2,2-dimethylpentane	0.0251	0.0307	0.0221	174.542	79.190	XXX
18.7539	630.5400	N6	methylcyclopentane	0.8915	0.9820	0.9356	161.240	71.800	XXX
19.3543	634.5800	I7	2,4-dimethylpentane	0.0608	0.0745	0.0536	176.882	80.490	XXX
20.2177	640.0800	I7	2,2,3-trimethylbutane	0.0046	0.0055	0.0041	177.584	80.880	XXX
22.7441	654.3400	A6	benzene	0.0943	0.0885	0.1067	176.162	80.090	XXX
23.8091	659.7000	I7	3,3-dimethylpentane	0.0153	0.0182	0.0135	186.908	86.060	XXX
24.5120	663.0500	N6	cyclohexane	0.5645	0.5980	0.5925	177.296	80.720	XXX
26.4919	671.8400	I7	2-methylhexane	0.3731	0.4533	0.3288	194.090	90.050	XXX
26.8261	673.2300	I7	2,3-dimethylpentane	0.1630	0.1934	0.1437	193.604	89.780	XXX
27.3956	675.5600	N7	1,1-dimethylcyclopentane	0.1602	0.1751	0.1441	189.464	87.480	XXX
28.4634	679.7500	I7	3-methylhexane	0.4617	0.5541	0.4070	197.330	91.850	XXX
29.8957	685.0700	N7	1c,3-dimethylcyclopentane	0.3131	0.3466	0.2816	195.386	90.770	XXX
30.5722	687.4700	N7	1t,3-dimethylcyclopentane	0.2856	0.3145	0.2569	197.096	91.720	XXX
30.9481	688.7700	I7	3-ethylpentane	0.0427	0.0504	0.0376	200.246	93.470	XXX
31.2276	689.7300	N7	1t,2-dimethylcyclopentane	0.4776	0.5241	0.4296	197.366	91.870	XXX
34.4404	700.0000	P7	n-heptane	1.0078	1.2155	0.8883	209.156	98.420	XXX
38.6708	724.5100	N7	1c,2-dimethylcyclopentane	0.0535	0.0603	0.0481	211.154	99.530	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
38.8108	725.2600	N7	methylcyclohexane	1.3871	1.4866	1.2477	213.674	100.930	XXX
39.5932	729.4200	I8	2,2-dimethylhexane	0.2269	0.2691	0.1755	224.312	106.840	XXX
41.5103	739.2100	N7	ethylcyclopentane	0.0808	0.0869	0.0727	218.246	103.470	XXX
41.9510	741.3800	I8	2,5-dimethylhexane	0.0517	0.0615	0.0400	228.398	109.110	XXX
42.3537	743.3500	I8	2,4-dimethylhexane	0.0689	0.0811	0.0533	228.974	109.430	XXX
43.4827	748.7300	N8	1c,2t,4-trimethylcyclopentane	0.1713	0.1851	0.1349	242.132	116.740	XXX
43.8221	750.3200	I8	3,3-dimethylhexane	0.0199	0.0231	0.0154	233.546	111.970	XXX
45.0681	756.0300	N8	1t,2c,3-trimethylcyclopentane	0.2048	0.2192	0.1612	230.738	110.410	XXX
45.6904	758.8100	I8	2,3,4-trimethylpentane	0.0250	0.0286	0.0193	236.246	113.470	XXX
46.4453	762.1200	A7	toluene	0.4054	0.3856	0.3886	231.134	110.630	XXX
48.0896	769.1300	I8	2,3-dimethylhexane	0.1128	0.1306	0.0872	240.098	115.610	XXX
48.3236	770.1000	I8	2-methyl-3-ethylpentane	0.0274	0.0318	0.0212	240.098	115.610	XXX
49.4043	774.5300	I8	2-methylheptane	0.4745	0.5607	0.3669	243.770	117.650	XXX
49.7049	775.7400	I8	4-methylheptane	0.1300	0.1522	0.1005	243.878	117.710	XXX
49.8566	776.3500	I8	3-methyl-3-ethylpentane	0.0161	0.0186	0.0124	240.098	115.610	XXX
49.9936	776.9000	I8	3,4-dimethylhexane	0.0226	0.0259	0.0175	243.914	117.730	XXX
50.3902	778.4700		unknown	0.0149	0.0175	0.0115	243.914	117.730	XXX
50.4622	778.7600	N8	1c,3-dimethylcyclohexane	0.0122	0.0132	0.0096	246.848	119.360	XXX
50.9337	780.6100	I8	3-methylheptane	0.2303	0.2690	0.1780	246.074	118.930	XXX
51.0935	781.2400	N8	1c,2t,3-trimethylcyclopentane	0.5023	0.5377	0.3954	243.500	117.500	XXX
51.2509	781.8500	I8	3-ethylhexane	0.0514	0.0594	0.0398	245.372	118.540	XXX
51.4744	782.7100	N8	1t,4-dimethylcyclohexane	0.1952	0.2111	0.1537	246.848	119.360	XXX
52.5617	786.8600	N8	1,1-dimethylcyclohexane	0.0629	0.0664	0.0495	247.190	119.550	XXX
53.1154	788.9300	I9	2,2,5-trimethylhexane	0.0031	0.0037	0.0022	255.362	124.090	XXX
53.3270	789.7200	N8	3t-ethylmethylcyclopentane	0.0429	0.0461	0.0337	249.980	121.100	XXX
53.7443	791.2600	N8	3c-ethylmethylcyclopentane	0.0382	0.0410	0.0300	249.980	121.100	XXX
53.9908	792.1600	N8	2t-ethylmethylcyclopentane	0.1040	0.1115	0.0818	250.160	121.200	XXX
54.3845	793.6000	N8	1,1-methylethylcyclopentane	0.0204	0.0215	0.0160	250.754	121.530	XXX
54.9181	795.5200	N8	1t,2-dimethylcyclohexane	0.2699	0.2868	0.2125	254.174	123.430	XXX
56.1824	800.0000	P8	n-octane	0.9013	1.0580	0.6969	258.224	125.680	XXX
56.3108	800.8600	N8	i-propylcyclopentane	0.1049	0.1114	0.0826	259.574	126.430	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
57.6464	809.7700		unknown	0.0052	0.0062	0.0041	259.574	126.430	XXX
57.7183	810.2500	I9	2,4,4-trimethylhexane	0.0201	0.0224	0.0139	32.000	0.000	XXX
58.1641	813.1600		unknown	0.0024	0.0028	0.0016	32.000	0.000	XXX
58.3819	814.5800		unknown	0.0043	0.0050	0.0118	32.000	0.000	XXX
58.8125	817.3600		unknown	0.0187	0.0221	0.0517	32.000	0.000	XXX
59.2085	819.9000	I9	2,3,4-trimethylhexane	0.0094	0.0105	0.0065	282.308	139.060	XXX
59.5503	822.0800	I9	2,2,3,4-tetramethylpentane	0.0134	0.0149	0.0092	271.454	133.030	XXX
59.8576	824.0200	N8	N8-[1]	0.0247	0.0261	0.0194	271.454	133.030	XXX
60.6055	828.7100	N8	1c,2-dimethylcyclohexane	0.1093	0.1132	0.0860	265.532	129.740	XXX
60.7703	829.7300	I9	2,3,5-trimethylhexane	0.0324	0.0370	0.0223	268.430	131.350	XXX
60.9011	830.5400	I9	2,2-dimethylheptane	0.0058	0.0068	0.0040	270.860	132.700	XXX
61.1326	831.9700	N8	N8-[2]	0.0082	0.0087	0.0065	270.860	132.700	XXX
61.4792	834.1000		unknown	0.0301	0.0354	0.0237	270.860	132.700	XXX
61.5828	834.7300	N9	1,1,4-trimethylcyclohexane	0.3441	0.3674	0.2407	275.000	135.000	XXX
61.7573	835.8000	I9	2,2,3-trimethylhexane	0.1805	0.2080	0.1243	271.220	132.900	XXX
62.1458	838.1600	I9	2,4-dimethylheptane	0.0211	0.0243	0.0145	271.220	132.900	XXX
62.5416	840.5400	N8	n-propylcyclopentane	0.2962	0.3146	0.2331	267.728	130.960	XXX
62.9165	842.7900	I9	2,5-dimethylheptane	0.1249	0.1437	0.0860	276.800	136.000	XXX
63.1322	844.0700	N9	*1c,3c,5-trimethylcyclohexane	0.0147	0.0158	0.0103	281.174	138.430	XXX
63.1966	844.4600	I9	3,3-dimethylheptane	0.0125	0.0142	0.0086	278.636	137.020	XXX
63.4049	845.6900	I9	3,5-dimethylheptane	0.0230	0.0263	0.0158	276.800	136.000	XXX
63.6430	847.1000	I9	2,6-dimethylheptane	0.0336	0.0391	0.0231	275.396	135.220	XXX
63.7102	847.4900		unknown	0.0165	0.0194	0.0114	275.396	135.220	XXX
63.9006	848.6100	N9	1,1,3-trimethylcyclohexane	0.0202	0.0211	0.0141	295.862	146.590	XXX
64.6283	852.8500	N9	1c,3c,5c-trimethylcyclohexane	0.0113	0.0119	0.0079	32.000	0.000	XXX
64.7368	853.4800	A8	ethylbenzene	0.0814	0.0774	0.0677	277.160	136.200	XXX
64.8506	854.1300	N9	1c,2t,4t-trimethylcyclohexane	0.0641	0.0678	0.0449	32.000	0.000	XXX
65.1826	856.0400	I9	I9-[1]	0.1599	0.1807	0.1101	32.000	0.000	XXX
65.5825	858.3300	N9	N9-[1]	0.0073	0.0077	0.0051	32.000	0.000	XXX
65.8274	859.7200	N9	N9-[2]	0.0074	0.0078	0.0052	32.000	0.000	XXX
66.2034	861.8500	A8	1,3-dimethylbenzene	0.3342	0.3189	0.2780	282.416	139.120	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
66.4129	863.0300	A8	1,4-dimethylbenzene	0.3146	0.3013	0.2617	281.048	138.360	XXX
66.7515	864.9200	I9	3,4-dimethylheptane	0.0158	0.0179	0.0109	285.080	140.600	XXX
66.8852	865.6700	N9	N9-[3]	0.0174	0.0184	0.0122	285.080	140.600	XXX
67.2239	867.5500	I9	4-ethylheptane	0.0700	0.0802	0.0482	288.392	142.440	XXX
67.5775	869.5100		unknown	0.0052	0.0061	0.0036	288.392	142.440	XXX
67.7092	870.2300	I9	4-methyloctane	0.1159	0.1327	0.0798	288.392	142.440	XXX
67.8769	871.1500	I9	2-methyloctane	0.1513	0.1749	0.1042	289.904	143.280	XXX
68.3719	873.8600	N9	1c,2t,3c-trimethylcyclohexane	0.0049	0.0054	0.0035	304.160	151.200	XXX
68.5288	874.7100	I9	3-ethylheptane	0.0108	0.0123	0.0075	289.400	143.000	XXX
68.7582	875.9500	I9	3,3-diethylpentane	0.0295	0.0321	0.0203	270.842	132.690	XXX
68.9742	877.1200	I9	3-methyloctane	0.2404	0.2751	0.1655	291.614	144.230	XXX
69.2674	878.6900	N9	1c,2t,4c-trimethylcyclohexane	0.0224	0.0239	0.0157	275.000	135.000	XXX
69.4632	879.7400		unknown	0.0182	0.0215	0.0128	275.000	135.000	XXX
69.7370	881.2000	N9	1,1,2-trimethylcyclohexane	0.0263	0.0271	0.0184	293.360	145.200	XXX
69.9375	882.2700	A8	1,2-dimethylbenzene	0.1483	0.1389	0.1234	291.974	144.430	XXX
70.0973	883.1100	I9	I9-[2]	0.0457	0.0516	0.0315	291.974	144.430	XXX
70.1656	883.4700		unknown	0.0216	0.0254	0.0149	291.974	144.430	XXX
70.2794	884.0700	I9	I9-[3]	0.0061	0.0069	0.0042	291.974	144.430	XXX
70.5240	885.3600	N9	N9-[4]	0.0064	0.0068	0.0045	291.974	144.430	XXX
70.8814	887.2400	N9	N9-[5]	0.0726	0.0768	0.0508	291.974	144.430	XXX
71.0834	888.2900	N9	N9-[6]	0.1711	0.1809	0.1197	291.974	144.430	XXX
71.4647	890.2700	I9	I9-[4]	0.0918	0.1037	0.0632	291.974	144.430	XXX
71.5435	890.6800	I9	I9-[5]	0.0373	0.0421	0.0257	291.974	144.430	XXX
71.8531	892.2800	N9	i-butylcyclopentane	0.0139	0.0147	0.0097	298.346	147.970	XXX
72.0861	893.4700		unknown	0.0152	0.0179	0.0106	298.346	147.970	XXX
72.1573	893.8400	N9	N9-[7]	0.0052	0.0055	0.0036	298.346	147.970	XXX
72.3113	894.6300		unknown	0.0073	0.0085	0.0051	298.346	147.970	XXX
72.7309	896.7700		unknown	0.0005	0.0006	0.0014	298.346	147.970	XXX
73.1708	898.9900	I9	I9-[6]	0.0170	0.0192	0.0117	298.346	147.970	XXX
73.3694	900.0000	P9	n-nonane	0.7633	0.8771	0.5256	303.476	150.820	XXX
73.5509	901.4000	N9	1,1-methylethylcyclohexane	0.0378	0.0386	0.0264	305.924	152.180	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
73.7658	903.0600	N9	N9-[8]	0.0195	0.0203	0.0136	305.924	152.180	XXX
74.0877	905.5400	N9	N9-[9]	0.1422	0.1485	0.0995	305.924	152.180	XXX
74.5244	908.8800	N9	N9-[10]	0.0312	0.0326	0.0219	305.924	152.180	XXX
75.1632	913.7300	A9	i-propylbenzene	0.0218	0.0209	0.0160	306.338	152.410	XXX
75.2526	914.4100		unknown	0.0033	0.0039	0.0092	306.338	152.410	XXX
75.4840	916.1500	I10	I10-[1]	0.0176	0.0198	0.0109	306.338	152.410	XXX
75.7740	918.3300	N9	N9-[11]	0.1362	0.1421	0.0953	306.338	152.410	XXX
76.0342	920.2700	I10	I10-[2]	0.0667	0.0754	0.0414	306.338	152.410	XXX
76.3043	922.2900	I10	2,4-dimethyloctane	0.0508	0.0577	0.0315	312.620	155.900	XXX
76.3867	922.9000		unknown	0.0077	0.0090	0.0048	312.620	155.900	XXX
76.6763	925.0400	N9	N9-[12]	0.0153	0.0160	0.0107	312.620	155.900	XXX
76.7435	925.5400		unknown	0.0340	0.0401	0.0238	312.620	155.900	XXX
76.8900	926.6200	N9	N9-[13]	0.0054	0.0057	0.0038	312.620	155.900	XXX
77.1646	928.6400	I10	2,6-dimethyloctane	0.0132	0.0150	0.0082	320.738	160.410	XXX
77.3425	929.9500	I10	2,5-dimethyloctane	0.0588	0.0664	0.0365	317.300	158.500	XXX
77.6001	931.8300	N9	n-butylcyclopentane	0.1652	0.1736	0.1156	313.916	156.620	XXX
77.8515	933.6600		unknown	0.0233	0.0275	0.0163	313.916	156.620	XXX
77.9481	934.3600	I10	I10-[3]	0.0264	0.0299	0.0164	313.916	156.620	XXX
78.1385	935.7400	N10	N10-[1]	0.0533	0.0550	0.0336	313.916	156.620	XXX
78.3625	937.3600	I10	I10-[4]	0.0160	0.0180	0.0099	313.916	156.620	XXX
78.6462	939.4100	I10	3,3-dimethyloctane	0.1768	0.1973	0.1098	322.160	161.200	XXX
78.8617	940.9600		unknown	0.0735	0.0865	0.0456	322.160	161.200	XXX
79.0756	942.4900		unknown	0.0349	0.0411	0.0217	322.160	161.200	XXX
79.2474	943.7100		unknown	0.0343	0.0404	0.0213	322.160	161.200	XXX
79.4602	945.2300		unknown	0.0135	0.0158	0.0084	322.160	161.200	XXX
79.5604	945.9400	N10	N10-[2]	0.0678	0.0699	0.0427	322.160	161.200	XXX
79.7432	947.2400	A9	n-propylbenzene	0.1768	0.1691	0.1299	318.632	159.240	XXX
80.0740	949.5800		unknown	0.0159	0.0187	0.0117	318.632	159.240	XXX
80.2501	950.8200	N10	N10-[3]	0.0215	0.0222	0.0135	318.632	159.240	XXX
80.4162	951.9800		unknown	0.0119	0.0140	0.0075	318.632	159.240	XXX
80.6318	953.5000	A9	1,3-methylethylbenzene	0.1030	0.0983	0.0757	322.394	161.330	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/19/2020 4:32:48 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18
Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM
Processed 194 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: T-1553, Eagle "R" Line Yield: 28.96
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
80.9375	955.6300	A9	1,4-methylethylbenzene	0.0615	0.0589	0.0452	323.618	162.010	XXX
81.0075	956.1200		unknown	0.0204	0.0240	0.0150	323.618	162.010	XXX
81.4817	959.4100		unknown	0.0145	0.0171	0.0107	323.618	162.010	XXX
81.5792	960.0800	N10	N10-[4]	0.0380	0.0391	0.0239	323.618	162.010	XXX
81.6733	960.7300	A9	1,3,5-trimethylbenzene	0.2081	0.1983	0.1529	328.532	164.740	XXX
82.0208	963.1300	I10	I10-[5]	0.0207	0.0230	0.0128	328.532	164.740	XXX
82.1901	964.2900	I10	I10-[6]	0.0276	0.0307	0.0171	328.532	164.740	XXX
82.2783	964.8900	I10	5-methylnonane	0.0388	0.0437	0.0241	329.180	165.100	XXX
82.4409	966.0000		unknown	0.0249	0.0293	0.0155	329.180	165.100	XXX
82.5294	966.6100	I10	4-methylnonane	0.1355	0.1510	0.0841	32.000	0.000	XXX
82.8871	969.0400	A9	1,2-methylethylbenzene	0.0986	0.0924	0.0725	329.324	165.180	XXX
83.1379	970.7400	I10	2-methylnonane	0.0735	0.0835	0.0457	332.654	167.030	XXX
83.3689	972.3100	I10	3-ethyloctane	0.0227	0.0252	0.0141	331.700	166.500	XXX
83.5901	973.8000	N10	N10-[5]	0.0124	0.0128	0.0078	331.700	166.500	XXX
83.7923	975.1600	I10	3-methylnonane	0.1076	0.1210	0.0668	334.040	167.800	XXX
83.9524	976.2300		unknown	0.0376	0.0443	0.0233	334.040	167.800	XXX
84.0685	977.0100	N10	N10-[6]	0.0320	0.0330	0.0201	334.040	167.800	XXX
84.2542	978.2500		unknown	0.0093	0.0110	0.0059	334.040	167.800	XXX
84.4295	979.4100	I10	I10-[7]	0.0356	0.0397	0.0221	334.040	167.800	XXX
84.5116	979.9600		unknown	0.0107	0.0126	0.0067	334.040	167.800	XXX
84.8133	981.9600	I10	I10-[8]	0.0097	0.0108	0.0060	334.040	167.800	XXX
84.9864	983.1100	I10	I10-[9]	0.0032	0.0036	0.0020	334.040	167.800	XXX
85.2023	984.5300	A9	1,2,4-trimethylbenzene	0.2408	0.2267	0.1770	336.884	169.380	XXX
85.3685	985.6300	N10	i-butylcyclohexane	0.0853	0.0884	0.0537	340.340	171.300	XXX
85.5956	987.1200	I10	I10-[10]	0.0588	0.0655	0.0365	340.340	171.300	XXX
85.7815	988.3400	I10	I10-[11]	0.0786	0.0876	0.0488	340.340	171.300	XXX
85.9849	989.6700	I10	I10-[12]	0.0113	0.0126	0.0070	340.340	171.300	XXX
86.0377	990.0100		unknown	0.0073	0.0086	0.0045	340.340	171.300	XXX
86.2235	991.2200	N10	N10-[7]	0.0113	0.0117	0.0071	340.340	171.300	XXX
86.3538	992.0700		unknown	0.0125	0.0147	0.0079	340.340	171.300	XXX
86.5487	993.3300	I10	I10-[13]	0.0086	0.0096	0.0053	340.340	171.300	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-0814-4-D7900.0001.CDF Acquired: 05/19/20 03:46:18

Sample: 20-NEDR-0814-4-D7900 Analyzed: 5/19/2020 4:32:48 AM

Processed 194 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: T-1553, Eagle "R" Line Yield: 28.96

Int Std: MEK

Int Std Amt: 0.31

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.02 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
86.7282	994.5000		unknown	0.0032	0.0037	0.0087	340.340	171.300	XXX
86.9046	995.6400		unknown	0.0065	0.0077	0.0181	340.340	171.300	XXX
86.9753	996.0900	A10	i-butylbenzene	0.0167	0.0162	0.0110	343.022	172.790	XXX
87.2258	997.7000	A10	sec-butylbenzene	0.0303	0.0290	0.0200	344.012	173.340	XXX
87.3559	998.5400		unknown	0.0106	0.0125	0.0070	344.012	173.340	XXX
87.5831	1000.0000	P10	n-decane	0.7106	0.8027	0.4411	345.470	174.150	XXX

Bakken 1552 Analysis

Crude Oil Type: Bakken
Date of Sample: May 29, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1552

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF
Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.48
Sample Den: 0.81

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	11.37	14.23	12.96
I-Paraffins:	11.25	13.24	10.29
Olefins:	0.00	0.00	0.00
Naphthenes:	9.78	10.27	8.76
Aromatics:	2.82	2.62	2.45
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.80	0.92	0.69

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	

Multisubstituted Aromatics: 1.89(Mass%) 1.75(Vol%)

Average Molecular Weight: 86.22

Relative Density: 0.66

Reid Vapor Pressure @ 100F: 6.51psi - 44.89kPa

Calculated Octane Number: 64.4

Motor Octane Number (Jenkins Calculation): 61.8

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	-43.67	155.71	T50	T90	FBP
BP by Vol (Deg F)	-43.67	155.71	T50	T90	FBP

Percent Carbon: 84.91

Percent Hydrogen: 15.09

Bromine Number (Calc): 0.01

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	8.14
Light Ends (C2s-C5s Vol %)	8.34

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF
Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.48
Sample Den: 0.81

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	72.05	0.63
C6	85.33	0.69
C7	98.83	0.72
C8	112.43	0.74
C9	125.95	0.76
C10	141.78	0.75
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	86.20	0.66

Octane Number

Research Octane Number:	64.4
Motor Octane Number:	61.8

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900 Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.48 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.07	0.00	0.00	0.00	0.00	0.00	0.07
C3	0.57	0.00	0.00	0.00	0.00	0.00	0.57
C4	1.56	0.30	0.00	0.00	0.00	0.00	1.85
C5	2.19	1.27	0.00	0.18	0.00	0.00	3.64
C6	2.03	1.87	0.00	1.47	0.20	0.00	5.57
C7	1.76	1.78	0.00	3.13	0.39	0.00	7.06
C8	1.37	2.34	0.00	2.79	0.90	0.03	7.43
C9	0.99	2.17	0.00	1.77	1.27	0.26	6.45
C10	0.83	1.52	0.00	0.44	0.07	0.51	3.37
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.37	11.25	0.00	9.78	2.82	0.80	35.21

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.80 Grand Total: 36.01

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.16	0.00	0.00	0.00	0.00	0.00	0.16
C3	0.91	0.00	0.00	0.00	0.00	0.00	0.91
C4	2.17	0.43	0.00	0.00	0.00	0.00	2.60
C5	2.81	1.66	0.00	0.19	0.00	0.00	4.67
C6	2.48	2.30	0.00	1.56	0.18	0.00	6.52
C7	2.08	2.10	0.00	3.33	0.36	0.00	7.86
C8	1.57	2.68	0.00	2.92	0.84	0.04	8.04
C9	1.12	2.42	0.00	1.82	1.18	0.29	6.83
C10	0.92	1.67	0.00	0.44	0.06	0.59	3.68
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	14.23	13.24	0.00	10.27	2.62	0.92	40.35

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.92 Grand Total: 41.27

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF
Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.48
Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.21	0.00	0.00	0.00	0.00	0.00	0.21
C3	1.20	0.00	0.00	0.00	0.00	0.00	1.20
C4	2.50	0.47	0.00	0.00	0.00	0.00	2.97
C5	2.83	1.65	0.00	0.23	0.00	0.00	4.71
C6	2.20	2.03	0.00	1.63	0.23	0.00	6.09
C7	1.64	1.66	0.00	2.97	0.39	0.00	6.66
C8	1.12	1.91	0.00	2.32	0.79	0.03	6.16
C9	0.72	1.57	0.00	1.31	0.99	0.27	4.86
C10	0.54	1.00	0.00	0.29	0.05	0.39	2.27
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.96	10.29	0.00	8.76	2.45	0.69	34.45

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.69
Grand Total: 35.15

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900 Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.48 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6973	200.0000	P2	ethane	0.0679	0.1610	0.2105	-127.480	-88.600	XXX
6.9556	300.0000	P3	propane	0.5680	0.9150	1.2014	-43.672	-42.040	XXX
7.0731	325.8000		unknown	0.0008	0.0009	0.0017	-43.672	-42.040	XXX
7.3594	367.5000	I4	i-butane	0.2959	0.4281	0.4748	10.904	-11.720	XXX
7.7059	400.0000	P4	n-butane	1.5564	2.1678	2.4973	31.100	-0.500	XXX
7.8768	414.2400	I5	2,2-dimethylpropane	0.0041	0.0056	0.0053	49.100	9.500	XXX
8.9749	475.2300	I5	i-pentane	1.2697	1.6521	1.6413	82.112	27.840	XXX
9.6604	500.0000	P5	n-pentane	2.1864	2.8148	2.8262	96.908	36.060	XXX
10.0313	511.3200	O5	t-pentene-2	0.0012	0.0015	0.0016	97.412	36.340	XXX
10.9601	535.0100	I6	2,2-dimethylbutane	0.0236	0.0293	0.0256	121.514	49.730	XXX
12.3399	562.1400	N5	cyclopentane	0.1766	0.1910	0.2349	120.650	49.250	XXX
12.4101	563.3400	I6	2,3-dimethylbutane	0.1110	0.1353	0.1201	136.364	57.980	XXX
12.6311	567.0200	I6	2-methylpentane	1.0682	1.3186	1.1560	140.468	60.260	XXX
13.5317	580.7300	I6	3-methylpentane	0.6698	0.8129	0.7249	145.886	63.270	XXX
15.0296	600.0000	P6	n-hexane	2.0316	2.4839	2.1987	155.714	68.730	XXX
18.3609	627.9300	I7	2,2-dimethylpentane	0.0242	0.0290	0.0225	174.542	79.190	XXX
18.7265	630.5000	N6	methylcyclopentane	0.9299	1.0014	1.0304	161.240	71.800	XXX
19.3220	634.5200	I7	2,4-dimethylpentane	0.0707	0.0847	0.0658	176.882	80.490	XXX
20.1818	640.0000	I7	2,2,3-trimethylbutane	0.0041	0.0048	0.0039	177.584	80.880	XXX
22.7063	654.2900	A6	benzene	0.1950	0.1789	0.2329	176.162	80.090	XXX
23.7712	659.6500	I7	3,3-dimethylpentane	0.0172	0.0200	0.0160	186.908	86.060	XXX
24.4754	663.0200	N6	cyclohexane	0.5418	0.5610	0.6004	177.296	80.720	XXX
26.4485	671.7900	I7	2-methylhexane	0.5587	0.6637	0.5200	194.090	90.050	XXX
26.7820	673.1900	I7	2,3-dimethylpentane	0.2351	0.2727	0.2188	193.604	89.780	XXX
27.3519	675.5200	N7	1,1-dimethylcyclopentane	0.1752	0.1872	0.1664	189.464	87.480	XXX
28.4158	679.7100	I7	3-methylhexane	0.7965	0.9345	0.7413	197.330	91.850	XXX
29.8548	685.0600	N7	1c,3-dimethylcyclopentane	0.3824	0.4139	0.3632	195.386	90.770	XXX
30.5235	687.4300	N7	1t,3-dimethylcyclopentane	0.3567	0.3841	0.3389	197.096	91.720	XXX
30.9000	688.7400	I7	3-ethylpentane	0.0749	0.0865	0.0698	200.246	93.470	XXX
31.1833	689.7100	N7	1t,2-dimethylcyclopentane	0.6866	0.7367	0.6522	197.366	91.870	XXX
34.3963	700.0000	P7	n-heptane	1.7615	2.0771	1.6395	209.156	98.420	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.48
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
38.6433	724.5900	N7	1c,2-dimethylcyclopentane	0.0905	0.0997	0.0860	211.154	99.530	XXX
38.7714	725.2800	N7	methylcyclohexane	1.3170	1.3800	1.2510	213.674	100.930	XXX
39.5500	729.4200	I8	2,2-dimethylhexane	0.2754	0.3193	0.2248	224.312	106.840	XXX
41.4706	739.2200	N7	ethylcyclopentane	0.1195	0.1257	0.1135	218.246	103.470	XXX
41.9101	741.3900	I8	2,5-dimethylhexane	0.0690	0.0802	0.0563	228.398	109.110	XXX
42.3119	743.3400	I8	2,4-dimethylhexane	0.1190	0.1370	0.0972	228.974	109.430	XXX
43.4385	748.7100	N8	1c,2t,4-trimethylcyclopentane	0.3106	0.3280	0.2581	242.132	116.740	XXX
43.7766	750.2900	I8	3,3-dimethylhexane	0.0373	0.0424	0.0305	233.546	111.970	XXX
45.0277	756.0200	N8	1t,2c,3-trimethylcyclopentane	0.3178	0.3325	0.2641	230.738	110.410	XXX
45.6530	758.8100	I8	2,3,4-trimethylpentane	0.0109	0.0123	0.0089	236.246	113.470	XXX
46.4149	762.1500	A7	toluene	0.3902	0.3629	0.3950	231.134	110.630	XXX
48.0583	769.1500	I8	2,3-dimethylhexane	0.1790	0.2027	0.1462	240.098	115.610	XXX
48.2922	770.1200	I8	2-methyl-3-ethylpentane	0.0481	0.0545	0.0393	240.098	115.610	XXX
49.3710	774.5400	I8	2-methylheptane	0.7053	0.8147	0.5758	243.770	117.650	XXX
49.6702	775.7400	I8	4-methylheptane	0.2655	0.3038	0.2168	243.878	117.710	XXX
49.8266	776.3700	I8	3-methyl-3-ethylpentane	0.0406	0.0459	0.0331	240.098	115.610	XXX
49.9593	776.9000	I8	3,4-dimethylhexane	0.0589	0.0661	0.0481	243.914	117.730	XXX
50.3502	778.4500		unknown	0.0314	0.0362	0.0257	243.914	117.730	XXX
50.4346	778.7900	N8	1c,3-dimethylcyclohexane	0.0266	0.0282	0.0221	246.848	119.360	XXX
50.9006	780.6200	I8	3-methylheptane	0.4465	0.5101	0.3646	246.074	118.930	XXX
51.0567	781.2200	N8	1c,2t,3-trimethylcyclopentane	0.6835	0.7152	0.5680	243.500	117.500	XXX
51.2084	781.8100	I8	3-ethylhexane	0.0796	0.0900	0.0650	245.372	118.540	XXX
51.4433	782.7200	N8	1t,4-dimethylcyclohexane	0.2159	0.2282	0.1794	246.848	119.360	XXX
52.5281	786.8600	N8	1,1-dimethylcyclohexane	0.0693	0.0715	0.0576	247.190	119.550	XXX
53.0547	788.8300	I9	2,2,5-trimethylhexane	0.0033	0.0038	0.0024	255.362	124.090	XXX
53.2950	789.7200	N8	3t-ethylmethylcyclopentane	0.0684	0.0719	0.0569	249.980	121.100	XXX
53.7154	791.2700	N8	3c-ethylmethylcyclopentane	0.0619	0.0651	0.0515	249.980	121.100	XXX
53.9609	792.1700	N8	2t-ethylmethylcyclopentane	0.1543	0.1617	0.1282	250.160	121.200	XXX
54.3591	793.6200	N8	1,1-methylethylcyclopentane	0.0265	0.0274	0.0221	250.754	121.530	XXX
54.8879	795.5200	N8	1t,2-dimethylcyclohexane	0.2781	0.2890	0.2312	254.174	123.430	XXX
56.1539	800.0000	P8	n-octane	1.3703	1.5726	1.1188	258.224	125.680	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900 Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.48 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
56.2667	800.7600	N8	i-propylcyclopentane	0.1622	0.1684	0.1348	259.574	126.430	XXX
57.4259	808.5000		unknown	0.0021	0.0025	0.0018	259.574	126.430	XXX
57.5984	809.6400		unknown	0.0095	0.0109	0.0079	259.574	126.430	XXX
57.6768	810.1600	I9	2,4,4-trimethylhexane	0.0416	0.0453	0.0302	32.000	0.000	XXX
58.1230	813.0800		unknown	0.0030	0.0035	0.0022	32.000	0.000	XXX
58.3465	814.5300		unknown	0.0066	0.0076	0.0192	32.000	0.000	XXX
58.7738	817.2900		unknown	0.0285	0.0328	0.0831	32.000	0.000	XXX
59.1875	819.9400	I9	2,3,4-trimethylhexane	0.0189	0.0206	0.0138	282.308	139.060	XXX
59.5160	822.0300	I9	2,2,3,4-tetramethylpentane	0.0207	0.0225	0.0150	271.454	133.030	XXX
59.8286	824.0100	N8	N8-[1]	0.0156	0.0161	0.0130	271.454	133.030	XXX
60.5780	828.7000	N8	1c,2-dimethylcyclohexane	0.1250	0.1266	0.1039	265.532	129.740	XXX
60.7432	829.7300	I9	2,3,5-trimethylhexane	0.0392	0.0438	0.0285	268.430	131.350	XXX
60.8861	830.6100	I9	2,2-dimethylheptane	0.0122	0.0138	0.0088	270.860	132.700	XXX
61.1113	832.0000	N8	N8-[2]	0.0152	0.0157	0.0127	270.860	132.700	XXX
61.3908	833.7200		unknown	0.0096	0.0111	0.0080	270.860	132.700	XXX
61.4808	834.2700		unknown	0.0783	0.0902	0.0651	270.860	132.700	XXX
61.5517	834.7000	N9	1,1,4-trimethylcyclohexane	0.3585	0.3743	0.2648	275.000	135.000	XXX
61.7300	835.7900	I9	2,2,3-trimethylhexane	0.2340	0.2637	0.1702	271.220	132.900	XXX
62.1235	838.1800	I9	2,4-dimethylheptane	0.0344	0.0388	0.0250	271.220	132.900	XXX
62.5143	840.5300	N8	n-propylcyclopentane	0.2633	0.2735	0.2189	267.728	130.960	XXX
62.8895	842.7800	I9	2,5-dimethylheptane	0.1527	0.1718	0.1110	276.800	136.000	XXX
63.0938	843.9900	N9	*1c,3c,5-trimethylcyclohexane	0.0229	0.0240	0.0169	281.174	138.430	XXX
63.1459	844.3000	I9	3,3-dimethylheptane	0.0157	0.0175	0.0114	278.636	137.020	XXX
63.3867	845.7300	I9	3,5-dimethylheptane	0.0391	0.0437	0.0285	276.800	136.000	XXX
63.6048	847.0200	I9	2,6-dimethylheptane	0.0552	0.0628	0.0401	275.396	135.220	XXX
63.6866	847.5000		unknown	0.0200	0.0231	0.0146	275.396	135.220	XXX
63.8678	848.5600	N9	1,1,3-trimethylcyclohexane	0.0353	0.0362	0.0261	295.862	146.590	XXX
64.6176	852.9300	N9	1c,3c,5c-trimethylcyclohexane	0.0225	0.0232	0.0166	32.000	0.000	XXX
64.7114	853.4700	A8	ethylbenzene	0.0830	0.0772	0.0729	277.160	136.200	XXX
64.8225	854.1100	N9	1c,2t,4t-trimethylcyclohexane	0.1170	0.1209	0.0864	32.000	0.000	XXX
65.1641	856.0700	I9	I9-[1]	0.1891	0.2089	0.1375	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF
Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.48
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
65.5391	858.2200	N9	N9-[1]	0.0162	0.0167	0.0120	32.000	0.000	XXX
65.8112	859.7600	N9	N9-[2]	0.0107	0.0111	0.0079	32.000	0.000	XXX
66.1765	861.8300	A8	1,3-dimethylbenzene	0.3847	0.3589	0.3380	282.416	139.120	XXX
66.3813	862.9800	A8	1,4-dimethylbenzene	0.2444	0.2289	0.2147	281.048	138.360	XXX
66.7275	864.9200	I9	3,4-dimethylheptane	0.0360	0.0396	0.0261	285.080	140.600	XXX
66.8559	865.6300	N9	N9-[3]	0.0437	0.0451	0.0323	285.080	140.600	XXX
67.2011	867.5500	I9	4-ethylheptane	0.0859	0.0962	0.0625	288.392	142.440	XXX
67.2792	867.9800	I9	I9-[2]	0.0103	0.0114	0.0075	288.392	142.440	XXX
67.5767	869.6300		unknown	0.0075	0.0086	0.0054	288.392	142.440	XXX
67.6835	870.2100	I9	4-methyloctane	0.2185	0.2446	0.1589	288.392	142.440	XXX
67.8519	871.1400	I9	2-methyloctane	0.2367	0.2675	0.1721	289.904	143.280	XXX
68.0017	871.9600		unknown	0.0036	0.0042	0.0026	289.904	143.280	XXX
68.3383	873.7900	N9	1c,2t,3c-trimethylcyclohexane	0.0082	0.0087	0.0061	304.160	151.200	XXX
68.4847	874.5900	I9	3-ethylheptane	0.0184	0.0204	0.0134	289.400	143.000	XXX
68.7378	875.9600	I9	3,3-diethylpentane	0.0737	0.0784	0.0536	270.842	132.690	XXX
68.9491	877.1000	I9	3-methyloctane	0.4277	0.4786	0.3110	291.614	144.230	XXX
69.2532	878.7300	N9	1c,2t,4c-trimethylcyclohexane	0.0299	0.0312	0.0221	275.000	135.000	XXX
69.4446	879.7500		unknown	0.0313	0.0360	0.0231	275.000	135.000	XXX
69.7182	881.2100	N9	1,1,2-trimethylcyclohexane	0.0309	0.0311	0.0228	293.360	145.200	XXX
69.9126	882.2400	A8	1,2-dimethylbenzene	0.1862	0.1706	0.1636	291.974	144.430	XXX
70.0734	883.0900	I9	I9-[3]	0.0392	0.0433	0.0285	291.974	144.430	XXX
70.1476	883.4900		unknown	0.0202	0.0233	0.0147	291.974	144.430	XXX
70.2417	883.9800	I9	I9-[4]	0.0089	0.0098	0.0064	291.974	144.430	XXX
70.5119	885.4100	N9	N9-[4]	0.0107	0.0111	0.0079	291.974	144.430	XXX
70.8534	887.1900	N9	N9-[5]	0.1321	0.1365	0.0976	291.974	144.430	XXX
71.0626	888.2900	N9	N9-[6]	0.2231	0.2306	0.1648	291.974	144.430	XXX
71.4440	890.2700	I9	I9-[5]	0.1130	0.1247	0.0821	291.974	144.430	XXX
71.5380	890.7500	I9	I9-[6]	0.0228	0.0252	0.0166	291.974	144.430	XXX
71.8407	892.3100	N9	i-butylcyclopentane	0.0217	0.0224	0.0161	298.346	147.970	XXX
72.0585	893.4300		unknown	0.0236	0.0272	0.0174	298.346	147.970	XXX
72.1203	893.7500	N9	N9-[7]	0.0102	0.0105	0.0075	298.346	147.970	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900 Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.48 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
72.2931	894.6300		unknown	0.0115	0.0132	0.0085	298.346	147.970	XXX
73.1977	899.2200	I9	I9-[7]	0.0179	0.0198	0.0130	298.346	147.970	XXX
73.3511	900.0000	P9	n-nonane	0.9937	1.1164	0.7226	303.476	150.820	XXX
73.5431	901.4800	N9	1,1-methylethylcyclohexane	0.0755	0.0755	0.0558	305.924	152.180	XXX
73.7383	902.9900	N9	N9-[8]	0.0281	0.0287	0.0208	305.924	152.180	XXX
74.0633	905.4900	N9	N9-[9]	0.1821	0.1859	0.1346	305.924	152.180	XXX
74.5090	908.9000	N9	N9-[10]	0.0455	0.0464	0.0336	305.924	152.180	XXX
74.6537	910.0000		unknown	0.0074	0.0085	0.0055	305.924	152.180	XXX
75.1416	913.7000	A9	i-propylbenzene	0.0317	0.0297	0.0246	306.338	152.410	XXX
75.2324	914.3900		unknown	0.0064	0.0074	0.0050	306.338	152.410	XXX
75.4661	916.1500	I10	I10-[1]	0.0321	0.0354	0.0210	306.338	152.410	XXX
75.7528	918.3000	N9	N9-[11]	0.1236	0.1262	0.0913	306.338	152.410	XXX
76.0104	920.2300	I10	I10-[2]	0.0776	0.0857	0.0509	306.338	152.410	XXX
76.2833	922.2600	I10	2,4-dimethyloctane	0.0490	0.0543	0.0321	312.620	155.900	XXX
76.3648	922.8600		unknown	0.0080	0.0092	0.0052	312.620	155.900	XXX
76.6315	924.8400	N9	N9-[12]	0.0228	0.0233	0.0169	312.620	155.900	XXX
76.7134	925.4400		unknown	0.0230	0.0265	0.0170	312.620	155.900	XXX
76.8799	926.6700	N9	N9-[13]	0.0065	0.0066	0.0048	312.620	155.900	XXX
77.1461	928.6300	I10	2,6-dimethyloctane	0.0152	0.0168	0.0099	320.738	160.410	XXX
77.3225	929.9200	I10	2,5-dimethyloctane	0.0756	0.0835	0.0496	317.300	158.500	XXX
77.5831	931.8300	N9	n-butylcyclopentane	0.1902	0.1954	0.1405	313.916	156.620	XXX
77.8233	933.5800		unknown	0.0324	0.0373	0.0240	313.916	156.620	XXX
77.9241	934.3100	I10	I10-[3]	0.0284	0.0313	0.0186	313.916	156.620	XXX
78.1261	935.7800	N10	N10-[1]	0.0923	0.0930	0.0614	313.916	156.620	XXX
78.3431	937.3400	I10	I10-[4]	0.0313	0.0345	0.0205	313.916	156.620	XXX
78.6334	939.4400	I10	3,3-dimethyloctane	0.2367	0.2582	0.1551	322.160	161.200	XXX
78.8388	940.9100		unknown	0.0527	0.0606	0.0345	322.160	161.200	XXX
79.0661	942.5400		unknown	0.0090	0.0103	0.0059	322.160	161.200	XXX
79.2362	943.7500		unknown	0.0495	0.0570	0.0324	322.160	161.200	XXX
79.4383	945.1900		unknown	0.0170	0.0195	0.0111	322.160	161.200	XXX
79.5414	945.9200	N10	N10-[2]	0.0801	0.0807	0.0533	322.160	161.200	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF
Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900
Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line
Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.48
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
79.7174	947.1700	A9	n-propylbenzene	0.1674	0.1566	0.1299	318.632	159.240	XXX
79.7875	947.6700		unknown	0.0313	0.0361	0.0243	318.632	159.240	XXX
80.0595	949.5900		unknown	0.0272	0.0313	0.0211	318.632	159.240	XXX
80.2361	950.8300	N10	N10-[3]	0.0365	0.0368	0.0243	318.632	159.240	XXX
80.3883	951.9000		unknown	0.0188	0.0216	0.0125	318.632	159.240	XXX
80.6094	953.4500	A9	1,3-methylethylbenzene	0.1451	0.1353	0.1126	322.394	161.330	XXX
80.9216	955.6300	A9	1,4-methylethylbenzene	0.0815	0.0763	0.0633	323.618	162.010	XXX
81.0208	956.3200		unknown	0.0134	0.0154	0.0104	323.618	162.010	XXX
81.4718	959.4500		unknown	0.0265	0.0305	0.0205	323.618	162.010	XXX
81.5775	960.1800	N10	N10-[4]	0.0634	0.0639	0.0422	323.618	162.010	XXX
81.6802	960.8900	A9	1,3,5-trimethylbenzene	0.3069	0.2860	0.2381	328.532	164.740	XXX
81.9998	963.0900	I10	I10-[5]	0.0296	0.0323	0.0194	328.532	164.740	XXX
82.1693	964.2500	I10	I10-[6]	0.0372	0.0405	0.0244	328.532	164.740	XXX
82.2639	964.9000	I10	5-methylnonane	0.0705	0.0776	0.0462	329.180	165.100	XXX
82.4275	966.0200		unknown	0.0335	0.0386	0.0220	329.180	165.100	XXX
82.5146	966.6100	I10	4-methylnonane	0.2630	0.2865	0.1724	32.000	0.000	XXX
82.8691	969.0200	A9	1,2-methylethylbenzene	0.1454	0.1331	0.1128	329.324	165.180	XXX
83.1125	970.6700	I10	2-methylnonane	0.0753	0.0835	0.0493	332.654	167.030	XXX
83.3572	972.3300	I10	3-ethyloctane	0.0491	0.0535	0.0322	331.700	166.500	XXX
83.6662	974.4100	N10	N10-[5]	0.0113	0.0113	0.0075	331.700	166.500	XXX
83.7805	975.1800	I10	3-methylnonane	0.1752	0.1926	0.1149	334.040	167.800	XXX
83.9557	976.3500		unknown	0.0457	0.0526	0.0299	334.040	167.800	XXX
84.0504	976.9800	N10	N10-[6]	0.0412	0.0415	0.0274	334.040	167.800	XXX
84.2365	978.2300		unknown	0.0128	0.0148	0.0085	334.040	167.800	XXX
84.4283	979.5000	I10	I10-[7]	0.0355	0.0387	0.0233	334.040	167.800	XXX
84.4681	979.7700		unknown	0.0198	0.0228	0.0130	334.040	167.800	XXX
84.5579	980.3700		unknown	0.0039	0.0045	0.0026	334.040	167.800	XXX
84.8061	982.0100	I10	I10-[8]	0.0129	0.0140	0.0085	334.040	167.800	XXX
84.9809	983.1700	I10	I10-[9]	0.0033	0.0035	0.0021	334.040	167.800	XXX
85.1859	984.5200	A9	1,2,4-trimethylbenzene	0.3929	0.3616	0.3048	336.884	169.380	XXX
85.3560	985.6400	N10	i-butylcyclohexane	0.1062	0.1076	0.0706	340.340	171.300	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 8:55:35 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-6-D7900.0004.CDF Acquired: 05/29/20 16:33:28
Sample: 20-NEDR-814-6-D7900 Analyzed: 5/29/2020 8:55:35 PM
Processed 201 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1552 Line Yield: 36.01
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.48 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
85.5714	987.0500	I10	I10-[10]	0.0858	0.0935	0.0562	340.340	171.300	XXX
85.7698	988.3500	I10	I10-[11]	0.1056	0.1150	0.0692	340.340	171.300	XXX
85.9675	989.6500	I10	I10-[12]	0.0242	0.0264	0.0159	340.340	171.300	XXX
86.0351	990.0900		unknown	0.0104	0.0120	0.0068	340.340	171.300	XXX
86.2244	991.3200	N10	N10-[7]	0.0092	0.0092	0.0061	340.340	171.300	XXX
86.3324	992.0200		unknown	0.0258	0.0297	0.0172	340.340	171.300	XXX
86.5374	993.3500	I10	I10-[13]	0.0106	0.0116	0.0070	340.340	171.300	XXX
86.7590	994.7800		unknown	0.0021	0.0024	0.0062	340.340	171.300	XXX
86.8560	995.4100		unknown	0.0156	0.0179	0.0454	340.340	171.300	XXX
86.9637	996.1000	A10	i-butylbenzene	0.0229	0.0216	0.0159	343.022	172.790	XXX
87.2080	997.6800	A10	sec-butylbenzene	0.0422	0.0395	0.0293	344.012	173.340	XXX
87.3385	998.5100		unknown	0.0165	0.0190	0.0115	344.012	173.340	XXX
87.5697	1000.0000	P10	n-decane	0.8302	0.9168	0.5442	345.470	174.150	XXX

WTI 1594 Analysis

Crude Oil Type: WTI
Date of Sample: May 29, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1594

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 5/29/2020 10:46:55 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF
Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900
Analyzed: 5/29/2020 10:46:55 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
Sample Wt: 10.36
Sample Den: 0.81

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	10.23	12.75	11.40
I-Paraffins:	10.37	12.28	9.55
Olefins:	0.00	0.00	0.00
Naphthenes:	11.46	12.08	10.52
Aromatics:	2.81	2.62	2.52
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.74	0.86	0.68

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	

Multisubstituted Aromatics: 1.59(Mass%) 1.48(Vol%)

Average Molecular Weight: 86.08

Relative Density: 0.66

Reid Vapor Pressure @ 100F: 4.85psi - 33.42kPa

Calculated Octane Number: 64.7

Motor Octane Number (Jenkins Calculation): 62.0

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	174.54	T50	T90	FBP
BP by Vol (Deg F)	-43.67	174.54	T50	T90	FBP

Percent Carbon: 84.97

Percent Hydrogen: 15.03

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	6.86
Light Ends (C2s-C5s Vol %)	7.09

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
Sample Wt: 10.36 Sample Den: 0.81

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	72.02	0.63
C6	85.13	0.70
C7	98.52	0.73
C8	112.32	0.75
C9	126.17	0.76
C10	141.82	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	86.10	0.66

Octane Number

Research Octane Number:	64.7
Motor Octane Number:	62.0

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
Sample Wt: 10.36 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.04	0.00	0.00	0.00	0.00	0.00	0.04
C3	0.42	0.00	0.00	0.00	0.00	0.00	0.42
C4	1.26	0.23	0.00	0.00	0.00	0.00	1.50
C5	1.89	1.17	0.00	0.21	0.00	0.00	3.27
C6	1.82	1.87	0.00	2.20	0.22	0.00	6.11
C7	1.70	1.70	0.00	3.94	0.63	0.00	7.98
C8	1.30	2.04	0.00	2.86	0.92	0.02	7.14
C9	0.97	1.98	0.00	1.85	0.99	0.24	6.04
C10	0.82	1.38	0.00	0.39	0.05	0.48	3.12
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	10.23	10.37	0.00	11.46	2.81	0.74	34.87

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.74 Grand Total: 35.62

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.09	0.00	0.00	0.00	0.00	0.00	0.09
C3	0.69	0.00	0.00	0.00	0.00	0.00	0.69
C4	1.77	0.34	0.00	0.00	0.00	0.00	2.11
C5	2.45	1.53	0.00	0.23	0.00	0.00	4.21
C6	2.23	2.30	0.00	2.34	0.20	0.00	7.08
C7	2.02	2.01	0.00	4.20	0.59	0.00	8.82
C8	1.49	2.35	0.00	3.00	0.86	0.03	7.74
C9	1.10	2.23	0.00	1.91	0.93	0.28	6.44
C10	0.91	1.52	0.00	0.40	0.05	0.55	3.43
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.75	12.28	0.00	12.08	2.62	0.86	39.73

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.86 Grand Total: 40.59

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05

Sample: 20-NEDR-814-8-D7900

Analyzed: 5/29/2020 10:46:56 PM

Processed 199 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: Shore Tank 1594 Line

Yield: 35.62

Int Std: MEK

Int Std Amt: 0.34

Sample Wt: 10.36 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.12	0.00	0.00	0.00	0.00	0.00	0.12
C3	0.90	0.00	0.00	0.00	0.00	0.00	0.90
C4	2.04	0.37	0.00	0.00	0.00	0.00	2.41
C5	2.46	1.52	0.00	0.28	0.00	0.00	4.26
C6	1.98	2.03	0.00	2.45	0.26	0.00	6.73
C7	1.59	1.59	0.00	3.76	0.64	0.00	7.58
C8	1.06	1.67	0.00	2.39	0.81	0.02	5.96
C9	0.71	1.45	0.00	1.37	0.77	0.29	4.59
C10	0.54	0.91	0.00	0.26	0.04	0.37	2.12
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.40	9.55	0.00	10.52	2.52	0.68	33.99

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.68	Grand Total:	34.67

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF
Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900
Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.36
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6944	200.0000	P2	ethane	0.0394	0.0940	0.1229	-127.480	-88.600	XXX
6.9537	300.0000	P3	propane	0.4243	0.6868	0.9016	-43.672	-42.040	XXX
7.3585	367.5800	I4	i-butane	0.2325	0.3381	0.3749	10.904	-11.720	XXX
7.7055	400.0000	P4	n-butane	1.2637	1.7687	2.0373	31.100	-0.500	XXX
7.8798	414.4800	I5	2,2-dimethylpropane	0.0036	0.0050	0.0047	49.100	9.500	XXX
8.9017	472.0900		unknown	0.0008	0.0010	0.0011	49.100	9.500	XXX
8.9776	475.2600	I5	i-pentane	1.1643	1.5222	1.5121	82.112	27.840	XXX
9.6646	500.0000	P5	n-pentane	1.8928	2.4487	2.4583	96.908	36.060	XXX
10.0442	511.5400	O5	t-pentene-2	0.0008	0.0009	0.0010	97.412	36.340	XXX
10.9659	534.9600	I6	2,2-dimethylbutane	0.0300	0.0374	0.0326	121.514	49.730	XXX
12.3484	562.0800	N5	cyclopentane	0.2091	0.2272	0.2794	120.650	49.250	XXX
12.4200	563.3000	I6	2,3-dimethylbutane	0.1108	0.1356	0.1204	136.364	57.980	XXX
12.6409	566.9700	I6	2-methylpentane	1.0238	1.2699	1.1132	140.468	60.260	XXX
13.5445	580.6900	I6	3-methylpentane	0.7048	0.8595	0.7663	145.886	63.270	XXX
15.0506	600.0000	P6	n-hexane	1.8191	2.2348	1.9780	155.714	68.730	XXX
18.3872	627.9300	I7	2,2-dimethylpentane	0.0283	0.0340	0.0265	174.542	79.190	XXX
18.7587	630.5400	N6	methylcyclopentane	1.0537	1.1402	1.1731	161.240	71.800	XXX
19.3509	634.5300	I7	2,4-dimethylpentane	0.0702	0.0845	0.0657	176.882	80.490	XXX
20.2309	640.1200	I7	2,2,3-trimethylbutane	0.0058	0.0068	0.0054	177.584	80.880	XXX
22.7416	654.3000	A6	benzene	0.2188	0.2017	0.2625	176.162	80.090	XXX
23.8064	659.6600	I7	3,3-dimethylpentane	0.0190	0.0222	0.0177	186.908	86.060	XXX
24.5148	663.0400	N6	cyclohexane	1.1503	1.1969	1.2807	177.296	80.720	XXX
26.4953	671.8300	I7	2-methylhexane	0.5562	0.6639	0.5201	194.090	90.050	XXX
26.8282	673.2200	I7	2,3-dimethylpentane	0.2094	0.2440	0.1958	193.604	89.780	XXX
27.3916	675.5200	N7	1,1-dimethylcyclopentane	0.1868	0.2006	0.1783	189.464	87.480	XXX
28.4637	679.7400	I7	3-methylhexane	0.7415	0.8743	0.6934	197.330	91.850	XXX
29.9033	685.0800	N7	1c,3-dimethylcyclopentane	0.3769	0.4100	0.3597	195.386	90.770	XXX
30.5744	687.4600	N7	1t,3-dimethylcyclopentane	0.3473	0.3758	0.3315	197.096	91.720	XXX
30.9500	688.7600	I7	3-ethylpentane	0.0707	0.0820	0.0661	200.246	93.470	XXX
31.2319	689.7300	N7	1t,2-dimethylcyclopentane	0.6519	0.7028	0.6221	197.366	91.870	XXX
34.4435	700.0000	P7	n-heptane	1.7026	2.0174	1.5922	209.156	98.420	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.36 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
38.6750	724.5200	N7	1c,2-dimethylcyclopentane	0.0786	0.0870	0.0750	211.154	99.530	XXX
38.8182	725.2900	N7	methylcyclohexane	2.1417	2.2549	2.0439	213.674	100.930	XXX
39.5886	729.3800	I8	2,2-dimethylhexane	0.2262	0.2635	0.1855	224.312	106.840	XXX
41.5097	739.1900	N7	ethylcyclopentane	0.1587	0.1678	0.1515	218.246	103.470	XXX
41.9550	741.3900	I8	2,5-dimethylhexane	0.0763	0.0891	0.0626	228.398	109.110	XXX
42.3515	743.3200	I8	2,4-dimethylhexane	0.0971	0.1123	0.0796	228.974	109.430	XXX
43.4841	748.7300	N8	1c,2t,4-trimethylcyclopentane	0.2443	0.2592	0.2040	242.132	116.740	XXX
43.8291	750.3400	I8	3,3-dimethylhexane	0.0306	0.0349	0.0251	233.546	111.970	XXX
45.0708	756.0300	N8	1t,2c,3-trimethylcyclopentane	0.2947	0.3099	0.2461	230.738	110.410	XXX
45.7022	758.8500	I8	2,3,4-trimethylpentane	0.0073	0.0083	0.0060	236.246	113.470	XXX
46.4506	762.1300	A7	toluene	0.6294	0.5881	0.6401	231.134	110.630	XXX
48.0911	769.1200	I8	2,3-dimethylhexane	0.1527	0.1737	0.1253	240.098	115.610	XXX
48.3291	770.1100	I8	2-methyl-3-ethylpentane	0.0421	0.0479	0.0345	240.098	115.610	XXX
49.4089	774.5400	I8	2-methylheptane	0.6792	0.7884	0.5572	243.770	117.650	XXX
49.7051	775.7300	I8	4-methylheptane	0.2160	0.2483	0.1772	243.878	117.710	XXX
49.8739	776.4100	I8	3-methyl-3-ethylpentane	0.0275	0.0312	0.0225	240.098	115.610	XXX
49.9957	776.9000	I8	3,4-dimethylhexane	0.0413	0.0465	0.0339	243.914	117.730	XXX
50.3892	778.4600		unknown	0.0243	0.0281	0.0199	243.914	117.730	XXX
50.4668	778.7700	N8	1c,3-dimethylcyclohexane	0.0154	0.0164	0.0129	246.848	119.360	XXX
50.9356	780.6100	I8	3-methylheptane	0.3667	0.4209	0.3008	246.074	118.930	XXX
51.0935	781.2300	N8	1c,2t,3-trimethylcyclopentane	0.7002	0.7363	0.5847	243.500	117.500	XXX
51.2493	781.8300	I8	3-ethylhexane	0.0780	0.0885	0.0640	245.372	118.540	XXX
51.4734	782.7000	N8	1t,4-dimethylcyclohexane	0.2342	0.2489	0.1956	246.848	119.360	XXX
52.5599	786.8400	N8	1,1-dimethylcyclohexane	0.0846	0.0878	0.0707	247.190	119.550	XXX
53.0978	788.8600	I9	2,2,5-trimethylhexane	0.0032	0.0036	0.0023	255.362	124.090	XXX
53.3284	789.7200	N8	3t-ethylmethylcyclopentane	0.0773	0.0816	0.0645	249.980	121.100	XXX
53.7421	791.2400	N8	3c-ethylmethylcyclopentane	0.0689	0.0727	0.0575	249.980	121.100	XXX
53.9923	792.1600	N8	2t-ethylmethylcyclopentane	0.1775	0.1870	0.1482	250.160	121.200	XXX
54.3843	793.5900	N8	1,1-methylethylcyclopentane	0.0264	0.0273	0.0220	250.754	121.530	XXX
54.9229	795.5300	N8	1t,2-dimethylcyclohexane	0.3157	0.3296	0.2636	254.174	123.430	XXX
56.1842	800.0000	P8	n-octane	1.2957	1.4941	1.0629	258.224	125.680	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.36 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
56.2983	800.7700	N8	i-propylcyclopentane	0.1504	0.1570	0.1256	259.574	126.430	XXX
57.6257	809.6200		unknown	0.0104	0.0120	0.0087	259.574	126.430	XXX
57.7024	810.1300	I9	2,4,4-trimethylhexane	0.0289	0.0317	0.0211	32.000	0.000	XXX
58.1493	813.0600		unknown	0.0027	0.0031	0.0020	32.000	0.000	XXX
58.3801	814.5600		unknown	0.0063	0.0073	0.0184	32.000	0.000	XXX
58.8041	817.3000		unknown	0.0262	0.0303	0.0766	32.000	0.000	XXX
59.2128	819.9200	I9	2,3,4-trimethylhexane	0.0154	0.0169	0.0112	282.308	139.060	XXX
59.5497	822.0600	I9	2,2,3,4-tetramethylpentane	0.0238	0.0261	0.0174	271.454	133.030	XXX
59.8490	823.9600	N8	N8-[1]	0.0164	0.0170	0.0137	271.454	133.030	XXX
60.6111	828.7300	N8	1c,2-dimethylcyclohexane	0.1203	0.1224	0.1005	265.532	129.740	XXX
60.7760	829.7600	I9	2,3,5-trimethylhexane	0.0300	0.0337	0.0219	268.430	131.350	XXX
60.9163	830.6200	I9	2,2-dimethylheptane	0.0099	0.0113	0.0072	270.860	132.700	XXX
61.1307	831.9500	N8	N8-[2]	0.0117	0.0122	0.0098	270.860	132.700	XXX
61.5033	834.2400		unknown	0.0809	0.0937	0.0676	270.860	132.700	XXX
61.5834	834.7300	N9	1,1,4-trimethylcyclohexane	0.4809	0.5045	0.3570	275.000	135.000	XXX
61.7531	835.7600	I9	2,2,3-trimethylhexane	0.2599	0.2944	0.1899	271.220	132.900	XXX
62.1531	838.1900	I9	2,4-dimethylheptane	0.0314	0.0355	0.0229	271.220	132.900	XXX
62.5406	840.5300	N8	n-propylcyclopentane	0.3224	0.3365	0.2693	267.728	130.960	XXX
62.9191	842.7900	I9	2,5-dimethylheptane	0.1491	0.1685	0.1089	276.800	136.000	XXX
63.1013	843.8800	N9	*1c,3c,5-trimethylcyclohexane	0.0163	0.0172	0.0121	281.174	138.430	XXX
63.1685	844.2800	I9	3,3-dimethylheptane	0.0153	0.0171	0.0112	278.636	137.020	XXX
63.4135	845.7300	I9	3,5-dimethylheptane	0.0356	0.0400	0.0260	276.800	136.000	XXX
63.6348	847.0300	I9	2,6-dimethylheptane	0.0506	0.0578	0.0370	275.396	135.220	XXX
63.7285	847.5900		unknown	0.0136	0.0158	0.0399	275.396	135.220	XXX
63.8948	848.5600	N9	1,1,3-trimethylcyclohexane	0.0336	0.0346	0.0249	295.862	146.590	XXX
64.5360	852.3000		unknown	0.0029	0.0033	0.0021	295.862	146.590	XXX
64.6403	852.9100	N9	1c,3c,5c-trimethylcyclohexane	0.0256	0.0266	0.0190	32.000	0.000	XXX
64.7316	853.4300	A8	ethylbenzene	0.1376	0.1286	0.1214	277.160	136.200	XXX
64.8450	854.0900	N9	1c,2t,4t-trimethylcyclohexane	0.1083	0.1125	0.0804	32.000	0.000	XXX
65.1866	856.0500	I9	I9-[1]	0.1675	0.1858	0.1223	32.000	0.000	XXX
65.5741	858.2700	N9	N9-[1]	0.0257	0.0267	0.0191	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.36 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
65.8442	859.8000	N9	N9-[2]	0.0118	0.0123	0.0088	32.000	0.000	XXX
66.2035	861.8400	A8	1,3-dimethylbenzene	0.3836	0.3595	0.3385	282.416	139.120	XXX
66.4080	862.9900	A8	1,4-dimethylbenzene	0.2386	0.2245	0.2106	281.048	138.360	XXX
66.7592	864.9500	I9	3,4-dimethylheptane	0.0258	0.0285	0.0188	285.080	140.600	XXX
66.8897	865.6800	N9	N9-[3]	0.0314	0.0326	0.0233	285.080	140.600	XXX
67.2213	867.5300	I9	4-ethylheptane	0.0786	0.0885	0.0575	288.392	142.440	XXX
67.2958	867.9400	I9	I9-[2]	0.0202	0.0224	0.0147	288.392	142.440	XXX
67.5938	869.5800		unknown	0.0150	0.0173	0.0109	288.392	142.440	XXX
67.7066	870.2000	I9	4-methyloctane	0.1751	0.1970	0.1280	288.392	142.440	XXX
67.8760	871.1300	I9	2-methyloctane	0.2162	0.2455	0.1579	289.904	143.280	XXX
68.3800	873.8900	N9	1c,2t,3c-trimethylcyclohexane	0.0117	0.0125	0.0087	304.160	151.200	XXX
68.5194	874.6400	I9	3-ethylheptane	0.0332	0.0370	0.0243	289.400	143.000	XXX
68.7585	875.9400	I9	3,3-diethylpentane	0.0561	0.0600	0.0410	270.842	132.690	XXX
68.9700	877.0800	I9	3-methyloctane	0.3624	0.4074	0.2647	291.614	144.230	XXX
69.2699	878.6900	N9	1c,2t,4c-trimethylcyclohexane	0.0254	0.0267	0.0189	275.000	135.000	XXX
69.4610	879.7100		unknown	0.0301	0.0349	0.0224	275.000	135.000	XXX
69.7385	881.1900	N9	1,1,2-trimethylcyclohexane	0.0322	0.0326	0.0239	293.360	145.200	XXX
69.9395	882.2600	A8	1,2-dimethylbenzene	0.1607	0.1479	0.1418	291.974	144.430	XXX
70.1030	883.1300	I9	I9-[3]	0.0393	0.0436	0.0287	291.974	144.430	XXX
70.1668	883.4700		unknown	0.0196	0.0227	0.0144	291.974	144.430	XXX
70.2652	883.9900	I9	I9-[4]	0.0098	0.0109	0.0072	291.974	144.430	XXX
70.5285	885.3700	N9	N9-[4]	0.0077	0.0080	0.0057	291.974	144.430	XXX
70.8737	887.1800	N9	N9-[5]	0.1102	0.1145	0.0818	291.974	144.430	XXX
71.0850	888.2800	N9	N9-[6]	0.2218	0.2304	0.1647	291.974	144.430	XXX
71.4598	890.2300	I9	I9-[5]	0.1026	0.1138	0.0749	291.974	144.430	XXX
71.5446	890.6700	I9	I9-[6]	0.0280	0.0311	0.0204	291.974	144.430	XXX
71.8534	892.2600	N9	i-butylcyclopentane	0.0224	0.0232	0.0166	298.346	147.970	XXX
72.0884	893.4700		unknown	0.0240	0.0278	0.0178	298.346	147.970	XXX
72.1398	893.7400	N9	N9-[7]	0.0100	0.0103	0.0074	298.346	147.970	XXX
72.2727	894.4200		unknown	0.0080	0.0093	0.0060	298.346	147.970	XXX
73.1819	899.0400	I9	I9-[7]	0.0158	0.0176	0.0116	298.346	147.970	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900 Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.36 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
73.3722	900.0000	P9	n-nonane	0.9726	1.0980	0.7106	303.476	150.820	XXX
73.5648	901.4900	N9	1,1-methylethylcyclohexane	0.0669	0.0673	0.0497	305.924	152.180	XXX
73.7677	903.0600	N9	N9-[8]	0.0352	0.0361	0.0261	305.924	152.180	XXX
74.0860	905.5100	N9	N9-[9]	0.1719	0.1762	0.1276	305.924	152.180	XXX
74.5286	908.8900	N9	N9-[10]	0.0486	0.0498	0.0361	305.924	152.180	XXX
74.8052	911.0000		unknown	0.0102	0.0118	0.0076	305.924	152.180	XXX
75.1667	913.7400	A9	i-propylbenzene	0.0359	0.0337	0.0280	306.338	152.410	XXX
75.2612	914.4500		unknown	0.0045	0.0052	0.0131	306.338	152.410	XXX
75.4802	916.1000	I10	I10-[1]	0.0246	0.0273	0.0162	306.338	152.410	XXX
75.7753	918.3200	N9	N9-[11]	0.1266	0.1298	0.0940	306.338	152.410	XXX
76.0334	920.2500	I10	I10-[2]	0.0918	0.1018	0.0604	306.338	152.410	XXX
76.3123	922.3300	I10	2,4-dimethyloctane	0.0442	0.0492	0.0291	312.620	155.900	XXX
76.3850	922.8700		unknown	0.0102	0.0118	0.0067	312.620	155.900	XXX
76.6768	925.0300	N9	N9-[12]	0.0145	0.0148	0.0107	312.620	155.900	XXX
76.7365	925.4700		unknown	0.0257	0.0298	0.0191	312.620	155.900	XXX
76.8367	926.2100	N9	N9-[13]	0.0049	0.0050	0.0036	312.620	155.900	XXX
77.1669	928.6400	I10	2,6-dimethyloctane	0.0116	0.0130	0.0077	320.738	160.410	XXX
77.3415	929.9200	I10	2,5-dimethyloctane	0.0639	0.0709	0.0421	317.300	158.500	XXX
77.6032	931.8400	N9	n-butylcyclopentane	0.2031	0.2097	0.1507	313.916	156.620	XXX
77.8390	933.5600		unknown	0.0276	0.0319	0.0205	313.916	156.620	XXX
77.9430	934.3100	I10	I10-[3]	0.0297	0.0329	0.0196	313.916	156.620	XXX
78.1390	935.7300	N10	N10-[1]	0.0764	0.0774	0.0511	313.916	156.620	XXX
78.3717	937.4200	I10	I10-[4]	0.0265	0.0294	0.0175	313.916	156.620	XXX
78.6474	939.4100	I10	3,3-dimethyloctane	0.2404	0.2635	0.1583	322.160	161.200	XXX
78.8645	940.9600		unknown	0.0473	0.0548	0.0312	322.160	161.200	XXX
79.0831	942.5300		unknown	0.0104	0.0120	0.0068	322.160	161.200	XXX
79.2466	943.7000		unknown	0.0435	0.0503	0.0286	322.160	161.200	XXX
79.4475	945.1300		unknown	0.0136	0.0157	0.0089	322.160	161.200	XXX
79.5650	945.9600	N10	N10-[2]	0.0828	0.0839	0.0553	322.160	161.200	XXX
79.7419	947.2200	A9	n-propylbenzene	0.1542	0.1449	0.1202	318.632	159.240	XXX
79.8175	947.7500		unknown	0.0255	0.0295	0.0199	318.632	159.240	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF
Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900
Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.36
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
80.0789	949.6000		unknown	0.0286	0.0331	0.0223	318.632	159.240	XXX
80.2449	950.7700	N10	N10-[3]	0.0350	0.0354	0.0233	318.632	159.240	XXX
80.4248	952.0400		unknown	0.0175	0.0203	0.0117	318.632	159.240	XXX
80.6334	953.5000	A9	1,3-methylethylbenzene	0.1204	0.1128	0.0939	322.394	161.330	XXX
80.9354	955.6100	A9	1,4-methylethylbenzene	0.0751	0.0706	0.0585	323.618	162.010	XXX
81.0283	956.2600		unknown	0.0184	0.0213	0.0144	323.618	162.010	XXX
81.4851	959.4300		unknown	0.0155	0.0179	0.0121	323.618	162.010	XXX
81.5692	960.0100	N10	N10-[4]	0.0296	0.0300	0.0198	323.618	162.010	XXX
81.6823	960.7900	A9	1,3,5-trimethylbenzene	0.2554	0.2391	0.1991	328.532	164.740	XXX
82.0196	963.1100	I10	I10-[5]	0.0254	0.0278	0.0167	328.532	164.740	XXX
82.1855	964.2500	I10	I10-[6]	0.0322	0.0352	0.0212	328.532	164.740	XXX
82.2804	964.9000	I10	5-methylnonane	0.0599	0.0663	0.0395	329.180	165.100	XXX
82.4442	966.0200		unknown	0.0247	0.0285	0.0162	329.180	165.100	XXX
82.5301	966.6100	I10	4-methylnonane	0.2024	0.2215	0.1333	32.000	0.000	XXX
82.8819	969.0000	A9	1,2-methylethylbenzene	0.1290	0.1187	0.1006	329.324	165.180	XXX
83.1361	970.7300	I10	2-methylnonane	0.0694	0.0774	0.0457	332.654	167.030	XXX
83.3764	972.3500	I10	3-ethyloctane	0.0420	0.0459	0.0276	331.700	166.500	XXX
83.5850	973.7600	N10	N10-[5]	0.0127	0.0128	0.0085	331.700	166.500	XXX
83.7906	975.1400	I10	3-methylnonane	0.1431	0.1581	0.0943	334.040	167.800	XXX
83.9622	976.2900		unknown	0.0515	0.0596	0.0339	334.040	167.800	XXX
84.0637	976.9700	N10	N10-[6]	0.0489	0.0495	0.0327	334.040	167.800	XXX
84.2298	978.0800		unknown	0.0143	0.0166	0.0096	334.040	167.800	XXX
84.4316	979.4300	I10	I10-[7]	0.0384	0.0421	0.0253	334.040	167.800	XXX
84.4827	979.7700		unknown	0.0210	0.0243	0.0138	334.040	167.800	XXX
84.6048	980.5800		unknown	0.0032	0.0037	0.0021	334.040	167.800	XXX
84.8156	981.9800	I10	I10-[8]	0.0125	0.0137	0.0082	334.040	167.800	XXX
84.9912	983.1400	I10	I10-[9]	0.0060	0.0066	0.0039	334.040	167.800	XXX
85.2000	984.5200	A9	1,2,4-trimethylbenzene	0.2233	0.2065	0.1741	336.884	169.380	XXX
85.3660	985.6100	N10	i-butylcyclohexane	0.0962	0.0979	0.0643	340.340	171.300	XXX
85.5840	987.0500	I10	I10-[10]	0.0774	0.0847	0.0510	340.340	171.300	XXX
85.7828	988.3500	I10	I10-[11]	0.1030	0.1127	0.0678	340.340	171.300	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 5/29/2020 10:46:56 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\MAY-20\20-NEDR-814-8-D7900.0004.CDF
Acquired: 05/29/20 20:51:05
Sample: 20-NEDR-814-8-D7900
Analyzed: 5/29/2020 10:46:56 PM
Processed 199 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1594 Line
Yield: 35.62
Int Std: MEK
Int Std Amt: 0.34
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 10.36
Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
85.9778	989.6200	I10	I10-[12]	0.0214	0.0235	0.0141	340.340	171.300	XXX
86.0586	990.1500		unknown	0.0093	0.0108	0.0061	340.340	171.300	XXX
86.2211	991.2100	N10	N10-[7]	0.0133	0.0134	0.0089	340.340	171.300	XXX
86.3557	992.0900		unknown	0.0261	0.0303	0.0175	340.340	171.300	XXX
86.5513	993.3500	I10	I10-[13]	0.0126	0.0138	0.0083	340.340	171.300	XXX
86.7591	994.7000		unknown	0.0017	0.0019	0.0049	340.340	171.300	XXX
86.8731	995.4400		unknown	0.0106	0.0122	0.0309	340.340	171.300	XXX
86.9734	996.0800	A10	i-butylbenzene	0.0200	0.0190	0.0140	343.022	172.790	XXX
87.2273	997.7200	A10	sec-butylbenzene	0.0305	0.0287	0.0213	344.012	173.340	XXX
87.3444	998.4700		unknown	0.0164	0.0190	0.0114	344.012	173.340	XXX
87.5823	1000.0000	P10	n-decane	0.8196	0.9095	0.5398	345.470	174.150	XXX

Cold Lake 1567 Analysis

Crude Oil Type: Cold Lake
Date of Sample: June 3, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1567

Sample ID: 2020-NEDR-000814-010 Product: Cold Lake T-1567 Line

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900
Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line
Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
Sample Wt: 5.98
Sample Den: 0.92

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	6.79	9.83	7.33
I-Paraffins:	6.97	9.86	6.77
Olefins:	0.00	0.00	0.00
Naphthenes:	3.12	3.74	2.61
Aromatics:	1.13	1.19	0.91
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.19	0.25	0.20

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	0.59(Mass%)	0.62(Vol%)

Average Molecular Weight: 71.22

Relative Density: 0.60

Reid Vapor Pressure @ 100F: 3.06psi - 21.11kPa

Calculated Octane Number: 65.7

Motor Octane Number (Jenkins Calculation): 64.1

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	155.71	T50	T90	FBP
BP by Vol (Deg F)	10.90	155.71	T50	T90	FBP

Percent Carbon: 84.65
Percent Hydrogen: 15.35

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	10.76
Light Ends (C2s-C5s Vol %)	10.94

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line
Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
Sample Wt: 5.98 Sample Den: 0.92

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.09	0.63
C6	85.42	0.68
C7	98.50	0.73
C8	111.97	0.75
C9	126.09	0.76
C10	141.81	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	71.20	0.60

Octane Number

Research Octane Number:	65.7
Motor Octane Number:	64.1

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line
Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
Sample Wt: 5.98 Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.07	0.00	0.00	0.00	0.00	0.00	0.07
C4	1.40	0.54	0.00	0.00	0.00	0.00	1.94
C5	2.64	2.46	0.00	0.15	0.00	0.00	5.25
C6	1.24	1.64	0.00	0.84	0.14	0.00	3.86
C7	0.65	0.81	0.00	1.05	0.31	0.00	2.83
C8	0.37	0.64	0.00	0.63	0.39	0.01	2.05
C9	0.24	0.54	0.00	0.36	0.28	0.05	1.47
C10	0.18	0.34	0.00	0.09	0.01	0.11	0.74
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	6.79	6.97	0.00	3.12	1.13	0.19	18.01

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.19 Grand Total: 18.20

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.13	0.00	0.00	0.00	0.00	0.00	0.13
C4	2.22	0.88	0.00	0.00	0.00	0.00	3.10
C5	3.86	3.65	0.00	0.18	0.00	0.00	7.69
C6	1.72	2.29	0.00	1.01	0.14	0.01	5.17
C7	0.87	1.09	0.00	1.27	0.33	0.00	3.56
C8	0.48	0.84	0.00	0.75	0.41	0.02	2.50
C9	0.31	0.68	0.00	0.42	0.29	0.07	1.78
C10	0.23	0.42	0.00	0.11	0.01	0.15	0.92
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.83	9.86	0.00	3.74	1.19	0.25	24.62

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.25 Grand Total: 24.86

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28

Sample: 20-NEDR-814-10-D7900

Analyzed: 6/3/2020 8:16:19 PM

Processed 185 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: Shore Tank 1567 Line

Yield: 18.20

Int Std: MEK

Int Std Amt: 0.17

Sample Wt: 5.98

Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.13	0.00	0.00	0.00	0.00	0.00	0.13
C4	1.97	0.75	0.00	0.00	0.00	0.01	2.73
C5	2.99	2.79	0.00	0.17	0.00	0.00	5.96
C6	1.18	1.56	0.00	0.81	0.14	0.01	3.70
C7	0.53	0.66	0.00	0.88	0.28	0.00	2.35
C8	0.26	0.46	0.00	0.46	0.30	0.02	1.51
C9	0.15	0.34	0.00	0.23	0.19	0.06	0.98
C10	0.10	0.20	0.00	0.05	0.01	0.10	0.46
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	7.33	6.77	0.00	2.61	0.91	0.20	17.63

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.20	Grand Total:	17.83

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.98 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6935	200.0000	P2	ethane	0.0037	0.0099	0.0100	-127.480	-88.600	XXX
6.9516	300.0000	P3	propane	0.0725	0.1329	0.1346	-43.672	-42.040	XXX
7.3552	367.5700	I4	i-butane	0.5357	0.8819	0.7542	10.904	-11.720	XXX
7.5909	390.9300		unknown	0.0027	0.0036	0.0070	10.904	-11.720	XXX
7.7018	400.0000	P4	n-butane	1.3997	2.2183	1.9707	31.100	-0.500	XXX
7.8753	414.4600	I5	2,2-dimethylpropane	0.0172	0.0266	0.0195	49.100	9.500	XXX
8.9709	475.2600	I5	i-pentane	2.4462	3.6216	2.7746	82.112	27.840	XXX
9.6565	500.0000	P5	n-pentane	2.6379	3.8641	2.9919	96.908	36.060	XXX
10.3195	519.4200		unknown	0.0043	0.0056	0.0109	96.908	36.060	XXX
10.9569	535.0400	I6	2,2-dimethylbutane	0.0693	0.0980	0.0658	121.514	49.730	XXX
12.3352	562.1500	N5	cyclopentane	0.1460	0.1796	0.1703	120.650	49.250	XXX
12.4063	563.3600	I6	2,3-dimethylbutane	0.1297	0.1798	0.1231	136.364	57.980	XXX
12.6275	567.0500	I6	2-methylpentane	0.9197	1.2918	0.8734	140.468	60.260	XXX
13.5285	580.7700	I6	3-methylpentane	0.5235	0.7229	0.4972	145.886	63.270	XXX
15.0235	600.0000	P6	n-hexane	1.2390	1.7236	1.1766	155.714	68.730	XXX
18.3559	627.9500	I7	2,2-dimethylpentane	0.0248	0.0338	0.0203	174.542	79.190	XXX
18.7268	630.5500	N6	methylcyclopentane	0.4436	0.5435	0.4313	161.240	71.800	XXX
19.3162	634.5300	I7	2,4-dimethylpentane	0.0473	0.0645	0.0386	176.882	80.490	XXX
20.1925	640.1200	I7	2,2,3-trimethylbutane	0.0067	0.0088	0.0054	177.584	80.880	XXX
22.6984	654.2900	A6	benzene	0.1358	0.1418	0.1423	176.162	80.090	XXX
23.7792	659.7300	I7	3,3-dimethylpentane	0.0190	0.0251	0.0155	186.908	86.060	XXX
24.4748	663.0600	N6	cyclohexane	0.3928	0.4628	0.3819	177.296	80.720	XXX
26.4490	671.8300	I7	2-methylhexane	0.2797	0.3781	0.2285	194.090	90.050	XXX
26.7836	673.2300	I7	2,3-dimethylpentane	0.0930	0.1228	0.0760	193.604	89.780	XXX
27.3506	675.5500	N7	1,1-dimethylcyclopentane	0.0517	0.0629	0.0431	189.464	87.480	XXX
28.4142	679.7300	I7	3-methylhexane	0.3186	0.4253	0.2602	197.330	91.850	XXX
29.8537	685.0800	N7	1c,3-dimethylcyclopentane	0.0969	0.1193	0.0808	195.386	90.770	XXX
30.5250	687.4700	N7	1t,3-dimethylcyclopentane	0.0836	0.1025	0.0697	197.096	91.720	XXX
30.8992	688.7700	I7	3-ethylpentane	0.0225	0.0296	0.0184	200.246	93.470	XXX
31.1851	689.7400	N7	1t,2-dimethylcyclopentane	0.1372	0.1675	0.1144	197.366	91.870	XXX
31.5944	691.1300	I8	2,2,4-trimethylpentane	0.0091	0.0121	0.0065	210.632	99.240	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.98 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
34.3881	700.0000	P7	n-heptane	0.6500	0.8721	0.5309	209.156	98.420	XXX
38.6323	724.5800	N7	1c,2-dimethylcyclopentane	0.0219	0.0274	0.0183	211.154	99.530	XXX
38.7727	725.3300	N7	methylcyclohexane	0.6144	0.7325	0.5121	213.674	100.930	XXX
39.5624	729.5200	I8	2,2-dimethylhexane	0.0485	0.0640	0.0348	224.312	106.840	XXX
41.4750	739.2800	N7	ethylcyclopentane	0.0487	0.0583	0.0406	218.246	103.470	XXX
41.9174	741.4600	I8	2,5-dimethylhexane	0.0305	0.0403	0.0218	228.398	109.110	XXX
42.3082	743.3600	I8	2,4-dimethylhexane	0.0331	0.0434	0.0237	228.974	109.430	XXX
43.4505	748.8000	N8	1c,2t,4-trimethylcyclopentane	0.0465	0.0559	0.0339	242.132	116.740	XXX
43.7956	750.4100	I8	3,3-dimethylhexane	0.0127	0.0165	0.0091	233.546	111.970	XXX
45.0270	756.0500	N8	1t,2c,3-trimethylcyclopentane	0.0391	0.0466	0.0285	230.738	110.410	XXX
45.6307	758.7400	I8	2,3,4-trimethylpentane	0.0085	0.0108	0.0061	236.246	113.470	XXX
46.4098	762.1600	A7	toluene	0.3101	0.3281	0.2754	231.134	110.630	XXX
48.0530	769.1500	I8	2,3-dimethylhexane	0.0397	0.0511	0.0284	240.098	115.610	XXX
48.2753	770.0700	I8	2-methyl-3-ethylpentane	0.0119	0.0154	0.0085	240.098	115.610	XXX
49.3710	774.5600	I8	2-methylheptane	0.2273	0.2987	0.1628	243.770	117.650	XXX
49.6740	775.7800	I8	4-methylheptane	0.0654	0.0852	0.0469	243.878	117.710	XXX
49.8438	776.4600	I8	3-methyl-3-ethylpentane	0.0091	0.0117	0.0065	240.098	115.610	XXX
49.9481	776.8800	I8	3,4-dimethylhexane	0.0115	0.0146	0.0082	243.914	117.730	XXX
50.3511	778.4800		unknown	0.0055	0.0071	0.0039	243.914	117.730	XXX
50.4265	778.7800	N8	1c,3-dimethylcyclohexane	0.0086	0.0104	0.0063	246.848	119.360	XXX
50.8977	780.6200	I8	3-methylheptane	0.1188	0.1544	0.0851	246.074	118.930	XXX
51.0644	781.2700	N8	1c,2t,3-trimethylcyclopentane	0.1582	0.1884	0.1154	243.500	117.500	XXX
51.2140	781.8500	I8	3-ethylhexane	0.0146	0.0188	0.0105	245.372	118.540	XXX
51.4410	782.7300	N8	1t,4-dimethylcyclohexane	0.0592	0.0712	0.0432	246.848	119.360	XXX
52.5283	786.8700	N8	1,1-dimethylcyclohexane	0.0299	0.0351	0.0218	247.190	119.550	XXX
52.7963	787.8800		unknown	0.0022	0.0029	0.0057	247.190	119.550	XXX
53.0634	788.8800	I9	2,2,5-trimethylhexane	0.0058	0.0075	0.0037	255.362	124.090	XXX
53.3072	789.7800	N8	3t-ethylmethylcyclopentane	0.0223	0.0267	0.0163	249.980	121.100	XXX
53.7140	791.2800	N8	3c-ethylmethylcyclopentane	0.0181	0.0216	0.0132	249.980	121.100	XXX
53.9547	792.1600	N8	2t-ethylmethylcyclopentane	0.0277	0.0331	0.0202	250.160	121.200	XXX
54.2149	793.1100		unknown	0.0056	0.0073	0.0143	250.160	121.200	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900
Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line
Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 5.98
Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
54.3194	793.4900	N8	1,1-methylethylcyclopentane	0.0092	0.0108	0.0067	250.754	121.530	XXX
54.8849	795.5200	N8	1t,2-dimethylcyclohexane	0.0567	0.0670	0.0413	254.174	123.430	XXX
56.1504	800.0000	P8	n-octane	0.3668	0.4790	0.2628	258.224	125.680	XXX
56.2689	800.8000	N8	i-propylcyclopentane	0.0412	0.0487	0.0301	259.574	126.430	XXX
57.6393	809.9300		unknown	0.0081	0.0106	0.0059	259.574	126.430	XXX
57.6432	809.9600	I9	2,4,4-trimethylhexane	0.0065	0.0081	0.0041	32.000	0.000	XXX
58.7791	817.3500		unknown	0.0064	0.0084	0.0041	32.000	0.000	XXX
59.1690	819.8400	I9	2,3,4-trimethylhexane	0.0050	0.0062	0.0032	282.308	139.060	XXX
59.5267	822.1200	I9	2,2,3,4-tetramethylpentane	0.0105	0.0130	0.0067	271.454	133.030	XXX
59.8362	824.0800	N8	N8-[1]	0.0090	0.0106	0.0066	271.454	133.030	XXX
60.5831	828.7500	N8	1c,2-dimethylcyclohexane	0.0318	0.0366	0.0232	265.532	129.740	XXX
60.7651	829.8800	I9	2,3,5-trimethylhexane	0.0045	0.0057	0.0028	268.430	131.350	XXX
60.8594	830.4700	I9	2,2-dimethylheptane	0.0032	0.0042	0.0021	270.860	132.700	XXX
61.1484	832.2500	N8	N8-[2]	0.0030	0.0035	0.0022	270.860	132.700	XXX
61.4708	834.2300		unknown	0.0173	0.0226	0.0126	270.860	132.700	XXX
61.5558	834.7500	N9	1,1,4-trimethylcyclohexane	0.0903	0.1072	0.0585	275.000	135.000	XXX
61.7303	835.8100	I9	2,2,3-trimethylhexane	0.0807	0.1035	0.0515	271.220	132.900	XXX
62.1384	838.2900	I9	2,4-dimethylheptane	0.0086	0.0110	0.0055	271.220	132.900	XXX
62.5091	840.5200	N8	n-propylcyclopentane	0.0740	0.0874	0.0539	267.728	130.960	XXX
62.8909	842.8000	I9	2,5-dimethylheptane	0.0572	0.0732	0.0365	276.800	136.000	XXX
63.1187	844.1600	N9	*1c,3c,5-trimethylcyclohexane	0.0054	0.0065	0.0035	281.174	138.430	XXX
63.1775	844.5100	I9	3,3-dimethylheptane	0.0075	0.0095	0.0048	278.636	137.020	XXX
63.3927	845.7800	I9	3,5-dimethylheptane	0.0084	0.0106	0.0053	276.800	136.000	XXX
63.6076	847.0500	I9	2,6-dimethylheptane	0.0115	0.0149	0.0073	275.396	135.220	XXX
63.8803	848.6500	N9	1,1,3-trimethylcyclohexane	0.0126	0.0147	0.0082	295.862	146.590	XXX
64.6188	852.9500	N9	1c,3c,5c-trimethylcyclohexane	0.0043	0.0050	0.0028	32.000	0.000	XXX
64.7099	853.4800	A8	ethylbenzene	0.0424	0.0448	0.0326	277.160	136.200	XXX
64.8261	854.1500	N9	1c,2t,4t-trimethylcyclohexane	0.0138	0.0163	0.0090	32.000	0.000	XXX
65.1585	856.0600	I9	I9-[1]	0.0298	0.0375	0.0190	32.000	0.000	XXX
65.5625	858.3700	N9	N9-[1]	0.0070	0.0083	0.0046	32.000	0.000	XXX
65.8324	859.9000	N9	N9-[2]	0.0060	0.0070	0.0039	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900
Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line
Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported.
Sample Wt: 5.98
Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
66.1803	861.8600	A8	1,3-dimethylbenzene	0.1831	0.1943	0.1411	282.416	139.120	XXX
66.3735	862.9500	A8	1,4-dimethylbenzene	0.0953	0.1015	0.0734	281.048	138.360	XXX
66.7412	865.0100	I9	3,4-dimethylheptane	0.0066	0.0083	0.0042	285.080	140.600	XXX
66.8850	865.8100	N9	N9-[3]	0.0080	0.0094	0.0052	285.080	140.600	XXX
67.2008	867.5600	I9	4-ethylheptane	0.0151	0.0193	0.0097	288.392	142.440	XXX
67.2588	867.8900	I9	I9-[2]	0.0067	0.0084	0.0043	288.392	142.440	XXX
67.5815	869.6700		unknown	0.0055	0.0072	0.0035	288.392	142.440	XXX
67.6890	870.2600	I9	4-methyloctane	0.0466	0.0594	0.0298	288.392	142.440	XXX
67.8510	871.1500	I9	2-methyloctane	0.0637	0.0819	0.0406	289.904	143.280	XXX
68.3463	873.8500	N9	1c,2t,3c-trimethylcyclohexane	0.0037	0.0045	0.0024	304.160	151.200	XXX
68.4858	874.6100	I9	3-ethylheptane	0.0048	0.0061	0.0031	289.400	143.000	XXX
68.7301	875.9300	I9	3,3-diethylpentane	0.0118	0.0143	0.0075	270.842	132.690	XXX
68.9450	877.0900	I9	3-methyloctane	0.0874	0.1113	0.0558	291.614	144.230	XXX
69.2508	878.7300	N9	1c,2t,4c-trimethylcyclohexane	0.0052	0.0061	0.0033	275.000	135.000	XXX
69.4163	879.6200		unknown	0.0045	0.0059	0.0029	275.000	135.000	XXX
69.7094	881.1800	N9	1,1,2-trimethylcyclohexane	0.0066	0.0076	0.0043	293.360	145.200	XXX
69.9142	882.2700	A8	1,2-dimethylbenzene	0.0692	0.0721	0.0534	291.974	144.430	XXX
70.0932	883.2100	I9	I9-[3]	0.0139	0.0174	0.0088	291.974	144.430	XXX
70.2333	883.9500	I9	I9-[4]	0.0049	0.0062	0.0032	291.974	144.430	XXX
70.8543	887.2100	N9	N9-[4]	0.0253	0.0297	0.0164	291.974	144.430	XXX
71.0603	888.2900	N9	N9-[5]	0.0390	0.0459	0.0253	291.974	144.430	XXX
71.4448	890.2800	I9	I9-[5]	0.0175	0.0219	0.0111	291.974	144.430	XXX
71.4925	890.5300	I9	I9-[6]	0.0116	0.0146	0.0074	291.974	144.430	XXX
71.8393	892.3200	N9	i-butylcyclopentane	0.0059	0.0069	0.0038	298.346	147.970	XXX
72.0538	893.4200		unknown	0.0089	0.0117	0.0228	298.346	147.970	XXX
72.2967	894.6600		unknown	0.0036	0.0048	0.0093	298.346	147.970	XXX
73.1467	898.9800	I9	I9-[7]	0.0081	0.0102	0.0052	298.346	147.970	XXX
73.3490	900.0000	P9	n-nonane	0.2395	0.3062	0.1528	303.476	150.820	XXX
73.4900	901.0900	N9	1,1-methylethylcyclohexane	0.0103	0.0118	0.0067	305.924	152.180	XXX
73.7633	903.2000	N9	N9-[6]	0.0075	0.0087	0.0049	305.924	152.180	XXX
74.0742	905.5900	N9	N9-[7]	0.0354	0.0411	0.0230	305.924	152.180	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.98 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
74.5168	908.9800	N9	N9-[8]	0.0109	0.0127	0.0071	305.924	152.180	XXX
75.1392	913.7000	A9	i-propylbenzene	0.0126	0.0134	0.0085	306.338	152.410	XXX
75.4712	916.2000	I10	I10-[1]	0.0086	0.0108	0.0049	306.338	152.410	XXX
75.7615	918.3800	N9	N9-[9]	0.0206	0.0239	0.0133	306.338	152.410	XXX
76.0146	920.2700	I10	I10-[2]	0.0191	0.0240	0.0110	306.338	152.410	XXX
76.3152	922.5100	I10	2,4-dimethyloctane	0.0177	0.0224	0.0102	312.620	155.900	XXX
76.7251	925.5500		unknown	0.0138	0.0180	0.0352	312.620	155.900	XXX
76.8133	926.2000	N9	N9-[10]	0.0035	0.0041	0.0023	312.620	155.900	XXX
77.1603	928.7500	I10	2,6-dimethyloctane	0.0048	0.0060	0.0028	320.738	160.410	XXX
77.3177	929.9100	I10	2,5-dimethyloctane	0.0189	0.0237	0.0109	317.300	158.500	XXX
77.5841	931.8500	N9	n-butylcyclopentane	0.0395	0.0462	0.0256	313.916	156.620	XXX
77.8807	934.0100		unknown	0.0136	0.0178	0.0088	313.916	156.620	XXX
77.9123	934.2400	I10	I10-[3]	0.0111	0.0139	0.0064	313.916	156.620	XXX
78.1176	935.7300	N10	N10-[1]	0.0159	0.0182	0.0092	313.916	156.620	XXX
78.3951	937.7400	I10	I10-[4]	0.0083	0.0104	0.0048	313.916	156.620	XXX
78.6317	939.4400	I10	3,3-dimethyloctane	0.0651	0.0808	0.0374	322.160	161.200	XXX
78.8410	940.9400		unknown	0.0113	0.0148	0.0065	322.160	161.200	XXX
78.9154	941.4800		unknown	0.0052	0.0068	0.0030	322.160	161.200	XXX
79.0583	942.5000		unknown	0.0061	0.0080	0.0035	322.160	161.200	XXX
79.2247	943.6900		unknown	0.0084	0.0110	0.0048	322.160	161.200	XXX
79.4296	945.1500		unknown	0.0068	0.0090	0.0039	322.160	161.200	XXX
79.5441	945.9600	N10	N10-[2]	0.0264	0.0303	0.0154	322.160	161.200	XXX
79.7198	947.2000	A9	n-propylbenzene	0.0251	0.0268	0.0171	318.632	159.240	XXX
80.0448	949.5000		unknown	0.0044	0.0057	0.0030	318.632	159.240	XXX
80.2343	950.8400	N10	N10-[3]	0.0084	0.0097	0.0049	318.632	159.240	XXX
80.3930	951.9500		unknown	0.0038	0.0049	0.0022	318.632	159.240	XXX
80.6170	953.5200	A9	1,3-methylethylbenzene	0.0410	0.0435	0.0279	322.394	161.330	XXX
80.9273	955.6900	A9	1,4-methylethylbenzene	0.0248	0.0264	0.0169	323.618	162.010	XXX
81.4959	959.6300		unknown	0.0055	0.0072	0.0038	323.618	162.010	XXX
81.5848	960.2500	N10	N10-[4]	0.0100	0.0115	0.0059	323.618	162.010	XXX
81.7083	961.1000	A9	1,3,5-trimethylbenzene	0.0637	0.0676	0.0434	328.532	164.740	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/3/2020 8:16:19 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-10-D7900.0002.CDF Acquired: 06/03/20 17:48:28
Sample: 20-NEDR-814-10-D7900 Analyzed: 6/3/2020 8:16:19 PM
Processed 185 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1567 Line Yield: 18.20
Int Std: MEK
Int Std Amt: 0.17
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.98 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
81.9851	963.0000	I10	I10-[5]	0.0065	0.0080	0.0037	328.532	164.740	XXX
82.1775	964.3200	I10	I10-[6]	0.0077	0.0096	0.0044	328.532	164.740	XXX
82.2624	964.9100	I10	5-methylnonane	0.0105	0.0131	0.0060	329.180	165.100	XXX
82.5126	966.6200	I10	4-methylnonane	0.0481	0.0596	0.0276	32.000	0.000	XXX
82.8725	969.0700	A9	1,2-methylethylbenzene	0.0293	0.0305	0.0199	329.324	165.180	XXX
83.1141	970.7000	I10	2-methylnonane	0.0204	0.0258	0.0117	332.654	167.030	XXX
83.3627	972.3800	I10	3-ethyloctane	0.0095	0.0118	0.0055	331.700	166.500	XXX
83.7843	975.2200	I10	3-methylnonane	0.0296	0.0370	0.0170	334.040	167.800	XXX
83.9742	976.4900		unknown	0.0106	0.0138	0.0061	334.040	167.800	XXX
84.0491	976.9900	N10	N10-[5]	0.0078	0.0089	0.0045	334.040	167.800	XXX
84.2380	978.2500		unknown	0.0016	0.0020	0.0009	334.040	167.800	XXX
84.4126	979.4200	I10	I10-[7]	0.0067	0.0083	0.0039	334.040	167.800	XXX
84.4758	979.8400		unknown	0.0073	0.0096	0.0042	334.040	167.800	XXX
84.8360	982.2300	I10	I10-[8]	0.0034	0.0042	0.0019	334.040	167.800	XXX
84.9926	983.2600	I10	I10-[9]	0.0031	0.0038	0.0018	334.040	167.800	XXX
85.1880	984.5500	A9	1,2,4-trimethylbenzene	0.0804	0.0842	0.0548	336.884	169.380	XXX
85.3570	985.6600	N10	i-butylcyclohexane	0.0163	0.0188	0.0095	340.340	171.300	XXX
85.5915	987.2000	I10	I10-[10]	0.0131	0.0163	0.0076	340.340	171.300	XXX
85.7740	988.4000	I10	I10-[11]	0.0200	0.0248	0.0115	340.340	171.300	XXX
86.0014	989.8800	I10	I10-[12]	0.0042	0.0052	0.0024	340.340	171.300	XXX
86.2073	991.2300	N10	N10-[6]	0.0075	0.0086	0.0044	340.340	171.300	XXX
86.3433	992.1100		unknown	0.0047	0.0062	0.0028	340.340	171.300	XXX
86.5976	993.7600	I10	I10-[13]	0.0044	0.0055	0.0026	340.340	171.300	XXX
86.7018	994.4300		unknown	0.0026	0.0034	0.0067	340.340	171.300	XXX
86.9649	996.1300	A10	i-butylbenzene	0.0066	0.0071	0.0040	343.022	172.790	XXX
87.1928	997.6000	A10	sec-butylbenzene	0.0066	0.0070	0.0040	344.012	173.340	XXX
87.3430	998.5600		unknown	0.0072	0.0095	0.0044	344.012	173.340	XXX
87.5668	1000.0000	P10	n-decane	0.1793	0.2253	0.1031	345.470	174.150	XXX

WCS 1556 Analysis

Crude Oil Type: Western Canadian Select (WCS)
Date of Sample: June 7, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1556

intertek
caleb brett

Certificate of Analysis

Sunoco Logistics L.P.
Allen Brady
2300 North Twin City Highway
Accounts Payable
Nederland, TX 77627
United States of America

Our Reference Number: US300-0046676
Lab Reference Number: 2020-NEDR-000814
Customer Reference Number: Submitted

Customer Product Description: WCS
Location: Sunoco, Nederland, Texas, United States
Sample Representing: Shore Tank 1556 Line
Drawn By: Intertek

Sample ID: 2020-NEDR-000814-012
Date Sampled: 07-Jun-2020
Date Submitted: 07-Jun-2020
Date Tested: 07-Jun-2020

Method	Property	Result	Units
ASTM D7900	Methane	<0.01	Vol %
	Ethane	0.01	Vol %
	Propane	0.10	Vol %
	Isobutane	0.41	Vol %
	n-Butane	1.28	Vol %
	Neopentane	0.03	Vol %
	Isopentane	4.28	Vol %
	n-Pentane	4.74	Vol %
	Cyclopentane	0.18	Vol %
	Cyclohexane	0.45	Vol %
	Methylcyclopentane	0.55	Vol %
	Benzene	0.13	Vol %
	Total Light Hydrocarbons (C1-nC10)	24.92	Vol %

f - Denotes analysis results which are ISO/IEC 17025 accredited by ANSI-ASQ National Accreditation Board

Analysis Total: $__________
______ O/T Hours @: ________ = $________
Blending:$ ___________ Shipping: $__________

Signed By: ______________________________ Date: ____________________
Amanda Holmes, Assistant Laboratory Manager

ANAB
ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
AT-2072.04

ISO 9001:2015
ABS-QE Certificate # 30701

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900
Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26
Sample Den: 0.92

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	6.77	9.75	7.19
I-Paraffins:	7.20	10.17	7.01
Olefins:	0.00	0.01	0.01
Naphthenes:	3.11	3.73	2.63
Aromatics:	1.06	1.12	0.87
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.11	0.14	0.11

Oxygenates:

Total: 0.00(Mass%) 0.00(Vol%)

Total Oxygen Content: 0.00(Mass%)

Multisubstituted Aromatics: 0.57(Mass%) 0.60(Vol%)

Average Molecular Weight: 70.87

Relative Density: 0.59

Reid Vapor Pressure @ 100F: 2.52psi - 17.34kPa

Calculated Octane Number: 63.5

Motor Octane Number (Jenkins Calculation): 62.3

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	31.10	155.71	T50	T90	FBP
BP by Vol (Deg F)	10.90	155.71	T50	T90	FBP

Percent Carbon: 84.64 Percent Hydrogen: 15.36

Bromine Number (Calc): 0.05

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	10.86
Light Ends (C2s-C5s Vol %)	11.05

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900
Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26
Sample Den: 0.92

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.10	0.63
C6	85.47	0.68
C7	98.55	0.73
C8	112.07	0.75
C9	126.09	0.76
C10	141.87	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	70.90	0.59

Octane Number

Research Octane Number: 63.5

Motor Octane Number: 62.3

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900
Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26
Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.06	0.00	0.00	0.00	0.00	0.00	0.06
C4	0.81	0.25	0.00	0.00	0.00	0.00	1.06
C5	3.23	2.91	0.00	0.15	0.00	0.00	6.29
C6	1.22	1.78	0.00	0.83	0.13	0.01	3.96
C7	0.66	0.83	0.00	1.10	0.30	0.02	2.90
C8	0.37	0.66	0.00	0.65	0.37	0.01	2.06
C9	0.24	0.50	0.00	0.31	0.26	0.04	1.35
C10	0.18	0.28	0.00	0.07	0.01	0.04	0.58
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	6.77	7.20	0.00	3.11	1.06	0.11	18.14

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.11	Grand Total:	18.25

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C4	1.28	0.41	0.00	0.00	0.00	0.00	1.69
C5	4.74	4.32	0.00	0.18	0.00	0.00	9.24
C6	1.70	2.49	0.00	1.00	0.13	0.01	5.33
C7	0.89	1.11	0.00	1.33	0.31	0.02	3.67
C8	0.49	0.86	0.00	0.77	0.39	0.01	2.52
C9	0.31	0.64	0.00	0.37	0.28	0.05	1.64
C10	0.22	0.35	0.00	0.09	0.01	0.05	0.72
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.75	10.17	0.01	3.73	1.12	0.14	24.78

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.14	Grand Total:	24.92

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900 Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26 Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C4	1.15	0.35	0.00	0.00	0.00	0.00	1.50
C5	3.69	3.32	0.00	0.17	0.00	0.00	7.19
C6	1.17	1.70	0.00	0.81	0.13	0.01	3.83
C7	0.54	0.68	0.00	0.92	0.26	0.03	2.45
C8	0.27	0.48	0.00	0.47	0.29	0.01	1.51
C9	0.16	0.32	0.00	0.20	0.18	0.04	0.90
C10	0.10	0.16	0.00	0.04	0.00	0.03	0.34
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	7.19	7.01	0.01	2.63	0.87	0.11	17.71

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.11
Grand Total: 17.82

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900 Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.26 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6887	200.0000	P2	ethane	0.0041	0.0110	0.0111	-127.480	-88.600	XXX
6.9476	300.0000	P3	propane	0.0559	0.1026	0.1045	-43.672	-42.040	XXX
7.3508	367.6200	I4	i-butane	0.2460	0.4059	0.3490	10.904	-11.720	XXX
7.5842	390.7300	O4	isobutylene	0.0016	0.0024	0.0023	20.750	-6.250	XXX
7.6977	400.0000	P4	n-butane	0.8081	1.2835	1.1462	31.100	-0.500	XXX
7.8717	414.5200	I5	2,2-dimethylpropane	0.0211	0.0329	0.0241	49.100	9.500	XXX
8.9656	475.2700	I5	i-pentane	2.8860	4.2822	3.2978	82.112	27.840	XXX
9.6507	500.0000	P5	n-pentane	3.2291	4.7408	3.6898	96.908	36.060	XXX
10.3157	519.5000		unknown	0.0052	0.0068	0.0134	96.908	36.060	XXX
10.9505	535.0700	I6	2,2-dimethylbutane	0.0912	0.1291	0.0872	121.514	49.730	XXX
11.4258	545.3000	O5	O5-[1]	0.0024	0.0033	0.0028	121.514	49.730	XXX
12.3279	562.1900	N5	cyclopentane	0.1483	0.1829	0.1744	120.650	49.250	XXX
12.3991	563.4100	I6	2,3-dimethylbutane	0.1440	0.2002	0.1378	136.364	57.980	XXX
12.6202	567.1000	I6	2-methylpentane	0.9561	1.3459	0.9147	140.468	60.260	XXX
13.5185	580.7900	I6	3-methylpentane	0.5896	0.8160	0.5641	145.886	63.270	XXX
15.0101	600.0000	P6	n-hexane	1.2185	1.6989	1.1658	155.714	68.730	XXX
18.3325	627.9000	I7	2,2-dimethylpentane	0.0263	0.0359	0.0217	174.542	79.190	XXX
18.7048	630.5200	N6	methylcyclopentane	0.4439	0.5451	0.4348	161.240	71.800	XXX
19.2965	634.5100	I7	2,4-dimethylpentane	0.0506	0.0691	0.0416	176.882	80.490	XXX
20.1692	640.0800	I7	2,2,3-trimethylbutane	0.0070	0.0094	0.0058	177.584	80.880	XXX
22.6748	654.2700	A6	benzene	0.1259	0.1317	0.1329	176.162	80.090	XXX
23.7465	659.6700	I7	3,3-dimethylpentane	0.0185	0.0245	0.0152	186.908	86.060	XXX
24.4495	663.0300	N6	cyclohexane	0.3852	0.4549	0.3773	177.296	80.720	XXX
26.1743	670.7500		unknown	0.0102	0.0134	0.0263	177.296	80.720	XXX
26.4190	671.7900	I7	2-methylhexane	0.2841	0.3849	0.2337	194.090	90.050	XXX
26.7443	673.1500	I7	2,3-dimethylpentane	0.0910	0.1203	0.0748	193.604	89.780	XXX
27.1902	674.9900		unknown	0.0079	0.0103	0.0065	193.604	89.780	XXX
27.3207	675.5100	N7	1,1-dimethylcyclopentane	0.0592	0.0722	0.0497	189.464	87.480	XXX
28.3848	679.7000	I7	3-methylhexane	0.3276	0.4383	0.2695	197.330	91.850	XXX
29.8170	685.0300	N7	1c,3-dimethylcyclopentane	0.1031	0.1273	0.0866	195.386	90.770	XXX
30.4938	687.4300	N7	1t,3-dimethylcyclopentane	0.0883	0.1085	0.0742	197.096	91.720	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900 Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.26 Sample Den: 0.92

Components Listed in Chromatographic Order **Page: 6**

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
30.8723	688.7500	I7	3-ethylpentane	0.0244	0.0321	0.0200	200.246	93.470	XXX
31.1559	689.7200	N7	1t,2-dimethylcyclopentane	0.1370	0.1676	0.1150	197.366	91.870	XXX
31.5679	691.1100	I8	2,2,4-trimethylpentane	0.0107	0.0143	0.0078	210.632	99.240	XXX
34.3652	700.0000	P7	n-heptane	0.6599	0.8874	0.5430	209.156	98.420	XXX
38.5983	724.5200	N7	1c,2-dimethylcyclopentane	0.0205	0.0258	0.0172	211.154	99.530	XXX
38.7424	725.2900	N7	methylcyclohexane	0.6474	0.7736	0.5436	213.674	100.930	XXX
39.5281	729.4600	I8	2,2-dimethylhexane	0.0527	0.0696	0.0380	224.312	106.840	XXX
41.4511	739.2700	N7	ethylcyclopentane	0.0455	0.0545	0.0382	218.246	103.470	XXX
41.8842	741.4000	I8	2,5-dimethylhexane	0.0344	0.0456	0.0248	228.398	109.110	XXX
42.2883	743.3700	I8	2,4-dimethylhexane	0.0351	0.0461	0.0254	228.974	109.430	XXX
43.4110	748.7200	N8	1c,2t,4-trimethylcyclopentane	0.0478	0.0575	0.0351	242.132	116.740	XXX
43.7531	750.3200	I8	3,3-dimethylhexane	0.0097	0.0126	0.0070	233.546	111.970	XXX
45.0087	756.0600	N8	1t,2c,3-trimethylcyclopentane	0.0428	0.0511	0.0314	230.738	110.410	XXX
45.6505	758.9300	I8	2,3,4-trimethylpentane	0.0068	0.0088	0.0049	236.246	113.470	XXX
46.3816	762.1300	A7	toluene	0.2961	0.3140	0.2649	231.134	110.630	XXX
48.0294	769.1400	I8	2,3-dimethylhexane	0.0421	0.0543	0.0304	240.098	115.610	XXX
48.2751	770.1600	I8	2-methyl-3-ethylpentane	0.0107	0.0138	0.0077	240.098	115.610	XXX
49.3481	774.5600	I8	2-methylheptane	0.2251	0.2966	0.1625	243.770	117.650	XXX
49.6467	775.7600	I8	4-methylheptane	0.0672	0.0877	0.0485	243.878	117.710	XXX
49.7974	776.3600	I8	3-methyl-3-ethylpentane	0.0079	0.0102	0.0057	240.098	115.610	XXX
49.9282	776.8800	I8	3,4-dimethylhexane	0.0119	0.0152	0.0086	243.914	117.730	XXX
50.3817	778.6800		unknown	0.0075	0.0099	0.0054	243.914	117.730	XXX
50.4193	778.8300	N8	1c,3-dimethylcyclohexane	0.0077	0.0092	0.0056	246.848	119.360	XXX
50.8777	780.6300	I8	3-methylheptane	0.1270	0.1654	0.0916	246.074	118.930	XXX
51.0347	781.2400	N8	1c,2t,3-trimethylcyclopentane	0.1723	0.2056	0.1266	243.500	117.500	XXX
51.1742	781.7800	I8	3-ethylhexane	0.0173	0.0223	0.0125	245.372	118.540	XXX
51.4212	782.7400	N8	1t,4-dimethylcyclohexane	0.0667	0.0804	0.0490	246.848	119.360	XXX
52.5117	786.8900	N8	1,1-dimethylcyclohexane	0.0285	0.0335	0.0209	247.190	119.550	XXX
53.2744	789.7300	N8	3t-ethylmethylcyclopentane	0.0195	0.0234	0.0143	249.980	121.100	XXX
53.6900	791.2600	N8	3c-ethylmethylcyclopentane	0.0160	0.0192	0.0118	249.980	121.100	XXX
53.9410	792.1800	N8	2t-ethylmethylcyclopentane	0.0227	0.0272	0.0167	250.160	121.200	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900 Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.26 Sample Den: 0.92

Components Listed in Chromatographic Order **Page: 7**

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
54.3053	793.5100	N8	1,1-methylethylcyclopentane	0.0062	0.0073	0.0045	250.754	121.530	XXX
54.8624	795.5100	N8	1t,2-dimethylcyclohexane	0.0590	0.0699	0.0434	254.174	123.430	XXX
56.1312	800.0000	P8	n-octane	0.3749	0.4906	0.2706	258.224	125.680	XXX
56.2590	800.8600	N8	i-propylcyclopentane	0.0469	0.0555	0.0345	259.574	126.430	XXX
57.5651	809.5700		unknown	0.0068	0.0090	0.0050	259.574	126.430	XXX
57.6516	810.1400	I9	2,4,4-trimethylhexane	0.0066	0.0082	0.0042	32.000	0.000	XXX
58.7423	817.2300		unknown	0.0065	0.0085	0.0167	32.000	0.000	XXX
59.1689	819.9600	I9	2,3,4-trimethylhexane	0.0059	0.0073	0.0038	282.308	139.060	XXX
59.4909	822.0100	I9	2,2,3,4-tetramethylpentane	0.0081	0.0100	0.0052	271.454	133.030	XXX
59.8107	824.0300	N8	N8-[1]	0.0085	0.0100	0.0063	271.454	133.030	XXX
60.5661	828.7600	N8	1c,2-dimethylcyclohexane	0.0315	0.0363	0.0231	265.532	129.740	XXX
60.7377	829.8300	I9	2,3,5-trimethylhexane	0.0045	0.0057	0.0029	268.430	131.350	XXX
61.4392	834.1500		unknown	0.0138	0.0181	0.0089	268.430	131.350	XXX
61.5288	834.7000	N9	1,1,4-trimethylcyclohexane	0.0963	0.1146	0.0629	275.000	135.000	XXX
61.7113	835.8100	I9	2,2,3-trimethylhexane	0.0823	0.1058	0.0529	271.220	132.900	XXX
62.1243	838.3100	I9	2,4-dimethylheptane	0.0087	0.0112	0.0056	271.220	132.900	XXX
62.4952	840.5500	N8	n-propylcyclopentane	0.0702	0.0832	0.0516	267.728	130.960	XXX
62.8708	842.7900	I9	2,5-dimethylheptane	0.0581	0.0746	0.0374	276.800	136.000	XXX
63.1046	844.1800	I9	3,3-dimethylheptane	0.0054	0.0069	0.0035	278.636	137.020	XXX
63.1641	844.5400		unknown	0.0081	0.0106	0.0052	278.636	137.020	XXX
63.3624	845.7100	I9	3,5-dimethylheptane	0.0073	0.0093	0.0047	276.800	136.000	XXX
63.5894	847.0500	I9	2,6-dimethylheptane	0.0112	0.0145	0.0072	275.396	135.220	XXX
63.8567	848.6200	N9	1,1,3-trimethylcyclohexane	0.0068	0.0080	0.0045	295.862	146.590	XXX
64.5595	852.7100	N9	1c,3c,5c-trimethylcyclohexane	0.0026	0.0030	0.0017	32.000	0.000	XXX
64.6806	853.4100	A8	ethylbenzene	0.0358	0.0380	0.0278	277.160	136.200	XXX
64.7945	854.0700	N9	1c,2t,4t-trimethylcyclohexane	0.0145	0.0170	0.0094	32.000	0.000	XXX
65.1513	856.1200	I9	I9-[1]	0.0313	0.0394	0.0201	32.000	0.000	XXX
65.5361	858.3200	N9	N9-[1]	0.0056	0.0066	0.0036	32.000	0.000	XXX
65.8124	859.8900	N9	N9-[2]	0.0058	0.0069	0.0038	32.000	0.000	XXX
66.1545	861.8200	A8	1,3-dimethylbenzene	0.1781	0.1895	0.1383	282.416	139.120	XXX
66.3539	862.9400	A8	1,4-dimethylbenzene	0.0905	0.0967	0.0703	281.048	138.360	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900
Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
66.7049	864.9000	I9	3,4-dimethylheptane	0.0061	0.0077	0.0039	285.080	140.600	XXX
66.8479	865.7000	N9	N9-[3]	0.0074	0.0087	0.0048	285.080	140.600	XXX
67.1891	867.6000	I9	4-ethylheptane	0.0181	0.0231	0.0116	288.392	142.440	XXX
67.6623	870.2100	I9	4-methyloctane	0.0436	0.0557	0.0280	288.392	142.440	XXX
67.8336	871.1500	I9	2-methyloctane	0.0607	0.0782	0.0390	289.904	143.280	XXX
68.7284	876.0100	I9	3,3-diethylpentane	0.0098	0.0119	0.0063	270.842	132.690	XXX
68.9282	877.0900	I9	3-methyloctane	0.0812	0.1036	0.0522	291.614	144.230	XXX
69.6958	881.1900	N9	1,1,2-trimethylcyclohexane	0.0053	0.0060	0.0034	293.360	145.200	XXX
69.8948	882.2500	A8	1,2-dimethylbenzene	0.0634	0.0662	0.0492	291.974	144.430	XXX
70.0640	883.1500	I9	I9-[2]	0.0129	0.0162	0.0083	291.974	144.430	XXX
70.2341	884.0400	I9	I9-[3]	0.0043	0.0055	0.0028	291.974	144.430	XXX
70.8440	887.2400	N9	N9-[4]	0.0217	0.0255	0.0141	291.974	144.430	XXX
71.0435	888.2800	N9	N9-[5]	0.0404	0.0476	0.0264	291.974	144.430	XXX
71.4280	890.2800	I9	I9-[4]	0.0218	0.0275	0.0140	291.974	144.430	XXX
71.5087	890.7000	I9	I9-[5]	0.0074	0.0094	0.0048	291.974	144.430	XXX
71.8185	892.2900	N9	i-butylcyclopentane	0.0042	0.0049	0.0027	298.346	147.970	XXX
72.0557	893.5100	N9	N9-[6]	0.0049	0.0058	0.0032	298.346	147.970	XXX
73.1196	898.9200	I9	I9-[6]	0.0035	0.0044	0.0023	298.346	147.970	XXX
73.3331	900.0000	P9	n-nonane	0.2435	0.3120	0.1566	303.476	150.820	XXX
73.4978	901.2700	N9	1,1-methylethylcyclohexane	0.0046	0.0052	0.0030	305.924	152.180	XXX
74.0640	905.6300	N9	N9-[7]	0.0277	0.0323	0.0181	305.924	152.180	XXX
74.1625	906.3800		unknown	0.0025	0.0033	0.0016	305.924	152.180	XXX
74.4880	908.8700	N9	N9-[8]	0.0107	0.0124	0.0070	305.924	152.180	XXX
75.1291	913.7300	A9	i-propylbenzene	0.0085	0.0091	0.0059	306.338	152.410	XXX
75.4578	916.2100	I10	I10-[1]	0.0058	0.0073	0.0034	306.338	152.410	XXX
75.7475	918.3800	N9	N9-[9]	0.0155	0.0181	0.0101	306.338	152.410	XXX
75.9923	920.2100	I10	I10-[2]	0.0151	0.0190	0.0087	306.338	152.410	XXX
76.2716	922.2800	I10	2,4-dimethyloctane	0.0124	0.0157	0.0072	312.620	155.900	XXX
76.5267	924.1700	N9	N9-[10]	0.0024	0.0028	0.0016	312.620	155.900	XXX
76.7046	925.4900		unknown	0.0089	0.0117	0.0058	312.620	155.900	XXX
77.3101	929.9400	I10	2,5-dimethyloctane	0.0171	0.0216	0.0099	317.300	158.500	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900 Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26 Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
77.5700	931.8300	N9	n-butylcyclopentane	0.0345	0.0404	0.0225	313.916	156.620	XXX
77.8108	933.5900		unknown	0.0064	0.0084	0.0042	313.916	156.620	XXX
77.9220	934.3900	I10	I10-[3]	0.0113	0.0143	0.0066	313.916	156.620	XXX
78.1008	935.6900	N10	N10-[1]	0.0110	0.0126	0.0065	313.916	156.620	XXX
78.6187	939.4200	I10	3,3-dimethyloctane	0.0591	0.0735	0.0343	322.160	161.200	XXX
78.8362	940.9800		unknown	0.0085	0.0112	0.0049	322.160	161.200	XXX
79.4059	945.0400		unknown	0.0030	0.0039	0.0017	322.160	161.200	XXX
79.5234	945.8800	N10	N10-[2]	0.0232	0.0266	0.0136	322.160	161.200	XXX
79.7182	947.2600	A9	n-propylbenzene	0.0200	0.0213	0.0137	318.632	159.240	XXX
80.2230	950.8200	N10	N10-[3]	0.0048	0.0055	0.0028	318.632	159.240	XXX
80.4087	952.1200		unknown	0.0033	0.0044	0.0020	318.632	159.240	XXX
80.6075	953.5100	A9	1,3-methylethylbenzene	0.0372	0.0395	0.0255	322.394	161.330	XXX
80.9038	955.5800	A9	1,4-methylethylbenzene	0.0221	0.0235	0.0151	323.618	162.010	XXX
81.5467	960.0300	N10	N10-[4]	0.0110	0.0127	0.0065	323.618	162.010	XXX
81.6949	961.0600	A9	1,3,5-trimethylbenzene	0.0671	0.0713	0.0460	328.532	164.740	XXX
81.9849	963.0500	I10	I10-[4]	0.0050	0.0062	0.0029	328.532	164.740	XXX
82.1514	964.1900	I10	I10-[5]	0.0040	0.0050	0.0023	328.532	164.740	XXX
82.2515	964.8800	I10	5-methylnonane	0.0136	0.0170	0.0079	329.180	165.100	XXX
82.5047	966.6000	I10	4-methylnonane	0.0476	0.0591	0.0276	32.000	0.000	XXX
82.8597	969.0200	A9	1,2-methylethylbenzene	0.0298	0.0311	0.0204	329.324	165.180	XXX
83.0999	970.6400	I10	2-methylnonane	0.0147	0.0186	0.0085	332.654	167.030	XXX
83.3526	972.3500	I10	3-ethyloctane	0.0079	0.0098	0.0046	331.700	166.500	XXX
83.7718	975.1700	I10	3-methylnonane	0.0291	0.0364	0.0168	334.040	167.800	XXX
83.9376	976.2800		unknown	0.0072	0.0094	0.0042	334.040	167.800	XXX
84.0291	976.8900	N10	N10-[5]	0.0074	0.0085	0.0044	334.040	167.800	XXX
84.2331	978.2500		unknown	0.0013	0.0017	0.0008	334.040	167.800	XXX
84.4130	979.4500	I10	I10-[6]	0.0134	0.0167	0.0078	334.040	167.800	XXX
85.1780	984.5100	A9	1,2,4-trimethylbenzene	0.0788	0.0827	0.0540	336.884	169.380	XXX
85.3466	985.6100	N10	i-butylcyclohexane	0.0141	0.0163	0.0083	340.340	171.300	XXX
85.5782	987.1300	I10	I10-[7]	0.0076	0.0094	0.0044	340.340	171.300	XXX
85.7725	988.4000	I10	I10-[8]	0.0126	0.0157	0.0073	340.340	171.300	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/7/2020 4:01:17 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-12-D7900.0001.CDF Acquired: 06/07/20 15:02:58
Sample: 20-NEDR-814-12-D7900
Analyzed: 6/7/2020 4:01:17 PM
Processed 161 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: SHORE TANK 1556 LINE
Yield: 18.25
Int Std: MEK
Int Std Amt: 0.32
Sample Wt: 10.26
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Page: 10

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
86.2157	991.2900	N10	N10-[6]	0.0032	0.0037	0.0019	340.340	171.300	XXX
86.9641	996.1300	A10	i-butylbenzene	0.0042	0.0045	0.0026	343.022	172.790	XXX
87.2125	997.7300	A10	sec-butylbenzene	0.0039	0.0041	0.0024	344.012	173.340	XXX
87.5667	1000.0000	P10	n-decane	0.1764	0.2221	0.1022	345.470	174.150	XXX

WTI 1549 Analysis

Crude Oil Type: WTI
Date of Sample: June 9, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1549

intertek
caleb brett

Certificate of Analysis

Sunoco Logistics L.P.
Allen Brady
2300 North Twin City Highway
Accounts Payable
Nederland, TX 77627
United States of America

Our Reference Number: US300-0046676
Lab Reference Number: 2020-NEDR-000814
Customer Reference Number: Submitted

Customer Product Description: WTI
Location: Sunoco, Nederland, Texas, United States
Sample Representing: Shore Tank 1549 Line
Drawn By: Intertek

Sample ID: 2020-NEDR-000814-014
Date Sampled: 09-Jun-2020
Date Submitted: 07-Jun-2020
Date Tested: 10-Jun-2020

Method	Property	Result	Units
ASTM D7900	Methane	<0.01	Vol %
	Ethane	0.08	Vol %
	Propane	0.74	Vol %
	Isobutane	0.33	Vol %
	n-Butane	1.86	Vol %
	Neopentane	<0.01	Vol %
	Isopentane	1.38	Vol %
	n-Pentane	2.12	Vol %
	Cyclopentane	0.28	Vol %
	Cyclohexane	0.92	Vol %
	Methylcyclopentane	1.81	Vol %
	Benzene	0.18	Vol %
	Toluene	0.48	Vol %
	Light ends (C1-C10)	35.9	Vol %

f - Denotes analysis results which are ISO/IEC 17025 accredited by ANSI-ASQ National Accreditation Board

Analysis Total: $__________
______ O/T Hours @: ________ = $________
Blending:$ ___________ Shipping: $__________

Results are only representative of the sample tested. All tests have been performed using the latest version unless otherwise indicated. This report shall not be reproduced except in full without written approval of Intertek. Report is subject to our standard Terms and Conditions which can be obtained at our website: http://www.intertek.com/terms

Signed By: ______________________________
Mar'Kiffany Lane, Laboratory Technician

Date: ____________________

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900 Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05 Sample Den: 0.82

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	8.61	10.93	9.80
I-Paraffins:	8.50	10.17	7.81
Olefins:	0.00	0.00	0.00
Naphthenes:	11.43	12.19	10.39
Aromatics:	2.18	2.05	1.97
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.51	0.59	0.40

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	1.05(Mass%)	0.98(Vol%)

Average Molecular Weight: 85.08

Relative Density: 0.66

Reid Vapor Pressure @ 100F: 4.71psi - 32.47kPa

Calculated Octane Number: 66.1

Motor Octane Number (Jenkins Calculation): 63.3

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	177.30	T50	T90	FBP
BP by Vol (Deg F)	-43.67	177.30	T50	T90	FBP

Percent Carbon: 84.95 Percent Hydrogen: 15.05
Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	6.51
Light Ends (C2s-C5s Vol %)	6.79

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01

Sample: 20-NEDR-814-14-D7900

Analyzed: 6/10/2020 4:21:49 AM

Processed 179 Peaks

Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments: ST 1549 WTI

Yield: 31.23

Int Std: MEK

Int Std Amt: 0.31

Sample Wt: 10.05 Sample Den: 0.82

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	71.97	0.63
C6	85.01	0.70
C7	98.44	0.74
C8	112.32	0.75
C9	126.38	0.76
C10	141.68	0.75
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	85.10	0.66

Octane Number

Research Octane Number: 66.1

Motor Octane Number: 63.3

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900
Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05
Sample Den: 0.82

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.45	0.00	0.00	0.00	0.00	0.00	0.45
C4	1.31	0.23	0.00	0.00	0.00	0.00	1.54
C5	1.62	1.04	0.00	0.25	0.00	0.00	2.92
C6	1.33	1.47	0.00	2.05	0.20	0.00	5.05
C7	1.28	1.26	0.00	3.87	0.51	0.00	6.93
C8	1.05	1.68	0.00	2.91	0.75	0.02	6.41
C9	0.81	1.71	0.00	1.81	0.68	0.21	5.21
C10	0.71	1.11	0.00	0.54	0.04	0.27	2.68
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	8.61	8.50	0.00	11.43	2.18	0.51	30.72

Oxygenates 0.00
Total Unknowns: 0.51
Total C14+: 0.00
Grand Total: 31.23

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.08	0.00	0.00	0.00	0.00	0.00	0.08
C3	0.74	0.00	0.00	0.00	0.00	0.00	0.74
C4	1.86	0.33	0.00	0.00	0.00	0.00	2.19
C5	2.12	1.38	0.00	0.28	0.00	0.00	3.78
C6	1.65	1.83	0.00	2.20	0.18	0.00	5.87
C7	1.53	1.51	0.00	4.18	0.48	0.00	7.70
C8	1.23	1.95	0.00	3.09	0.70	0.02	6.99
C9	0.92	1.93	0.00	1.89	0.64	0.25	5.63
C10	0.80	1.24	0.00	0.55	0.04	0.32	2.94
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	10.93	10.17	0.00	12.19	2.05	0.59	35.33

Oxygenates 0.00
Total Unknowns: 0.59
Total C14+: 0.00
Grand Total: 35.92

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900
Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05
Sample Den: 0.82

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C3	0.95	0.00	0.00	0.00	0.00	0.00	0.95
C4	2.10	0.36	0.00	0.00	0.00	0.00	2.47
C5	2.10	1.35	0.00	0.33	0.00	0.00	3.78
C6	1.44	1.59	0.00	2.27	0.23	0.00	5.53
C7	1.19	1.17	0.00	3.67	0.52	0.00	6.56
C8	0.86	1.37	0.00	2.42	0.65	0.02	5.31
C9	0.59	1.24	0.00	1.34	0.53	0.16	3.85
C10	0.47	0.73	0.00	0.36	0.03	0.22	1.80
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.80	7.81	0.00	10.39	1.97	0.40	29.96

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.40	Grand Total:	30.36

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900 Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05 Sample Den: 0.82

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order **Page: 5**

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6912	200.0000	P2	ethane	0.0338	0.0813	0.1046	-127.480	-88.600	XXX
6.9500	300.0000	P3	propane	0.4511	0.7373	0.9529	-43.672	-42.040	XXX
7.3539	367.6400	I4	i-butane	0.2273	0.3337	0.3643	10.904	-11.720	XXX
7.7002	400.0000	P4	n-butane	1.3131	1.8558	2.1043	31.100	-0.500	XXX
7.8733	414.4300	I5	2,2-dimethylpropane	0.0018	0.0025	0.0023	49.100	9.500	XXX
8.9686	475.2600	I5	i-pentane	1.0425	1.3763	1.3459	82.112	27.840	XXX
9.6538	500.0000	P5	n-pentane	1.6247	2.1224	2.0975	96.908	36.060	XXX
10.9520	535.0100	I6	2,2-dimethylbutane	0.0133	0.0168	0.0144	121.514	49.730	XXX
12.3314	562.1600	N5	cyclopentane	0.2521	0.2766	0.3348	120.650	49.250	XXX
12.4012	563.3500	I6	2,3-dimethylbutane	0.0768	0.0949	0.0830	136.364	57.980	XXX
12.6232	567.0500	I6	2-methylpentane	0.7950	0.9958	0.8593	140.468	60.260	XXX
13.5232	580.7700	I6	3-methylpentane	0.5830	0.7179	0.6301	145.886	63.270	XXX
15.0175	600.0000	P6	n-hexane	1.3335	1.6542	1.4413	155.714	68.730	XXX
18.3417	627.9000	I7	2,2-dimethylpentane	0.0134	0.0163	0.0125	174.542	79.190	XXX
18.7104	630.4900	N6	methylcyclopentane	1.1742	1.2831	1.2996	161.240	71.800	XXX
19.3057	634.5100	I7	2,4-dimethylpentane	0.0411	0.0500	0.0382	176.882	80.490	XXX
22.6843	654.2600	A6	benzene	0.1969	0.1832	0.2347	176.162	80.090	XXX
23.7491	659.6300	I7	3,3-dimethylpentane	0.0085	0.0100	0.0079	186.908	86.060	XXX
24.4582	663.0200	N6	cyclohexane	0.8771	0.9216	0.9708	177.296	80.720	XXX
26.4312	671.8000	I7	2-methylhexane	0.3699	0.4458	0.3438	194.090	90.050	XXX
26.7655	673.2000	I7	2,3-dimethylpentane	0.1845	0.2171	0.1715	193.604	89.780	XXX
27.3285	675.5000	N7	1,1-dimethylcyclopentane	0.1714	0.1858	0.1626	189.464	87.480	XXX
28.3993	679.7200	I7	3-methylhexane	0.5764	0.6862	0.5358	197.330	91.850	XXX
29.8317	685.0400	N7	1c,3-dimethylcyclopentane	0.4611	0.5064	0.4374	195.386	90.770	XXX
30.5091	687.4500	N7	1t,3-dimethylcyclopentane	0.4232	0.4623	0.4015	197.096	91.720	XXX
30.8816	688.7400	I7	3-ethylpentane	0.0690	0.0809	0.0642	200.246	93.470	XXX
31.1634	689.7100	N7	1t,2-dimethylcyclopentane	0.8307	0.9044	0.7881	197.366	91.870	XXX
34.3767	700.0000	P7	n-heptane	1.2818	1.5336	1.1915	209.156	98.420	XXX
38.6175	724.5500	N7	1c,2-dimethylcyclopentane	0.0990	0.1106	0.0939	211.154	99.530	XXX
38.7567	725.3000	N7	methylcyclohexane	1.7057	1.8135	1.6181	213.674	100.930	XXX
39.5366	729.4400	I8	2,2-dimethylhexane	0.2163	0.2544	0.1763	224.312	106.840	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900 Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.05 Sample Den: 0.82

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
41.4535	739.2200	N7	ethylcyclopentane	0.1818	0.1941	0.1725	218.246	103.470	XXX
41.8990	741.4100	I8	2,5-dimethylhexane	0.0472	0.0557	0.0385	228.398	109.110	XXX
42.2997	743.3600	I8	2,4-dimethylhexane	0.0692	0.0808	0.0564	228.974	109.430	XXX
43.4328	748.7600	N8	1c,2t,4-trimethylcyclopentane	0.2736	0.2932	0.2271	242.132	116.740	XXX
43.7642	750.3100	I8	3,3-dimethylhexane	0.0193	0.0222	0.0157	233.546	111.970	XXX
45.0201	756.0500	N8	1t,2c,3-trimethylcyclopentane	0.3814	0.4050	0.3166	230.738	110.410	XXX
45.6466	758.8400	I8	2,3,4-trimethylpentane	0.0055	0.0062	0.0045	236.246	113.470	XXX
46.4031	762.1600	A7	toluene	0.5135	0.4844	0.5191	231.134	110.630	XXX
48.0476	769.1500	I8	2,3-dimethylhexane	0.1281	0.1472	0.1045	240.098	115.610	XXX
48.2830	770.1300	I8	2-methyl-3-ethylpentane	0.0449	0.0516	0.0366	240.098	115.610	XXX
49.3646	774.5600	I8	2-methylheptane	0.5575	0.6535	0.4546	243.770	117.650	XXX
49.6627	775.7600	I8	4-methylheptane	0.1594	0.1850	0.1300	243.878	117.710	XXX
49.8323	776.4400	I8	3-methyl-3-ethylpentane	0.0297	0.0341	0.0242	240.098	115.610	XXX
49.9520	776.9200	I8	3,4-dimethylhexane	0.0371	0.0421	0.0302	243.914	117.730	XXX
50.3526	778.5000		unknown	0.0208	0.0243	0.0169	243.914	117.730	XXX
50.4282	778.8000	N8	1c,3-dimethylcyclohexane	0.0227	0.0243	0.0188	246.848	119.360	XXX
50.8901	780.6100	I8	3-methylheptane	0.2557	0.2963	0.2085	246.074	118.930	XXX
51.0491	781.2300	N8	1c,2t,3-trimethylcyclopentane	0.6410	0.6806	0.5321	243.500	117.500	XXX
51.2090	781.8500	I8	3-ethylhexane	0.1091	0.1250	0.0889	245.372	118.540	XXX
51.4334	782.7200	N8	1t,4-dimethylcyclohexane	0.1905	0.2044	0.1582	246.848	119.360	XXX
52.5236	786.8700	N8	1,1-dimethylcyclohexane	0.0587	0.0615	0.0487	247.190	119.550	XXX
53.2858	789.7100	N8	3t-ethylmethylcyclopentane	0.0958	0.1022	0.0795	249.980	121.100	XXX
53.7083	791.2700	N8	3c-ethylmethylcyclopentane	0.0861	0.0918	0.0715	249.980	121.100	XXX
53.9501	792.1600	N8	2t-ethylmethylcyclopentane	0.2324	0.2472	0.1929	250.160	121.200	XXX
54.3404	793.5700	N8	1,1-methylethylcyclopentane	0.0220	0.0231	0.0183	250.754	121.530	XXX
54.8806	795.5200	N8	1t,2-dimethylcyclohexane	0.3251	0.3427	0.2698	254.174	123.430	XXX
55.9900	799.4400	N8	1t,3-dimethylcyclohexane	0.0065	0.0069	0.0054	254.174	123.430	XXX
56.1484	800.0000	P8	n-octane	1.0524	1.2255	0.8582	258.224	125.680	XXX
56.2625	800.7700	N8	i-propylcyclopentane	0.1378	0.1452	0.1144	259.574	126.430	XXX
57.5892	809.6100		unknown	0.0101	0.0118	0.0084	259.574	126.430	XXX
57.6790	810.2000	I9	2,4,4-trimethylhexane	0.0278	0.0307	0.0202	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900 Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.05 Sample Den: 0.82

Components Listed in Chromatographic Order **Page: 7**

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
58.7706	817.3000		unknown	0.0228	0.0267	0.0166	32.000	0.000	XXX
59.1808	819.9300	I9	2,3,4-trimethylhexane	0.0130	0.0144	0.0095	282.308	139.060	XXX
59.5198	822.0800	I9	2,2,3,4-tetramethylpentane	0.0316	0.0350	0.0230	271.454	133.030	XXX
59.8224	824.0000	N8	N8-[1]	0.0101	0.0106	0.0084	271.454	133.030	XXX
60.5930	828.8200	N8	1c,2-dimethylcyclohexane	0.1038	0.1067	0.0862	265.532	129.740	XXX
60.7469	829.7700	I9	2,3,5-trimethylhexane	0.0315	0.0357	0.0229	268.430	131.350	XXX
60.8572	830.4600	I9	2,2-dimethylheptane	0.0061	0.0070	0.0044	270.860	132.700	XXX
61.0975	831.9400	N8	N8-[2]	0.0104	0.0109	0.0086	270.860	132.700	XXX
61.4583	834.1500		unknown	0.0677	0.0791	0.0562	270.860	132.700	XXX
61.5506	834.7200	N9	1,1,4-trimethylcyclohexane	0.4438	0.4702	0.3275	275.000	135.000	XXX
61.7261	835.7900	I9	2,2,3-trimethylhexane	0.2259	0.2583	0.1640	271.220	132.900	XXX
62.1270	838.2200	I9	2,4-dimethylheptane	0.0265	0.0303	0.0193	271.220	132.900	XXX
62.5136	840.5500	N8	n-propylcyclopentane	0.3123	0.3291	0.2593	267.728	130.960	XXX
62.8882	842.7900	I9	2,5-dimethylheptane	0.0932	0.1064	0.0677	276.800	136.000	XXX
63.0897	843.9900	N9	*1c,3c,5-trimethylcyclohexane	0.0130	0.0139	0.0096	281.174	138.430	XXX
63.3794	845.7000	I9	3,5-dimethylheptane	0.0367	0.0416	0.0267	276.800	136.000	XXX
63.6059	847.0400	I9	2,6-dimethylheptane	0.0525	0.0606	0.0382	275.396	135.220	XXX
63.6850	847.5000		unknown	0.0157	0.0184	0.0114	275.396	135.220	XXX
63.8656	848.5600	N9	1,1,3-trimethylcyclohexane	0.0407	0.0423	0.0300	295.862	146.590	XXX
64.5943	852.8000	N9	1c,3c,5c-trimethylcyclohexane	0.0282	0.0296	0.0208	32.000	0.000	XXX
64.7006	853.4200	A8	ethylbenzene	0.1574	0.1485	0.1381	277.160	136.200	XXX
64.8221	854.1200	N9	1c,2t,4t-trimethylcyclohexane	0.1401	0.1469	0.1034	32.000	0.000	XXX
65.1572	856.0500	I9	I9-[1]	0.1829	0.2049	0.1328	32.000	0.000	XXX
65.5444	858.2600	N9	N9-[1]	0.0254	0.0266	0.0187	32.000	0.000	XXX
65.8059	859.7400	N9	N9-[2]	0.0094	0.0098	0.0069	32.000	0.000	XXX
66.1786	861.8500	A8	1,3-dimethylbenzene	0.2697	0.2553	0.2366	282.416	139.120	XXX
66.3875	863.0200	A8	1,4-dimethylbenzene	0.1819	0.1728	0.1596	281.048	138.360	XXX
66.7257	864.9100	I9	3,4-dimethylheptane	0.0194	0.0217	0.0141	285.080	140.600	XXX
66.8495	865.6000	N9	N9-[3]	0.0264	0.0277	0.0195	285.080	140.600	XXX
67.1982	867.5400	I9	4-ethylheptane	0.0732	0.0831	0.0531	288.392	142.440	XXX
67.2655	867.9100	I9	I9-[2]	0.0254	0.0285	0.0185	288.392	142.440	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900
Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05
Sample Den: 0.82

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Page: 8

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
67.5359	869.4100		unknown	0.0200	0.0234	0.0145	288.392	142.440	XXX
67.6857	870.2300	I9	4-methyloctane	0.1264	0.1435	0.0918	288.392	142.440	XXX
67.8552	871.1600	I9	2-methyloctane	0.1532	0.1756	0.1112	289.904	143.280	XXX
68.3798	874.0200	N9	N9-[4]	0.0077	0.0081	0.0057	289.904	143.280	XXX
68.4996	874.6700	I9	3-ethylheptane	0.0435	0.0490	0.0316	289.400	143.000	XXX
68.7375	875.9600	I9	3,3-diethylpentane	0.0428	0.0462	0.0311	270.842	132.690	XXX
68.9516	877.1100	I9	3-methyloctane	0.3225	0.3662	0.2342	291.614	144.230	XXX
69.2458	878.6900	N9	1c,2t,4c-trimethylcyclohexane	0.0279	0.0296	0.0206	275.000	135.000	XXX
69.4212	879.6300		unknown	0.0351	0.0411	0.0259	275.000	135.000	XXX
69.7559	881.4100	N9	1,1,2-trimethylcyclohexane	0.0327	0.0334	0.0241	293.360	145.200	XXX
69.9158	882.2600	A8	1,2-dimethylbenzene	0.1368	0.1272	0.1201	291.974	144.430	XXX
70.0793	883.1200	I9	I9-[3]	0.0328	0.0367	0.0238	291.974	144.430	XXX
70.1470	883.4800	I9	I9-[4]	0.0185	0.0207	0.0134	291.974	144.430	XXX
70.2550	884.0500		unknown	0.0081	0.0095	0.0059	291.974	144.430	XXX
70.4932	885.3000	N9	N9-[5]	0.0086	0.0091	0.0064	291.974	144.430	XXX
70.8536	887.1900	N9	N9-[6]	0.1278	0.1340	0.0943	291.974	144.430	XXX
71.0650	888.2900	N9	N9-[7]	0.2186	0.2292	0.1613	291.974	144.430	XXX
71.4420	890.2500	I9	I9-[5]	0.0962	0.1078	0.0699	291.974	144.430	XXX
71.5275	890.6900	I9	I9-[6]	0.0241	0.0270	0.0175	291.974	144.430	XXX
71.8372	892.2900	N9	i-butylcyclopentane	0.0256	0.0268	0.0189	298.346	147.970	XXX
72.0617	893.4400		unknown	0.0268	0.0313	0.0198	298.346	147.970	XXX
72.1141	893.7100	N9	N9-[8]	0.0128	0.0135	0.0095	298.346	147.970	XXX
72.2914	894.6200		unknown	0.0072	0.0084	0.0053	298.346	147.970	XXX
73.3531	900.0000	P9	n-nonane	0.8059	0.9187	0.5853	303.476	150.820	XXX
73.5452	901.4800	N9	1,1-methylethylcyclohexane	0.0733	0.0744	0.0541	305.924	152.180	XXX
73.7403	902.9900	N9	N9-[9]	0.0262	0.0272	0.0194	305.924	152.180	XXX
74.0692	905.5200	N9	N9-[10]	0.1482	0.1535	0.1094	305.924	152.180	XXX
74.5087	908.8800	N9	N9-[11]	0.0295	0.0306	0.0218	305.924	152.180	XXX
75.1442	913.7100	A9	i-propylbenzene	0.0401	0.0380	0.0310	306.338	152.410	XXX
75.4660	916.1300	I10	I10-[1]	0.0212	0.0237	0.0139	306.338	152.410	XXX
75.7560	918.3100	N9	N9-[12]	0.1602	0.1659	0.1182	306.338	152.410	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900
Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05
Sample Den: 0.82

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
76.0159	920.2500	I10	I10-[2]	0.0872	0.0977	0.0571	306.338	152.410	XXX
76.2967	922.3400	I10	2,4-dimethyloctane	0.0452	0.0509	0.0296	312.620	155.900	XXX
76.6287	924.8000	N9	N9-[13]	0.0091	0.0094	0.0067	312.620	155.900	XXX
76.7313	925.5600		unknown	0.0258	0.0302	0.0191	312.620	155.900	XXX
76.8365	926.3400	N9	N9-[14]	0.0048	0.0050	0.0035	312.620	155.900	XXX
77.1453	928.6100	I10	2,6-dimethyloctane	0.0056	0.0063	0.0037	320.738	160.410	XXX
77.3288	929.9500	I10	2,5-dimethyloctane	0.0468	0.0524	0.0306	317.300	158.500	XXX
77.5851	931.8300	N9	n-butylcyclopentane	0.1698	0.1770	0.1253	313.916	156.620	XXX
77.8100	933.4600		unknown	0.0181	0.0211	0.0134	313.916	156.620	XXX
77.9281	934.3200	I10	I10-[3]	0.0122	0.0137	0.0080	313.916	156.620	XXX
78.1250	935.7500	N10	N10-[1]	0.0615	0.0629	0.0408	313.916	156.620	XXX
78.3526	937.3900	I10	I10-[4]	0.0119	0.0134	0.0078	313.916	156.620	XXX
78.6371	939.4400	I10	3,3-dimethyloctane	0.2111	0.2336	0.1382	322.160	161.200	XXX
78.8357	940.8700		unknown	0.0253	0.0296	0.0166	322.160	161.200	XXX
79.2368	943.7400		unknown	0.0336	0.0392	0.0220	322.160	161.200	XXX
79.5443	945.9200	N10	N10-[2]	0.0742	0.0759	0.0493	322.160	161.200	XXX
79.7249	947.2000	A9	n-propylbenzene	0.1826	0.1733	0.1415	318.632	159.240	XXX
80.0623	949.5900		unknown	0.0247	0.0289	0.0191	318.632	159.240	XXX
80.2321	950.7800	N10	N10-[3]	0.0291	0.0298	0.0193	318.632	159.240	XXX
80.3980	951.9500		unknown	0.0096	0.0113	0.0064	318.632	159.240	XXX
80.6189	953.5000	A9	1,3-methylethylbenzene	0.1034	0.0978	0.0801	322.394	161.330	XXX
80.9250	955.6300	A9	1,4-methylethylbenzene	0.0878	0.0834	0.0681	323.618	162.010	XXX
81.5100	959.6900		unknown	0.0173	0.0202	0.0134	323.618	162.010	XXX
81.6641	960.7600	N10	N10-[4]	0.2329	0.2381	0.1546	323.618	162.010	XXX
82.0026	963.0900	I10	I10-[5]	0.0184	0.0204	0.0121	323.618	162.010	XXX
82.1690	964.2300	I10	I10-[6]	0.0380	0.0420	0.0249	323.618	162.010	XXX
82.2659	964.8900	I10	5-methylnonane	0.0364	0.0407	0.0238	329.180	165.100	XXX
82.4131	965.9000		unknown	0.0178	0.0208	0.0117	329.180	165.100	XXX
82.5209	966.6300	I10	4-methylnonane	0.1645	0.1818	0.1077	32.000	0.000	XXX
82.8737	969.0300	A9	1,2-methylethylbenzene	0.0862	0.0801	0.0668	329.324	165.180	XXX
83.1199	970.7000	I10	2-methylnonane	0.0605	0.0681	0.0396	332.654	167.030	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:21:49 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-14-D7900.0002.CDF Acquired: 06/09/20 22:12:01
Sample: 20-NEDR-814-14-D7900 Analyzed: 6/10/2020 4:21:49 AM
Processed 179 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: ST 1549 WTI
Yield: 31.23
Int Std: MEK
Int Std Amt: 0.31
Sample Wt: 10.05 Sample Den: 0.82

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
83.3694	972.3900	I10	3-ethyloctane	0.0200	0.0221	0.0131	331.700	166.500	XXX
83.7838	975.1800	I10	3-methylnonane	0.0938	0.1047	0.0614	334.040	167.800	XXX
83.9561	976.3300		unknown	0.0312	0.0364	0.0204	334.040	167.800	XXX
84.0568	977.0000	N10	N10-[5]	0.0513	0.0525	0.0341	334.040	167.800	XXX
84.2256	978.1300		unknown	0.0047	0.0055	0.0031	334.040	167.800	XXX
84.4211	979.4300	I10	I10-[7]	0.0306	0.0338	0.0200	334.040	167.800	XXX
84.4850	979.8600		unknown	0.0133	0.0156	0.0087	334.040	167.800	XXX
84.7984	981.9400	I10	I10-[8]	0.0062	0.0068	0.0041	334.040	167.800	XXX
84.9871	983.1900	I10	I10-[9]	0.0045	0.0049	0.0029	334.040	167.800	XXX
85.1919	984.5400	A9	1,2,4-trimethylbenzene	0.1796	0.1677	0.1392	336.884	169.380	XXX
85.3650	985.6800	N10	i-butylcyclohexane	0.0829	0.0852	0.0550	340.340	171.300	XXX
85.5833	987.1100	I10	I10-[10]	0.0832	0.0920	0.0545	340.340	171.300	XXX
85.7792	988.3900	I10	I10-[11]	0.0865	0.0956	0.0566	340.340	171.300	XXX
85.9765	989.6800	I10	I10-[12]	0.0176	0.0194	0.0115	340.340	171.300	XXX
86.0297	990.0300		unknown	0.0061	0.0071	0.0040	340.340	171.300	XXX
86.2209	991.2700	N10	N10-[6]	0.0042	0.0043	0.0028	340.340	171.300	XXX
86.3461	992.0900		unknown	0.0212	0.0247	0.0141	340.340	171.300	XXX
86.5435	993.3700	I10	I10-[13]	0.0106	0.0117	0.0069	340.340	171.300	XXX
86.8599	995.4100		unknown	0.0132	0.0154	0.0384	340.340	171.300	XXX
86.9665	996.1000	A10	i-butylbenzene	0.0159	0.0152	0.0110	343.022	172.790	XXX
87.2206	997.7300	A10	sec-butylbenzene	0.0277	0.0263	0.0192	344.012	173.340	XXX
87.3403	998.5000		unknown	0.0113	0.0132	0.0078	344.012	173.340	XXX
87.5735	1000.0000	P10	n-decane	0.7125	0.7984	0.4664	345.470	174.150	XXX

Bakken 1558 Analysis

Crude Oil Type: Bakken
Date of Sample: June 9, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1558

intertek
caleb brett

Certificate of Analysis

Sunoco Logistics L.P.
Allen Brady
2300 North Twin City Highway
Accounts Payable
Nederland, TX 77627
United States of America

Our Reference Number: US300-0046676
Lab Reference Number: 2020-NEDR-000814
Customer Reference Number: Submitted

Customer Product Description:	BAKKEN	**Sample ID:**	2020-NEDR-000814-015
Location:	Sunoco, Nederland, Texas, United States	**Date Sampled:**	09-Jun-2020
Sample Representing:	Shore Tank 1558 Line	**Date Submitted:**	07-Jun-2020
Drawn By:	Intertek	**Date Tested:**	10-Jun-2020

Method	Property	Result	Units
ASTM D7900	Methane	<0.01	Vol %
	Ethane	0.20	Vol %
	Propane	1.16	Vol %
	Isobutane	0.48	Vol %
	n-Butane	2.45	Vol %
	Neopentane	<0.01	Vol %
	Isopentane	1.90	Vol %
	n-Pentane	3.35	Vol %
	Cyclopentane	0.22	Vol %
	Cyclohexane	0.57	Vol %
	Methylcyclopentane	1.34	Vol %
	Benzene	0.17	Vol %
	Toluene	0.34	Vol %
	Light Ends (C1-C10)	41.9	Vol %

f - Denotes analysis results which are ISO/IEC 17025 accredited by ANSI-ASQ National Accreditation Board

Analysis Total: $__________
______ O/T Hours @: ________ = $________
Blending:$ ___________ Shipping: $__________

Results are only representative of the sample tested. All tests have been performed using the latest version unless otherwise indicated. This report shall not be reproduced except in full without written approval of Intertek. Report is subject to our standard Terms and Conditions which can be obtained at our website: http://www.intertek.com/terms

Signed By: ____________________________________ Date: ____________________
Mar'Kiffany Lane, Laboratory Technician

ANAB
ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
AT-2072.04

ISO 9001:2015
ABS-QE Certificate # 30701

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900 Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Location: RITA - LT ENDS
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03 Sample Den: 0.81

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	11.99	15.15	13.77
I-Paraffins:	11.27	13.33	10.25
Olefins:	0.00	0.00	0.00
Naphthenes:	9.75	10.25	8.61
Aromatics:	2.72	2.53	2.31
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.57	0.66	0.46

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	1.80(Mass%)	1.67(Vol%)

Average Molecular Weight: 83.46

Relative Density: 0.65

Reid Vapor Pressure @ 100F: 7.74psi - 53.37kPa

Calculated Octane Number: 64.6

Motor Octane Number (Jenkins Calculation): 62.2

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	-43.67	155.71	T50	T90	FBP
BP by Vol (Deg F)	-43.67	155.71	T50	T90	FBP

Percent Carbon: 84.86 Percent Hydrogen: 15.14

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	9.54
Light Ends (C2s-C5s Vol %)	9.76

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03
Sample Den: 0.81

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.58
C5	72.05	0.63
C6	85.35	0.69
C7	98.83	0.72
C8	112.45	0.74
C9	125.90	0.77
C10	141.80	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	83.50	0.65

Octane Number

Research Octane Number: 64.6

Motor Octane Number: 62.2

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03
Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.09	0.00	0.00	0.00	0.00	0.00	0.09
C3	0.72	0.00	0.00	0.00	0.00	0.00	0.72
C4	1.76	0.33	0.00	0.00	0.00	0.00	2.09
C5	2.60	1.46	0.00	0.21	0.00	0.00	4.27
C6	2.07	2.01	0.00	1.59	0.18	0.00	5.86
C7	1.73	1.74	0.00	3.15	0.37	0.00	6.99
C8	1.31	2.24	0.00	2.73	0.84	0.03	7.14
C9	0.94	2.07	0.00	1.71	1.27	0.17	6.14
C10	0.79	1.41	0.00	0.37	0.06	0.38	3.01
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	11.99	11.27	0.00	9.75	2.72	0.57	35.74

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.57
Grand Total: 36.31

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.20	0.00	0.00	0.00	0.00	0.00	0.20
C3	1.16	0.00	0.00	0.00	0.00	0.00	1.16
C4	2.45	0.48	0.00	0.00	0.00	0.00	2.93
C5	3.35	1.90	0.00	0.22	0.00	0.00	5.48
C6	2.53	2.47	0.00	1.69	0.17	0.00	6.86
C7	2.04	2.05	0.00	3.36	0.34	0.00	7.79
C8	1.51	2.57	0.00	2.85	0.78	0.03	7.73
C9	1.05	2.31	0.00	1.76	1.18	0.19	6.49
C10	0.87	1.55	0.00	0.37	0.06	0.43	3.29
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	15.15	13.33	0.00	10.25	2.53	0.66	41.26

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.66
Grand Total: 41.92

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900 Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA

Comments:

Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03 Sample Den: 0.81

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.26	0.00	0.00	0.00	0.00	0.00	0.26
C3	1.49	0.00	0.00	0.00	0.00	0.00	1.49
C4	2.76	0.52	0.00	0.00	0.00	0.00	3.28
C5	3.29	1.85	0.00	0.27	0.00	0.00	5.41
C6	2.19	2.13	0.00	1.72	0.22	0.00	6.26
C7	1.57	1.59	0.00	2.93	0.36	0.00	6.45
C8	1.05	1.79	0.00	2.22	0.72	0.03	5.80
C9	0.67	1.47	0.00	1.23	0.96	0.14	4.47
C10	0.51	0.90	0.00	0.24	0.04	0.29	1.99
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	13.77	10.25	0.00	8.61	2.31	0.46	34.94

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.46	Grand Total:	35.41

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900 Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.03 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6918	200.0000	P2	ethane	0.0859	0.2038	0.2607	-127.480	-88.600	XXX
6.9511	300.0000	P3	propane	0.7190	1.1584	1.4875	-43.672	-42.040	XXX
7.3557	367.6200	I4	i-butane	0.3302	0.4778	0.5183	10.904	-11.720	XXX
7.7027	400.0000	P4	n-butane	1.7566	2.4473	2.7572	31.100	-0.500	XXX
7.8762	414.4300	I5	2,2-dimethylpropane	0.0039	0.0054	0.0050	49.100	9.500	XXX
8.9743	475.2600	I5	i-pentane	1.4583	1.8979	1.8440	82.112	27.840	XXX
9.6611	500.0000	P5	n-pentane	2.5995	3.3475	3.2871	96.908	36.060	XXX
10.9624	534.9900	I6	2,2-dimethylbutane	0.0233	0.0289	0.0247	121.514	49.730	XXX
12.3441	562.1000	N5	cyclopentane	0.2078	0.2248	0.2703	120.650	49.250	XXX
12.4161	563.3300	I6	2,3-dimethylbutane	0.1187	0.1446	0.1256	136.364	57.980	XXX
12.6375	567.0000	I6	2-methylpentane	1.1580	1.4298	1.2260	140.468	60.260	XXX
13.5394	580.7000	I6	3-methylpentane	0.7147	0.8676	0.7566	145.886	63.270	XXX
15.0435	600.0000	P6	n-hexane	2.0674	2.5283	2.1887	155.714	68.730	XXX
18.3743	627.9000	I7	2,2-dimethylpentane	0.0210	0.0251	0.0191	174.542	79.190	XXX
18.7495	630.5300	N6	methylcyclopentane	1.0425	1.1230	1.1301	161.240	71.800	XXX
19.3442	634.5400	I7	2,4-dimethylpentane	0.0684	0.0820	0.0622	176.882	80.490	XXX
22.7316	654.3000	A6	benzene	0.1844	0.1692	0.2154	176.162	80.090	XXX
23.8039	659.6900	I7	3,3-dimethylpentane	0.0171	0.0198	0.0155	186.908	86.060	XXX
24.5095	663.0600	N6	cyclohexane	0.5476	0.5672	0.5936	177.296	80.720	XXX
26.4886	671.8400	I7	2-methylhexane	0.5428	0.6450	0.4942	194.090	90.050	XXX
26.8174	673.2200	I7	2,3-dimethylpentane	0.2226	0.2582	0.2027	193.604	89.780	XXX
27.3841	675.5300	N7	1,1-dimethylcyclopentane	0.1660	0.1775	0.1543	189.464	87.480	XXX
28.4615	679.7700	I7	3-methylhexane	0.8011	0.9402	0.7294	197.330	91.850	XXX
29.8904	685.0700	N7	1c,3-dimethylcyclopentane	0.4052	0.4387	0.3765	195.386	90.770	XXX
30.5669	687.4700	N7	1t,3-dimethylcyclopentane	0.3721	0.4007	0.3458	197.096	91.720	XXX
30.9456	688.7800	I7	3-ethylpentane	0.0708	0.0817	0.0644	200.246	93.470	XXX
31.2243	689.7300	N7	1t,2-dimethylcyclopentane	0.7226	0.7755	0.6715	197.366	91.870	XXX
34.4338	700.0000	P7	n-heptane	1.7258	2.0356	1.5714	209.156	98.420	XXX
38.6642	724.5100	N7	1c,2-dimethylcyclopentane	0.0795	0.0876	0.0739	211.154	99.530	XXX
38.8023	725.2500	N7	methylcyclohexane	1.2799	1.3414	1.1892	213.674	100.930	XXX
39.5866	729.4200	I8	2,2-dimethylhexane	0.2673	0.3100	0.2135	224.312	106.840	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900 Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.03 Sample Den: 0.81

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
41.5044	739.2100	N7	ethylcyclopentane	0.1287	0.1355	0.1196	218.246	103.470	XXX
41.9450	741.3900	I8	2,5-dimethylhexane	0.0632	0.0735	0.0505	228.398	109.110	XXX
42.3509	743.3600	I8	2,4-dimethylhexane	0.1060	0.1220	0.0847	228.974	109.430	XXX
43.4778	748.7400	N8	1c,2t,4-trimethylcyclopentane	0.3213	0.3394	0.2613	242.132	116.740	XXX
43.8118	750.3000	I8	3,3-dimethylhexane	0.0334	0.0379	0.0267	233.546	111.970	XXX
45.0622	756.0300	N8	1t,2c,3-trimethylcyclopentane	0.3463	0.3625	0.2816	230.738	110.410	XXX
45.6745	758.7600	I8	2,3,4-trimethylpentane	0.0123	0.0138	0.0098	236.246	113.470	XXX
46.4419	762.1300	A7	toluene	0.3682	0.3425	0.3646	231.134	110.630	XXX
48.0830	769.1200	I8	2,3-dimethylhexane	0.1748	0.1980	0.1396	240.098	115.610	XXX
48.3149	770.0900	I8	2-methyl-3-ethylpentane	0.0487	0.0552	0.0389	240.098	115.610	XXX
49.3994	774.5400	I8	2-methylheptane	0.6769	0.7822	0.5406	243.770	117.650	XXX
49.6975	775.7400	I8	4-methylheptane	0.2466	0.2822	0.1969	243.878	117.710	XXX
49.8551	776.3700	I8	3-methyl-3-ethylpentane	0.0389	0.0441	0.0311	240.098	115.610	XXX
49.9835	776.8800	I8	3,4-dimethylhexane	0.0497	0.0557	0.0397	243.914	117.730	XXX
50.3811	778.4600		unknown	0.0228	0.0263	0.0182	243.914	117.730	XXX
50.4668	778.8000	N8	1c,3-dimethylcyclohexane	0.0250	0.0264	0.0203	246.848	119.360	XXX
50.9261	780.6100	I8	3-methylheptane	0.4171	0.4766	0.3331	246.074	118.930	XXX
51.0847	781.2200	N8	1c,2t,3-trimethylcyclopentane	0.6290	0.6584	0.5114	243.500	117.500	XXX
51.2449	781.8500	I8	3-ethylhexane	0.1012	0.1143	0.0808	245.372	118.540	XXX
51.4686	782.7100	N8	1t,4-dimethylcyclohexane	0.2018	0.2134	0.1640	246.848	119.360	XXX
52.5531	786.8500	N8	1,1-dimethylcyclohexane	0.0648	0.0669	0.0527	247.190	119.550	XXX
53.3143	789.7000	N8	3t-ethylmethylcyclopentane	0.0708	0.0744	0.0575	249.980	121.100	XXX
53.7343	791.2500	N8	3c-ethylmethylcyclopentane	0.0652	0.0685	0.0530	249.980	121.100	XXX
53.9845	792.1600	N8	2t-ethylmethylcyclopentane	0.1688	0.1770	0.1373	250.160	121.200	XXX
54.3627	793.5400	N8	1,1-methylethylcyclopentane	0.0254	0.0262	0.0206	250.754	121.530	XXX
54.9087	795.5100	N8	1t,2-dimethylcyclohexane	0.2642	0.2745	0.2148	254.174	123.430	XXX
56.0032	799.3900		unknown	0.0042	0.0048	0.0118	254.174	123.430	XXX
56.1767	800.0000	P8	n-octane	1.3119	1.5059	1.0478	258.224	125.680	XXX
56.2942	800.7900	N8	i-propylcyclopentane	0.1320	0.1370	0.1073	259.574	126.430	XXX
57.6992	810.1600	I9	2,4,4-trimethylhexane	0.0440	0.0480	0.0313	32.000	0.000	XXX
58.7929	817.2700		unknown	0.0241	0.0277	0.0171	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03 Sample Den: 0.81

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
59.1930	819.8400	I9	2,3,4-trimethylhexane	0.0180	0.0196	0.0128	282.308	139.060	XXX
59.5449	822.0800	I9	2,2,3,4-tetramethylpentane	0.0229	0.0250	0.0163	271.454	133.030	XXX
59.8467	823.9900	N8	N8-[1]	0.0153	0.0158	0.0124	271.454	133.030	XXX
60.5998	828.7100	N8	1c,2-dimethylcyclohexane	0.1205	0.1221	0.0980	265.532	129.740	XXX
60.7694	829.7600	I9	2,3,5-trimethylhexane	0.0355	0.0397	0.0253	268.430	131.350	XXX
60.9110	830.6400	I9	2,2-dimethylheptane	0.0143	0.0163	0.0102	270.860	132.700	XXX
61.1267	831.9700	N8	N8-[2]	0.0146	0.0151	0.0119	270.860	132.700	XXX
61.4792	834.1400		unknown	0.0618	0.0711	0.0502	270.860	132.700	XXX
61.5757	834.7300	N9	1,1,4-trimethylcyclohexane	0.3676	0.3839	0.2657	275.000	135.000	XXX
61.7513	835.8000	I9	2,2,3-trimethylhexane	0.2265	0.2554	0.1611	271.220	132.900	XXX
62.1424	838.1700	I9	2,4-dimethylheptane	0.0297	0.0334	0.0211	271.220	132.900	XXX
62.5332	840.5300	N8	n-propylcyclopentane	0.2610	0.2711	0.2122	267.728	130.960	XXX
62.9079	842.7700	I9	2,5-dimethylheptane	0.1421	0.1598	0.1011	276.800	136.000	XXX
63.1050	843.9500	N9	*1c,3c,5-trimethylcyclohexane	0.0272	0.0285	0.0197	281.174	138.430	XXX
63.1835	844.4100	I9	3,3-dimethylheptane	0.0113	0.0125	0.0080	278.636	137.020	XXX
63.4023	845.7100	I9	3,5-dimethylheptane	0.0403	0.0450	0.0287	276.800	136.000	XXX
63.6293	847.0500	I9	2,6-dimethylheptane	0.0545	0.0619	0.0387	275.396	135.220	XXX
63.6942	847.4300		unknown	0.0238	0.0274	0.0169	275.396	135.220	XXX
63.8842	848.5500	N9	1,1,3-trimethylcyclohexane	0.0403	0.0412	0.0291	295.862	146.590	XXX
64.6109	852.7800	N9	1c,3c,5c-trimethylcyclohexane	0.0163	0.0168	0.0118	32.000	0.000	XXX
64.7295	853.4700	A8	ethylbenzene	0.0797	0.0742	0.0685	277.160	136.200	XXX
64.8420	854.1200	N9	1c,2t,4t-trimethylcyclohexane	0.1223	0.1264	0.0884	32.000	0.000	XXX
65.1731	856.0200	I9	I9-[1]	0.1748	0.1931	0.1243	32.000	0.000	XXX
65.5544	858.2000	N9	N9-[1]	0.0148	0.0153	0.0107	32.000	0.000	XXX
65.8367	859.8100	N9	N9-[2]	0.0103	0.0106	0.0074	32.000	0.000	XXX
66.1957	861.8400	A8	1,3-dimethylbenzene	0.3574	0.3335	0.3071	282.416	139.120	XXX
66.3995	862.9900	A8	1,4-dimethylbenzene	0.2374	0.2224	0.2040	281.048	138.360	XXX
66.7448	864.9200	I9	3,4-dimethylheptane	0.0354	0.0390	0.0252	285.080	140.600	XXX
66.8702	865.6200	N9	N9-[3]	0.0451	0.0466	0.0326	285.080	140.600	XXX
67.2172	867.5500	I9	4-ethylheptane	0.1001	0.1121	0.0712	288.392	142.440	XXX
67.5417	869.3400		unknown	0.0077	0.0089	0.0055	288.392	142.440	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03
Sample Den: 0.81

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
67.6975	870.2000	I9	4-methyloctane	0.2149	0.2406	0.1529	288.392	142.440	XXX
67.8686	871.1400	I9	2-methyloctane	0.2328	0.2631	0.1656	289.904	143.280	XXX
68.3600	873.8200		unknown	0.0078	0.0089	0.0221	289.904	143.280	XXX
68.5131	874.6500	I9	3-ethylheptane	0.0169	0.0187	0.0120	289.400	143.000	XXX
68.7516	875.9500	I9	3,3-diethylpentane	0.0663	0.0705	0.0472	270.842	132.690	XXX
68.9625	877.0900	I9	3-methyloctane	0.4085	0.4572	0.2906	291.614	144.230	XXX
69.2545	878.6500	N9	1c,2t,4c-trimethylcyclohexane	0.0194	0.0202	0.0140	275.000	135.000	XXX
69.4527	879.7200		unknown	0.0201	0.0231	0.0145	275.000	135.000	XXX
69.7327	881.2100	N9	1,1,2-trimethylcyclohexane	0.0235	0.0237	0.0170	293.360	145.200	XXX
69.9260	882.2400	A8	1,2-dimethylbenzene	0.1673	0.1533	0.1438	291.974	144.430	XXX
70.0876	883.0900	I9	I9-[2]	0.0339	0.0374	0.0241	291.974	144.430	XXX
70.1467	883.4000	I9	I9-[3]	0.0182	0.0201	0.0130	291.974	144.430	XXX
70.2450	883.9200		unknown	0.0097	0.0112	0.0069	291.974	144.430	XXX
70.5295	885.4200	N9	N9-[4]	0.0086	0.0089	0.0062	291.974	144.430	XXX
70.8719	887.2200	N9	N9-[5]	0.1383	0.1430	0.0999	291.974	144.430	XXX
71.0751	888.2800	N9	N9-[6]	0.2201	0.2276	0.1591	291.974	144.430	XXX
71.4528	890.2400	I9	I9-[4]	0.1027	0.1134	0.0730	291.974	144.430	XXX
71.5358	890.6700	I9	I9-[5]	0.0261	0.0289	0.0186	291.974	144.430	XXX
71.8583	892.3300	N9	i-butylcyclopentane	0.0236	0.0244	0.0170	298.346	147.970	XXX
72.0758	893.4500	N9	N9-[7]	0.0292	0.0302	0.0211	298.346	147.970	XXX
72.2975	894.5900		unknown	0.0110	0.0126	0.0079	298.346	147.970	XXX
73.3635	900.0000	P9	n-nonane	0.9358	1.0516	0.6657	303.476	150.820	XXX
73.5592	901.5100	N9	1,1-methylethylcyclohexane	0.0644	0.0644	0.0466	305.924	152.180	XXX
73.7535	903.0100	N9	N9-[8]	0.0119	0.0121	0.0086	305.924	152.180	XXX
74.0765	905.5000	N9	N9-[9]	0.1534	0.1566	0.1109	305.924	152.180	XXX
74.5187	908.8800	N9	N9-[10]	0.0349	0.0356	0.0252	305.924	152.180	XXX
75.1566	913.7300	A9	i-propylbenzene	0.0282	0.0264	0.0214	306.338	152.410	XXX
75.2476	914.4100		unknown	0.0049	0.0056	0.0139	306.338	152.410	XXX
75.4788	916.1600	I10	I10-[1]	0.0303	0.0335	0.0195	306.338	152.410	XXX
75.7627	918.2900	N9	N9-[11]	0.1303	0.1330	0.0941	306.338	152.410	XXX
76.0227	920.2300	I10	I10-[2]	0.0762	0.0842	0.0489	306.338	152.410	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03
Sample Den: 0.81

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
76.3024	922.3100	I10	2,4-dimethyloctane	0.0560	0.0622	0.0359	312.620	155.900	XXX
76.6412	924.8300	N9	N9-[12]	0.0160	0.0163	0.0116	312.620	155.900	XXX
76.7225	925.4300		unknown	0.0270	0.0312	0.0195	312.620	155.900	XXX
76.8948	926.7000	N9	N9-[13]	0.0059	0.0060	0.0043	312.620	155.900	XXX
77.1608	928.6600	I10	2,6-dimethyloctane	0.0137	0.0152	0.0088	320.738	160.410	XXX
77.3315	929.9100	I10	2,5-dimethyloctane	0.0718	0.0793	0.0461	317.300	158.500	XXX
77.5952	931.8400	N9	n-butylcyclopentane	0.1826	0.1876	0.1319	313.916	156.620	XXX
77.8416	933.6300		unknown	0.0280	0.0323	0.0203	313.916	156.620	XXX
77.9326	934.2900	I10	I10-[3]	0.0302	0.0333	0.0193	313.916	156.620	XXX
78.1372	935.7800	N10	N10-[1]	0.0902	0.0910	0.0587	313.916	156.620	XXX
78.3529	937.3400	I10	I10-[4]	0.0339	0.0375	0.0218	313.916	156.620	XXX
78.6399	939.4000	I10	3,3-dimethyloctane	0.2323	0.2535	0.1489	322.160	161.200	XXX
78.8477	940.9000		unknown	0.0517	0.0595	0.0331	322.160	161.200	XXX
79.2524	943.7900		unknown	0.0476	0.0549	0.0305	322.160	161.200	XXX
79.4542	945.2300		unknown	0.0150	0.0173	0.0096	322.160	161.200	XXX
79.5549	945.9400	N10	N10-[2]	0.0746	0.0752	0.0485	322.160	161.200	XXX
79.7300	947.1800	A9	n-propylbenzene	0.2001	0.1872	0.1519	318.632	159.240	XXX
80.0712	949.6000		unknown	0.0295	0.0339	0.0224	318.632	159.240	XXX
80.2439	950.8100	N10	N10-[3]	0.0356	0.0359	0.0232	318.632	159.240	XXX
80.3979	951.9000		unknown	0.0183	0.0211	0.0119	318.632	159.240	XXX
80.6224	953.4700	A9	1,3-methylethylbenzene	0.1374	0.1282	0.1043	322.394	161.330	XXX
80.9281	955.6000	A9	1,4-methylethylbenzene	0.0927	0.0868	0.0703	323.618	162.010	XXX
81.4758	959.4100		unknown	0.0217	0.0250	0.0165	323.618	162.010	XXX
81.5500	959.9200	N10	N10-[4]	0.0346	0.0349	0.0225	323.618	162.010	XXX
81.6893	960.8800	A9	1,3,5-trimethylbenzene	0.3127	0.2914	0.2374	328.532	164.740	XXX
82.0121	963.1100	I10	I10-[5]	0.0283	0.0308	0.0181	328.532	164.740	XXX
82.1774	964.2400	I10	I10-[6]	0.0292	0.0318	0.0187	328.532	164.740	XXX
82.2791	964.9400	I10	5-methylnonane	0.0637	0.0702	0.0409	329.180	165.100	XXX
82.4167	965.8800		unknown	0.0234	0.0270	0.0150	329.180	165.100	XXX
82.5249	966.6200	I10	4-methylnonane	0.2510	0.2735	0.1609	32.000	0.000	XXX
82.8776	969.0200	A9	1,2-methylethylbenzene	0.1282	0.1174	0.0973	329.324	165.180	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/10/2020 4:25:13 AM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-15-D7900.0002.CDF Acquired: 06/10/20 00:21:47
Sample: 20-NEDR-814-15-D7900
Analyzed: 6/10/2020 4:25:12 AM
Processed 180 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments:
Yield: 36.31
Int Std: MEK
Int Std Amt: 0.35
Sample Wt: 10.03
Sample Den: 0.81

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
83.1245	970.6900	I10	2-methylnonane	0.0631	0.0700	0.0404	332.654	167.030	XXX
83.3678	972.3400	I10	3-ethyloctane	0.0315	0.0344	0.0202	331.700	166.500	XXX
83.7864	975.1500	I10	3-methylnonane	0.1494	0.1643	0.0958	334.040	167.800	XXX
83.9676	976.3700		unknown	0.0313	0.0361	0.0201	334.040	167.800	XXX
84.0465	976.9000	N10	N10-[5]	0.0319	0.0321	0.0207	334.040	167.800	XXX
84.2350	978.1600		unknown	0.0024	0.0028	0.0016	334.040	167.800	XXX
84.4285	979.4500	I10	I10-[7]	0.0251	0.0273	0.0161	334.040	167.800	XXX
84.4785	979.7800		unknown	0.0188	0.0216	0.0120	334.040	167.800	XXX
84.8280	982.1000	I10	I10-[8]	0.0112	0.0122	0.0072	334.040	167.800	XXX
85.1955	984.5300	A9	1,2,4-trimethylbenzene	0.3669	0.3378	0.2785	336.884	169.380	XXX
85.3653	985.6500	N10	i-butylcyclohexane	0.0983	0.0996	0.0639	340.340	171.300	XXX
85.5762	987.0300	I10	I10-[9]	0.0850	0.0926	0.0545	340.340	171.300	XXX
85.7811	988.3700	I10	I10-[10]	0.0965	0.1052	0.0619	340.340	171.300	XXX
85.9738	989.6300	I10	I10-[11]	0.0201	0.0219	0.0129	340.340	171.300	XXX
86.0383	990.0500		unknown	0.0063	0.0073	0.0041	340.340	171.300	XXX
86.2183	991.2300	N10	N10-[6]	0.0050	0.0050	0.0032	340.340	171.300	XXX
86.3438	992.0400		unknown	0.0239	0.0276	0.0156	340.340	171.300	XXX
86.5428	993.3300	I10	I10-[12]	0.0113	0.0123	0.0072	340.340	171.300	XXX
86.8591	995.3800		unknown	0.0125	0.0144	0.0355	340.340	171.300	XXX
86.9694	996.0900	A10	i-butylbenzene	0.0231	0.0218	0.0157	343.022	172.790	XXX
87.2143	997.6700	A10	sec-butylbenzene	0.0398	0.0372	0.0270	344.012	173.340	XXX
87.3532	998.5600		unknown	0.0146	0.0168	0.0099	344.012	173.340	XXX
87.5775	1000.0000	P10	n-decane	0.7902	0.8729	0.5067	345.470	174.150	XXX

WTS 1530 Analysis

Crude Oil Type: West Texas Sour (WTS)
Date of Sample: June 13, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1530

intertek
caleb brett

Certificate of Analysis

Sunoco Logistics L.P.
Allen Brady
2300 North Twin City Highway
Accounts Payable
Nederland, TX 77627
United States of America

Our Reference Number: US300-0046676
Lab Reference Number: 2020-NEDR-000814
Customer Reference Number: Submitted

Customer Product Description: WTS
Location: Sunoco, Nederland, Texas, United States
Sample Representing: Shore Tank 1530 Line Transfer
Drawn By: Intertek

Sample ID: 2020-NEDR-000814-020
Date Sampled: 13-Jun-2020
Date Submitted: 13-Jun-2020
Date Tested: 14-Jun-2020

Method	Property	Result	Units
ASTM D7900	Methane	<0.01	Vol %
	Ethane	0.07	Vol %
	Propane	0.52	Vol %
	Isobutane	0.59	Vol %
	n-Butane	2.13	Vol %
	Neopentane	0.02	Vol %
	Isopentane	2.63	Vol %
	n-Pentane	3.38	Vol %
	Cyclopentane	0.20	Vol %
	Cyclohexane	0.65	Vol %
	Methylcyclopentane	0.80	Vol %
	Benzene	0.17	Vol %
	Note	See attached.	
	Total Light Ends (C1-nC10)	34.86	Vol %

f - Denotes analysis results which are ISO/IEC 17025 accredited by ANSI-ASQ National Accreditation Board

Analysis Total: $__________
______ O/T Hours @: ________ = $________
Blending:$ ___________ Shipping: $__________

Results are only representative of the sample tested. All tests have been performed using the latest version unless otherwise indicated. This report shall not be reproduced except in full without written approval of Intertek. Report is subject to our standard Terms and Conditions which can be obtained at our website: http://www.intertek.com/terms

Signed By: ____ Date: ____________________
Amanda Holmes, Assistant Laboratory Manager

ANAB ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
AT-2072.04

ISO 9001:2015
ABS-QE Certificate # 30701

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900
Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28
Sample Den: 0.85

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	9.73	12.88	10.74
I-Paraffins:	9.63	12.22	9.08
Olefins:	0.00	0.00	0.00
Naphthenes:	6.37	7.08	5.62
Aromatics:	2.24	2.19	1.92
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.40	0.49	0.32

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	1.31(Mass%)	1.29(Vol%)

Average Molecular Weight: 81.27

Relative Density: 0.64

Reid Vapor Pressure @ 100F: 4.51psi - 31.12kPa

Calculated Octane Number: 64.5

Motor Octane Number (Jenkins Calculation): 62.3

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	155.71	T50	T90	FBP
BP by Vol (Deg F)	-43.67	155.71	T50	T90	FBP

Percent Carbon: 84.84

Percent Hydrogen: 15.16

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	9.34
Light Ends (C2s-C5s Vol %)	9.55

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28 Sample Den: 0.85

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.07	0.63
C6	85.36	0.69
C7	98.66	0.73
C8	112.22	0.75
C9	126.10	0.76
C10	141.86	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	81.30	0.64

Octane Number

Research Octane Number: 64.5

Motor Octane Number: 62.3

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900
Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28
Sample Den: 0.85

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.03	0.00	0.00	0.00	0.00	0.00	0.03
C3	0.30	0.00	0.00	0.00	0.00	0.00	0.30
C4	1.45	0.38	0.00	0.00	0.00	0.00	1.83
C5	2.48	1.92	0.00	0.18	0.00	0.00	4.59
C6	1.75	1.87	0.00	1.30	0.17	0.00	5.10
C7	1.41	1.47	0.00	2.09	0.48	0.00	5.45
C8	1.01	1.59	0.00	1.52	0.80	0.01	4.93
C9	0.73	1.40	0.00	1.02	0.75	0.13	4.03
C10	0.57	0.98	0.00	0.26	0.03	0.25	2.10
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.73	9.63	0.00	6.37	2.24	0.40	27.96

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.40
Grand Total: 28.36

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.07	0.00	0.00	0.00	0.00	0.00	0.07
C3	0.52	0.00	0.00	0.00	0.00	0.00	0.52
C4	2.13	0.59	0.00	0.00	0.00	0.00	2.72
C5	3.38	2.65	0.00	0.20	0.00	0.00	6.23
C6	2.26	2.43	0.00	1.46	0.17	0.00	6.32
C7	1.76	1.83	0.00	2.35	0.48	0.00	6.41
C8	1.22	1.93	0.00	1.68	0.79	0.01	5.64
C9	0.86	1.66	0.00	1.11	0.74	0.16	4.53
C10	0.67	1.14	0.00	0.28	0.03	0.30	2.42
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	12.88	12.22	0.00	7.08	2.19	0.49	34.37

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.49
Grand Total: 34.86

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28 Sample Den: 0.85

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.08	0.00	0.00	0.00	0.00	0.00	0.08
C3	0.62	0.00	0.00	0.00	0.00	0.00	0.62
C4	2.23	0.59	0.00	0.00	0.00	0.01	2.83
C5	3.08	2.39	0.00	0.23	0.00	0.01	5.70
C6	1.82	1.94	0.00	1.39	0.20	0.01	5.35
C7	1.26	1.31	0.00	1.91	0.47	0.00	4.95
C8	0.79	1.25	0.00	1.21	0.68	0.01	3.93
C9	0.51	0.98	0.00	0.72	0.56	0.11	2.87
C10	0.36	0.62	0.00	0.17	0.02	0.18	1.34
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	10.74	9.08	0.00	5.62	1.92	0.32	27.36

Oxygenates 0.00 Total C14+: 0.00
Total Unknowns: 0.32 Grand Total: 27.67

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30

NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.28 Sample Den: 0.85

Components Listed in Chromatographic Order

Page: 5

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6938	200.0000	P2	ethane	0.0272	0.0682	0.0809	-127.480	-88.600	XXX
6.9522	300.0000	P3	propane	0.3049	0.5194	0.6187	-43.672	-42.040	XXX
7.3560	367.5800	I4	i-butane	0.3848	0.5887	0.5923	10.904	-11.720	XXX
7.5931	391.0600		unknown	0.0024	0.0029	0.0067	10.904	-11.720	XXX
7.7025	400.0000	P4	n-butane	1.4475	2.1323	2.2284	31.100	-0.500	XXX
7.8763	414.4800	I5	2,2-dimethylpropane	0.0152	0.0219	0.0188	49.100	9.500	XXX
8.9709	475.2300	I5	i-pentane	1.9084	2.6261	2.3668	82.112	27.840	XXX
9.3309	489.0100		unknown	0.0020	0.0024	0.0055	82.112	27.840	XXX
9.6570	500.0000	P5	n-pentane	2.4816	3.3789	3.0776	96.908	36.060	XXX
10.3200	519.4200		unknown	0.0029	0.0036	0.0082	96.908	36.060	XXX
10.9555	535.0000	I6	2,2-dimethylbutane	0.0495	0.0651	0.0514	121.514	49.730	XXX
12.3354	562.1400	N5	cyclopentane	0.1789	0.2046	0.2282	120.650	49.250	XXX
12.4065	563.3600	I6	2,3-dimethylbutane	0.1328	0.1711	0.1379	136.364	57.980	XXX
12.6265	567.0200	I6	2-methylpentane	1.0588	1.3822	1.0994	140.468	60.260	XXX
13.5275	580.7400	I6	3-methylpentane	0.6320	0.8112	0.6562	145.886	63.270	XXX
15.0243	600.0000	P6	n-hexane	1.7496	2.2622	1.8166	155.714	68.730	XXX
18.3516	627.9200	I7	2,2-dimethylpentane	0.0309	0.0390	0.0276	174.542	79.190	XXX
18.7211	630.5100	N6	methylcyclopentane	0.7058	0.8039	0.7504	161.240	71.800	XXX
19.3111	634.4900	I7	2,4-dimethylpentane	0.0708	0.0898	0.0632	176.882	80.490	XXX
20.1840	640.0600	I7	2,2,3-trimethylbutane	0.0064	0.0079	0.0057	177.584	80.880	XXX
22.6972	654.2800	A6	benzene	0.1711	0.1660	0.1960	176.162	80.090	XXX
23.7746	659.7100	I7	3,3-dimethylpentane	0.0192	0.0236	0.0171	186.908	86.060	XXX
24.4667	663.0200	N6	cyclohexane	0.5977	0.6546	0.6355	177.296	80.720	XXX
26.4424	671.8000	I7	2-methylhexane	0.5069	0.6368	0.4526	194.090	90.050	XXX
26.7754	673.2000	I7	2,3-dimethylpentane	0.1753	0.2150	0.1565	193.604	89.780	XXX
27.3455	675.5300	N7	1,1-dimethylcyclopentane	0.0869	0.0982	0.0792	189.464	87.480	XXX
28.4100	679.7200	I7	3-methylhexane	0.6066	0.7527	0.5417	197.330	91.850	XXX
29.8452	685.0600	N7	1c,3-dimethylcyclopentane	0.1968	0.2253	0.1794	195.386	90.770	XXX
30.5185	687.4500	N7	1t,3-dimethylcyclopentane	0.1791	0.2039	0.1632	197.096	91.720	XXX
30.8934	688.7500	I7	3-ethylpentane	0.0506	0.0618	0.0452	200.246	93.470	XXX
31.1773	689.7200	N7	1t,2-dimethylcyclopentane	0.3328	0.3776	0.3033	197.366	91.870	XXX

Detailed Hydrocarbon Analysis Detail Report - Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.28 Sample Den: 0.85

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
31.5741	691.0600	I8	2,2,4-trimethylpentane	0.0079	0.0097	0.0062	210.632	99.240	XXX
34.3858	700.0000	P7	n-heptane	1.4124	1.7614	1.2613	209.156	98.420	XXX
38.6317	724.5800	N7	1c,2-dimethylcyclopentane	0.0450	0.0524	0.0410	211.154	99.530	XXX
38.7671	725.3100	N7	methylcyclohexane	1.1547	1.2795	1.0523	213.674	100.930	XXX
39.5449	729.4400	I8	2,2-dimethylhexane	0.1165	0.1429	0.0913	224.312	106.840	XXX
41.4659	739.2400	N7	ethylcyclopentane	0.0974	0.1083	0.0887	218.246	103.470	XXX
41.9056	741.4100	I8	2,5-dimethylhexane	0.0662	0.0814	0.0519	228.398	109.110	XXX
42.3059	743.3600	I8	2,4-dimethylhexane	0.0895	0.1089	0.0701	228.974	109.430	XXX
43.4351	748.7400	N8	1c,2t,4-trimethylcyclopentane	0.1205	0.1346	0.0961	242.132	116.740	XXX
43.7829	750.3600	I8	3,3-dimethylhexane	0.0248	0.0298	0.0194	233.546	111.970	XXX
45.0235	756.0400	N8	1t,2c,3-trimethylcyclopentane	0.1296	0.1434	0.1033	230.738	110.410	XXX
45.6486	758.8300	I8	2,3,4-trimethylpentane	0.0125	0.0148	0.0098	236.246	113.470	XXX
46.4091	762.1600	A7	toluene	0.4830	0.4750	0.4691	231.134	110.630	XXX
48.0574	769.1700	I8	2,3-dimethylhexane	0.1038	0.1243	0.0813	240.098	115.610	XXX
48.2830	770.1100	I8	2-methyl-3-ethylpentane	0.0308	0.0369	0.0241	240.098	115.610	XXX
49.3699	774.5600	I8	2-methylheptane	0.5217	0.6374	0.4087	243.770	117.650	XXX
49.6651	775.7500	I8	4-methylheptane	0.1877	0.2271	0.1470	243.878	117.710	XXX
49.8249	776.3900	I8	3-methyl-3-ethylpentane	0.0213	0.0254	0.0166	240.098	115.610	XXX
49.9486	776.8800	I8	3,4-dimethylhexane	0.0297	0.0352	0.0232	243.914	117.730	XXX
50.3757	778.5800		unknown	0.0114	0.0139	0.0090	243.914	117.730	XXX
50.4380	778.8200	N8	1c,3-dimethylcyclohexane	0.0089	0.0099	0.0071	246.848	119.360	XXX
50.8963	780.6200	I8	3-methylheptane	0.3464	0.4185	0.2714	246.074	118.930	XXX
51.0590	781.2600	N8	1c,2t,3-trimethylcyclopentane	0.3846	0.4256	0.3067	243.500	117.500	XXX
51.2082	781.8300	I8	3-ethylhexane	0.0348	0.0415	0.0272	245.372	118.540	XXX
51.4423	782.7400	N8	1t,4-dimethylcyclohexane	0.1378	0.1541	0.1099	246.848	119.360	XXX
52.5304	786.8800	N8	1,1-dimethylcyclohexane	0.0526	0.0575	0.0420	247.190	119.550	XXX
53.0707	788.9000	I9	2,2,5-trimethylhexane	0.0037	0.0044	0.0026	255.362	124.090	XXX
53.2889	789.7100	N8	3t-ethylmethylcyclopentane	0.0436	0.0485	0.0348	249.980	121.100	XXX
53.7062	791.2500	N8	3c-ethylmethylcyclopentane	0.0380	0.0423	0.0303	249.980	121.100	XXX
53.9587	792.1800	N8	2t-ethylmethylcyclopentane	0.0926	0.1027	0.0738	250.160	121.200	XXX
54.3439	793.5800	N8	1,1-methylethylcyclopentane	0.0142	0.0155	0.0113	250.754	121.530	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.28 Sample Den: 0.85

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
54.8836	795.5200	N8	1t,2-dimethylcyclohexane	0.1520	0.1670	0.1212	254.174	123.430	XXX
56.1503	800.0000	P8	n-octane	1.0067	1.2218	0.7886	258.224	125.680	XXX
56.2758	800.8400	N8	i-propylcyclopentane	0.0846	0.0929	0.0675	259.574	126.430	XXX
57.6341	809.9000		unknown	0.0107	0.0130	0.0085	259.574	126.430	XXX
57.6767	810.1800	I9	2,4,4-trimethylhexane	0.0111	0.0128	0.0078	32.000	0.000	XXX
58.7700	817.2900		unknown	0.0113	0.0138	0.0079	32.000	0.000	XXX
59.1873	819.9600	I9	2,3,4-trimethylhexane	0.0113	0.0130	0.0079	282.308	139.060	XXX
59.5219	822.0900	I9	2,2,3,4-tetramethylpentane	0.0136	0.0156	0.0095	271.454	133.030	XXX
59.8287	824.0300	N8	N8-[1]	0.0149	0.0163	0.0119	271.454	133.030	XXX
60.5771	828.7100	N8	1c,2-dimethylcyclohexane	0.0879	0.0941	0.0701	265.532	129.740	XXX
60.7392	829.7200	I9	2,3,5-trimethylhexane	0.0148	0.0175	0.0103	268.430	131.350	XXX
60.8855	830.6300	I9	2,2-dimethylheptane	0.0079	0.0095	0.0055	270.860	132.700	XXX
61.1082	832.0000	N8	N8-[2]	0.0058	0.0064	0.0046	270.860	132.700	XXX
61.4683	834.2100		unknown	0.0449	0.0547	0.0358	270.860	132.700	XXX
61.5541	834.7400	N9	1,1,4-trimethylcyclohexane	0.2625	0.2899	0.1861	275.000	135.000	XXX
61.7296	835.8100	I9	2,2,3-trimethylhexane	0.1595	0.1901	0.1112	271.220	132.900	XXX
62.1262	838.2100	I9	2,4-dimethylheptane	0.0112	0.0133	0.0078	271.220	132.900	XXX
62.5173	840.5700	N8	n-propylcyclopentane	0.1521	0.1671	0.1213	267.728	130.960	XXX
62.8879	842.7800	I9	2,5-dimethylheptane	0.1221	0.1452	0.0852	276.800	136.000	XXX
63.1000	844.0500	N9	*1c,3c,5-trimethylcyclohexane	0.0158	0.0175	0.0112	281.174	138.430	XXX
63.1420	844.3000	I9	3,3-dimethylheptane	0.0139	0.0163	0.0097	278.636	137.020	XXX
63.3916	845.7700	I9	3,5-dimethylheptane	0.0182	0.0215	0.0127	276.800	136.000	XXX
63.6106	847.0700	I9	2,6-dimethylheptane	0.0224	0.0269	0.0156	275.396	135.220	XXX
63.6762	847.4500		unknown	0.0097	0.0119	0.0068	275.396	135.220	XXX
63.8707	848.5900	N9	1,1,3-trimethylcyclohexane	0.0160	0.0173	0.0113	295.862	146.590	XXX
64.6117	852.9100	N9	1c,3c,5c-trimethylcyclohexane	0.0121	0.0133	0.0086	32.000	0.000	XXX
64.7043	853.4400	A8	ethylbenzene	0.1084	0.1066	0.0914	277.160	136.200	XXX
64.8151	854.0800	N9	1c,2t,4t-trimethylcyclohexane	0.0528	0.0577	0.0374	32.000	0.000	XXX
65.1611	856.0700	I9	I9-[1]	0.0821	0.0959	0.0573	32.000	0.000	XXX
65.5599	858.3500	N9	N9-[1]	0.0129	0.0141	0.0091	32.000	0.000	XXX
65.8235	859.8500	N9	N9-[2]	0.0069	0.0076	0.0049	32.000	0.000	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900
Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28
Sample Den: 0.85

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
66.1766	861.8400	A8	1,3-dimethylbenzene	0.3257	0.3213	0.2745	282.416	139.120	XXX
66.3841	863.0100	A8	1,4-dimethylbenzene	0.2249	0.2227	0.1896	281.048	138.360	XXX
66.7210	864.8900	I9	3,4-dimethylheptane	0.0196	0.0229	0.0137	285.080	140.600	XXX
66.8630	865.6800	N9	N9-[3]	0.0267	0.0292	0.0189	285.080	140.600	XXX
67.1981	867.5500	I9	4-ethylheptane	0.0592	0.0701	0.0413	288.392	142.440	XXX
67.2783	867.9900	I9	I9-[2]	0.0095	0.0111	0.0066	288.392	142.440	XXX
67.5698	869.6000		unknown	0.0070	0.0085	0.0049	288.392	142.440	XXX
67.6858	870.2400	I9	4-methyloctane	0.1715	0.2030	0.1196	288.392	142.440	XXX
67.8523	871.1500	I9	2-methyloctane	0.1981	0.2368	0.1382	289.904	143.280	XXX
68.3504	873.8700		unknown	0.0062	0.0075	0.0173	289.904	143.280	XXX
68.4965	874.6600	I9	3-ethylheptane	0.0133	0.0156	0.0093	289.400	143.000	XXX
68.7381	875.9700	I9	3,3-diethylpentane	0.0482	0.0542	0.0336	270.842	132.690	XXX
68.9457	877.0900	I9	3-methyloctane	0.2762	0.3269	0.1927	291.614	144.230	XXX
69.2490	878.7200	N9	1c,2t,4c-trimethylcyclohexane	0.0118	0.0131	0.0084	275.000	135.000	XXX
69.4416	879.7500		unknown	0.0140	0.0171	0.0099	275.000	135.000	XXX
69.7137	881.2000	N9	1,1,2-trimethylcyclohexane	0.0174	0.0186	0.0123	293.360	145.200	XXX
69.9135	882.2600	A8	1,2-dimethylbenzene	0.1430	0.1385	0.1205	291.974	144.430	XXX
70.0856	883.1700	I9	I9-[3]	0.0214	0.0250	0.0149	291.974	144.430	XXX
70.1534	883.5300		unknown	0.0082	0.0100	0.0057	291.974	144.430	XXX
70.2244	883.9000	I9	I9-[4]	0.0068	0.0079	0.0047	291.974	144.430	XXX
70.5083	885.3900	N9	N9-[4]	0.0050	0.0054	0.0035	291.974	144.430	XXX
70.8540	887.2000	N9	N9-[5]	0.0691	0.0755	0.0490	291.974	144.430	XXX
71.0643	888.3000	N9	N9-[6]	0.1190	0.1301	0.0843	291.974	144.430	XXX
71.4394	890.2500	I9	I9-[5]	0.0597	0.0697	0.0416	291.974	144.430	XXX
71.5239	890.6900	I9	I9-[6]	0.0165	0.0192	0.0115	291.974	144.430	XXX
71.8358	892.2900	N9	i-butylcyclopentane	0.0149	0.0163	0.0106	298.346	147.970	XXX
72.0591	893.4400		unknown	0.0158	0.0192	0.0112	298.346	147.970	XXX
72.1318	893.8100	N9	N9-[7]	0.0055	0.0060	0.0039	298.346	147.970	XXX
72.2308	894.3200		unknown	0.0059	0.0072	0.0042	298.346	147.970	XXX
73.1391	898.9300	I9	I9-[7]	0.0106	0.0124	0.0074	298.346	147.970	XXX
73.3502	900.0000	P9	n-nonane	0.7257	0.8623	0.5063	303.476	150.820	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900
Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28
Sample Den: 0.85

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
73.5285	901.3800	N9	1,1-methylethylcyclohexane	0.0287	0.0304	0.0204	305.924	152.180	XXX
73.7576	903.1500	N9	N9-[8]	0.0205	0.0221	0.0145	305.924	152.180	XXX
74.0624	905.4900	N9	N9-[9]	0.0906	0.0978	0.0642	305.924	152.180	XXX
74.5043	908.8700	N9	N9-[10]	0.0248	0.0267	0.0176	305.924	152.180	XXX
74.7730	910.9200		unknown	0.0038	0.0046	0.0027	305.924	152.180	XXX
75.1434	913.7300	A9	i-propylbenzene	0.0225	0.0222	0.0167	306.338	152.410	XXX
75.4752	916.2300	I10	I10-[1]	0.0191	0.0223	0.0120	306.338	152.410	XXX
75.7591	918.3600	N9	N9-[11]	0.0625	0.0674	0.0443	306.338	152.410	XXX
76.0092	920.2300	I10	I10-[2]	0.0514	0.0600	0.0323	306.338	152.410	XXX
76.2824	922.2600	I10	2,4-dimethyloctane	0.0503	0.0591	0.0316	312.620	155.900	XXX
76.6450	924.9500	N9	N9-[12]	0.0107	0.0115	0.0076	312.620	155.900	XXX
76.7193	925.5000		unknown	0.0194	0.0236	0.0137	312.620	155.900	XXX
76.8569	926.5100	N9	N9-[13]	0.0035	0.0038	0.0025	312.620	155.900	XXX
77.1453	928.6400	I10	2,6-dimethyloctane	0.0122	0.0143	0.0077	320.738	160.410	XXX
77.3188	929.9100	I10	2,5-dimethyloctane	0.0514	0.0600	0.0323	317.300	158.500	XXX
77.5787	931.8100	N9	n-butylcyclopentane	0.1258	0.1367	0.0892	313.916	156.620	XXX
77.8424	933.7300		unknown	0.0153	0.0186	0.0108	313.916	156.620	XXX
77.9263	934.3400	I10	I10-[3]	0.0280	0.0327	0.0176	313.916	156.620	XXX
78.1251	935.7800	N10	N10-[1]	0.0548	0.0584	0.0349	313.916	156.620	XXX
78.3439	937.3600	I10	I10-[4]	0.0158	0.0184	0.0099	313.916	156.620	XXX
78.6305	939.4300	I10	3,3-dimethyloctane	0.1549	0.1787	0.0974	322.160	161.200	XXX
78.8415	940.9400		unknown	0.0426	0.0519	0.0268	322.160	161.200	XXX
79.0564	942.4800		unknown	0.0132	0.0161	0.0083	322.160	161.200	XXX
79.2383	943.7800		unknown	0.0250	0.0304	0.0157	322.160	161.200	XXX
79.4247	945.1100		unknown	0.0118	0.0144	0.0074	322.160	161.200	XXX
79.5354	945.8900	N10	N10-[2]	0.0724	0.0771	0.0462	322.160	161.200	XXX
79.7243	947.2300	A9	n-propylbenzene	0.1073	0.1062	0.0799	318.632	159.240	XXX
80.0658	949.6500		unknown	0.0163	0.0198	0.0121	318.632	159.240	XXX
80.2275	950.7900	N10	N10-[3]	0.0217	0.0231	0.0138	318.632	159.240	XXX
80.3813	951.8700		unknown	0.0109	0.0132	0.0069	318.632	159.240	XXX
80.6158	953.5100	A9	1,3-methylethylbenzene	0.1025	0.1011	0.0763	322.394	161.330	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900 Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 10.28 Sample Den: 0.85

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
80.9191	955.6300	A9	1,4-methylethylbenzene	0.0602	0.0596	0.0448	323.618	162.010	XXX
81.4621	959.4000		unknown	0.0121	0.0148	0.0090	323.618	162.010	XXX
81.5627	960.0900	N10	N10-[4]	0.0313	0.0334	0.0200	323.618	162.010	XXX
81.6870	960.9500	A9	1,3,5-trimethylbenzene	0.1725	0.1700	0.1284	328.532	164.740	XXX
82.0028	963.1300	I10	I10-[5]	0.0135	0.0156	0.0085	328.532	164.740	XXX
82.1844	964.3700	I10	I10-[6]	0.0138	0.0159	0.0087	328.532	164.740	XXX
82.2691	964.9500	I10	5-methylnonane	0.0500	0.0582	0.0314	329.180	165.100	XXX
82.5110	966.6000	I10	4-methylnonane	0.1656	0.1908	0.1041	32.000	0.000	XXX
82.8690	969.0400	A9	1,2-methylethylbenzene	0.1095	0.1060	0.0815	329.324	165.180	XXX
83.1093	970.6700	I10	2-methylnonane	0.0547	0.0642	0.0344	332.654	167.030	XXX
83.3566	972.3400	I10	3-ethyloctane	0.0256	0.0294	0.0161	331.700	166.500	XXX
83.7734	975.1500	I10	3-methylnonane	0.1135	0.1319	0.0714	334.040	167.800	XXX
83.9490	976.3200		unknown	0.0221	0.0269	0.0139	334.040	167.800	XXX
84.0425	976.9500	N10	N10-[5]	0.0196	0.0209	0.0125	334.040	167.800	XXX
84.1598	977.7300		unknown	0.0055	0.0068	0.0035	334.040	167.800	XXX
84.4247	979.5000	I10	I10-[7]	0.0179	0.0206	0.0112	334.040	167.800	XXX
84.4700	979.8000		unknown	0.0118	0.0144	0.0074	334.040	167.800	XXX
84.8094	982.0500	I10	I10-[8]	0.0089	0.0102	0.0056	334.040	167.800	XXX
84.9801	983.1800	I10	I10-[9]	0.0024	0.0028	0.0015	334.040	167.800	XXX
85.1836	984.5300	A9	1,2,4-trimethylbenzene	0.1751	0.1705	0.1304	336.884	169.380	XXX
85.3582	985.6800	N10	i-butylcyclohexane	0.0546	0.0585	0.0348	340.340	171.300	XXX
85.5739	987.0900	I10	I10-[10]	0.0489	0.0563	0.0307	340.340	171.300	XXX
85.7693	988.3700	I10	I10-[11]	0.0659	0.0759	0.0414	340.340	171.300	XXX
85.9674	989.6700	I10	I10-[12]	0.0116	0.0133	0.0073	340.340	171.300	XXX
86.0196	990.0100		unknown	0.0073	0.0089	0.0046	340.340	171.300	XXX
86.2016	991.1900	N10	N10-[6]	0.0093	0.0099	0.0059	340.340	171.300	XXX
86.3421	992.1100		unknown	0.0158	0.0193	0.0101	340.340	171.300	XXX
86.5302	993.3300	I10	I10-[13]	0.0068	0.0078	0.0042	340.340	171.300	XXX
86.7168	994.5300		unknown	0.0018	0.0021	0.0049	340.340	171.300	XXX
86.8888	995.6400		unknown	0.0049	0.0060	0.0138	340.340	171.300	XXX
86.9662	996.1400	A10	i-butylbenzene	0.0124	0.0124	0.0082	343.022	172.790	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 8:55:15 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-20-D7900.0004.CDF Acquired: 06/14/20 20:00:42
Sample: 20-NEDR-814-20-D7900
Analyzed: 6/14/2020 8:55:15 PM
Processed 191 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: WTS Tank 1530 Line Transfer
Yield: 28.36
Int Std: MEK
Int Std Amt: 0.30
Sample Wt: 10.28
Sample Den: 0.85

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
87.2166	997.7500	A10	sec-butylbenzene	0.0170	0.0168	0.0113	344.012	173.340	XXX
87.3383	998.5400		unknown	0.0082	0.0099	0.0054	344.012	173.340	XXX
87.5661	1000.0000	P10	n-decane	0.5738	0.6702	0.3609	345.470	174.150	XXX

AWB 1566 Analysis

Crude Oil Type: Access Western Blend (AWB)
Date of Sample: June 13, 2020
Location of Sample: Nederland Terminal; Shore Tank T-1566

intertek
caleb brett

Certificate of Analysis

Sunoco Logistics L.P.
Allen Brady
2300 North Twin City Highway
Accounts Payable
Nederland, TX 77627
United States of America

Our Reference Number: US300-0046676
Lab Reference Number: 2020-NEDR-000814
Customer Reference Number: Submitted

Customer Product Description: AWB
Location: Sunoco, Nederland, Texas, United States
Sample Representing: Shore Tank 1566 Line
Drawn By: Intertek

Sample ID: 2020-NEDR-000814-018
Date Sampled: 13-Jun-2020
Date Submitted: 13-Jun-2020
Date Tested: 14-Jun-2020

Method	Property	Result	Units
ASTM D7900	Methane	<0.01	Vol %
	Ethane	0.01	Vol %
	Propane	0.10	Vol %
	Isobutane	0.45	Vol %
	n-Butane	1.34	Vol %
	Neopentane	0.04	Vol %
	Isopentane	4.87	Vol %
	n-Pentane	4.70	Vol %
	Cyclopentane	0.21	Vol %
	Cyclohexane	0.53	Vol %
	Methylcyclopentane	0.60	Vol %
	Benzene	0.14	Vol %
	Note	See attached.	
	Total Light Ends (C1-nC10)	26.33	Vol %

f - Denotes analysis results which are ISO/IEC 17025 accredited by ANSI-ASQ National Accreditation Board

Analysis Total: $__________
______ O/T Hours @: _________ = $________
Blending:$ ___________ Shipping: $__________

Results are only representative of the sample tested. All tests have been performed using the latest version unless otherwise indicated. This report shall not be reproduced except in full without written approval of Intertek. Report is subject to our standard Terms and Conditions which can be obtained at our website: http://www.intertek.com/terms

Signed By: ____________________________________
Amanda Holmes, Assistant Laboratory Manager

Date: ____________________

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ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
AT-2072.04

ISO 9001:2015
ABS-QE Certificate # 30701

Detailed Hydrocarbon Analysis Summary Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

SUMMARY REPORT

Group Type	Total(Mass%)	Total(Vol%)	Total(Mol%)
Paraffins:	6.81	9.81	7.27
I-Paraffins:	7.92	11.21	7.79
Olefins:	0.00	0.00	0.00
Naphthenes:	3.33	3.99	2.84
Aromatics:	1.07	1.13	0.88
Total C14+:	0.00	0.00	0.00
Total Unknowns:	0.14	0.18	0.11

Oxygenates:

Total:	0.00(Mass%)	0.00(Vol%)
Total Oxygen Content:	0.00(Mass%)	
Multisubstituted Aromatics:	0.56(Mass%)	0.59(Vol%)

Average Molecular Weight: 72.73

Relative Density: 0.60

Reid Vapor Pressure @ 100F: 2.71psi - 18.71kPa

Calculated Octane Number: 65.6

Motor Octane Number (Jenkins Calculation): 63.9

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	31.10	155.71	T50	T90	FBP
BP by Vol (Deg F)	10.90	155.71	T50	T90	FBP

Percent Carbon: 84.63

Percent Hydrogen: 15.37

Bromine Number (Calc): 0.00

FORMULA RESULTS:

Formula Name	Result
Light Ends (C2-nC5 Vol %)	11.52
Light Ends (C2s-C5s Vol %)	11.73

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

Molecular Weight and Relative Density Data

Group	Avg Mw.	Avg Rel. Density
C1	0.00	0.00
C2	30.07	0.34
C3	44.10	0.50
C4	58.12	0.57
C5	72.10	0.63
C6	85.46	0.68
C7	98.53	0.73
C8	112.09	0.75
C9	126.12	0.76
C10	141.85	0.74
C11	0.00	0.00
C12	0.00	0.00
C13	0.00	0.00
Total Sample:	72.70	0.60

Octane Number

Research Octane Number: 65.6

Motor Octane Number: 63.9

(Calculated from Individual Component Values)

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mass Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.06	0.00	0.00	0.00	0.00	0.00	0.06
C4	0.85	0.27	0.00	0.00	0.00	0.00	1.12
C5	3.20	3.31	0.00	0.17	0.00	0.00	6.68
C6	1.29	1.98	0.00	0.94	0.14	0.01	4.35
C7	0.63	0.87	0.00	1.15	0.30	0.00	2.95
C8	0.37	0.69	0.00	0.67	0.37	0.01	2.10
C9	0.23	0.50	0.00	0.32	0.25	0.04	1.34
C10	0.18	0.31	0.00	0.08	0.01	0.09	0.66
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	6.81	7.92	0.00	3.33	1.07	0.14	19.13

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.14
Grand Total: 19.26

Totals by Group Type & Carbon Number (in Volume Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.10	0.00	0.00	0.00	0.00	0.00	0.10
C4	1.34	0.45	0.00	0.00	0.00	0.00	1.79
C5	4.70	4.91	0.00	0.21	0.00	0.00	9.82
C6	1.80	2.77	0.00	1.13	0.14	0.01	5.85
C7	0.84	1.17	0.00	1.39	0.32	0.00	3.72
C8	0.48	0.90	0.00	0.80	0.39	0.01	2.58
C9	0.29	0.64	0.00	0.38	0.27	0.05	1.63
C10	0.22	0.38	0.00	0.09	0.01	0.12	0.83
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	9.81	11.21	0.00	3.99	1.13	0.18	26.14

Oxygenates 0.00
Total C14+: 0.00
Total Unknowns: 0.18
Grand Total: 26.33

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

Totals by Group Type & Carbon Number (in Mol Percent)

	Paraffins	I-Paraffins	Olefins	Naphthenes	Aromatics	Unknowns	Total
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.01	0.00	0.00	0.00	0.00	0.00	0.01
C3	0.11	0.00	0.00	0.00	0.00	0.00	0.11
C4	1.20	0.38	0.00	0.00	0.00	0.01	1.59
C5	3.67	3.79	0.00	0.20	0.00	0.00	7.66
C6	1.24	1.90	0.00	0.92	0.14	0.02	4.22
C7	0.52	0.72	0.00	0.97	0.27	0.00	2.47
C8	0.27	0.50	0.00	0.49	0.29	0.01	1.55
C9	0.15	0.32	0.00	0.21	0.17	0.02	0.88
C10	0.10	0.18	0.00	0.05	0.01	0.06	0.39
C11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:	7.27	7.79	0.00	2.84	0.88	0.11	18.77

Oxygenates	0.00	Total C14+:	0.00
Total Unknowns:	0.11	Grand Total:	18.88

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
6.6935	200.0000	P2	ethane	0.0054	0.0147	0.0149	-127.480	-88.600	XXX
6.9515	300.0000	P3	propane	0.0572	0.1049	0.1071	-43.672	-42.040	XXX
7.3560	367.5800	I4	i-butane	0.2699	0.4452	0.3838	10.904	-11.720	XXX
7.5919	390.8900		unknown	0.0022	0.0029	0.0058	10.904	-11.720	XXX
7.7036	400.0000	P4	n-butane	0.8457	1.3429	1.2025	31.100	-0.500	XXX
7.8782	414.5100	I5	2,2-dimethylpropane	0.0284	0.0442	0.0326	49.100	9.500	XXX
8.9757	475.2800	I5	i-pentane	3.2822	4.8684	3.7593	82.112	27.840	XXX
9.6622	500.0000	P5	n-pentane	3.2017	4.6989	3.6671	96.908	36.060	XXX
10.3273	519.4200		unknown	0.0059	0.0078	0.0153	96.908	36.060	XXX
10.9652	535.0100	I6	2,2-dimethylbutane	0.1075	0.1523	0.1031	121.514	49.730	XXX
12.3471	562.1100	N5	cyclopentane	0.1683	0.2076	0.1984	120.650	49.250	XXX
12.4176	563.3100	I6	2,3-dimethylbutane	0.1555	0.2161	0.1491	136.364	57.980	XXX
12.6391	566.9900	I6	2-methylpentane	1.0719	1.5084	1.0279	140.468	60.260	XXX
13.5423	580.7100	I6	3-methylpentane	0.6427	0.8891	0.6163	145.886	63.270	XXX
15.0472	600.0000	P6	n-hexane	1.2939	1.8033	1.2407	155.714	68.730	XXX
18.3898	627.9800	I7	2,2-dimethylpentane	0.0329	0.0449	0.0272	174.542	79.190	XXX
18.7572	630.5600	N6	methylcyclopentane	0.4902	0.6018	0.4813	161.240	71.800	XXX
19.3531	634.5700	I7	2,4-dimethylpentane	0.0525	0.0717	0.0433	176.882	80.490	XXX
20.2289	640.1400	I7	2,2,3-trimethylbutane	0.0073	0.0098	0.0060	177.584	80.880	XXX
22.7419	654.3300	A6	benzene	0.1366	0.1428	0.1445	176.162	80.090	XXX
23.8133	659.7200	I7	3,3-dimethylpentane	0.0145	0.0192	0.0119	186.908	86.060	XXX
24.5162	663.0800	N6	cyclohexane	0.4448	0.5252	0.4368	177.296	80.720	XXX
26.4926	671.8500	I7	2-methylhexane	0.3060	0.4144	0.2523	194.090	90.050	XXX
26.8209	673.2200	I7	2,3-dimethylpentane	0.0941	0.1244	0.0776	193.604	89.780	XXX
27.3906	675.5500	N7	1,1-dimethylcyclopentane	0.0596	0.0726	0.0502	189.464	87.480	XXX
28.4580	679.7400	I7	3-methylhexane	0.3357	0.4490	0.2769	197.330	91.850	XXX
29.8943	685.0800	N7	1c,3-dimethylcyclopentane	0.1008	0.1244	0.0849	195.386	90.770	XXX
30.5772	687.5000	N7	1t,3-dimethylcyclopentane	0.0867	0.1064	0.0729	197.096	91.720	XXX
30.9374	688.7500	I7	3-ethylpentane	0.0247	0.0326	0.0204	200.246	93.470	XXX
31.2278	689.7400	N7	1t,2-dimethylcyclopentane	0.1439	0.1760	0.1211	197.366	91.870	XXX
31.6355	691.1200	I8	2,2,4-trimethylpentane	0.0149	0.0198	0.0108	210.632	99.240	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900 Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.68 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
34.4343	700.0000	P7	n-heptane	0.6275	0.8434	0.5175	209.156	98.420	XXX
38.6775	724.5800	N7	1c,2-dimethylcyclopentane	0.0232	0.0292	0.0195	211.154	99.530	XXX
38.8153	725.3200	N7	methylcyclohexane	0.6875	0.8212	0.5786	213.674	100.930	XXX
39.5974	729.4800	I8	2,2-dimethylhexane	0.0534	0.0705	0.0386	224.312	106.840	XXX
41.5111	739.2400	N7	ethylcyclopentane	0.0479	0.0574	0.0403	218.246	103.470	XXX
41.9566	741.4400	I8	2,5-dimethylhexane	0.0406	0.0538	0.0294	228.398	109.110	XXX
42.3510	743.3600	I8	2,4-dimethylhexane	0.0414	0.0543	0.0300	228.974	109.430	XXX
43.4821	748.7600	N8	1c,2t,4-trimethylcyclopentane	0.0514	0.0619	0.0379	242.132	116.740	XXX
43.8182	750.3300	I8	3,3-dimethylhexane	0.0132	0.0171	0.0096	233.546	111.970	XXX
45.0656	756.0400	N8	1t,2c,3-trimethylcyclopentane	0.0466	0.0556	0.0343	230.738	110.410	XXX
45.6936	758.8400	I8	2,3,4-trimethylpentane	0.0073	0.0093	0.0053	236.246	113.470	XXX
46.4466	762.1500	A7	toluene	0.3018	0.3199	0.2707	231.134	110.630	XXX
48.0873	769.1400	I8	2,3-dimethylhexane	0.0428	0.0552	0.0310	240.098	115.610	XXX
48.3175	770.0900	I8	2-methyl-3-ethylpentane	0.0114	0.0147	0.0082	240.098	115.610	XXX
49.4055	774.5500	I8	2-methylheptane	0.2248	0.2961	0.1626	243.770	117.650	XXX
49.6949	775.7200	I8	4-methylheptane	0.0676	0.0882	0.0489	243.878	117.710	XXX
49.8707	776.4300	I8	3-methyl-3-ethylpentane	0.0092	0.0119	0.0067	240.098	115.610	XXX
49.9936	776.9200	I8	3,4-dimethylhexane	0.0105	0.0134	0.0076	243.914	117.730	XXX
50.4138	778.5900		unknown	0.0070	0.0092	0.0051	243.914	117.730	XXX
50.4528	778.7400	N8	1c,3-dimethylcyclohexane	0.0087	0.0104	0.0064	246.848	119.360	XXX
50.9276	780.6100	I8	3-methylheptane	0.1305	0.1700	0.0944	246.074	118.930	XXX
51.0908	781.2400	N8	1c,2t,3-trimethylcyclopentane	0.1727	0.2060	0.1272	243.500	117.500	XXX
51.2250	781.7600	I8	3-ethylhexane	0.0185	0.0238	0.0134	245.372	118.540	XXX
51.4791	782.7500	N8	1t,4-dimethylcyclohexane	0.0736	0.0887	0.0542	246.848	119.360	XXX
52.5598	786.8700	N8	1,1-dimethylcyclohexane	0.0303	0.0356	0.0223	247.190	119.550	XXX
53.1269	788.9900	I9	2,2,5-trimethylhexane	0.0032	0.0042	0.0021	255.362	124.090	XXX
53.3217	789.7200	N8	3t-ethylmethylcyclopentane	0.0192	0.0230	0.0141	249.980	121.100	XXX
53.7436	791.2700	N8	3c-ethylmethylcyclopentane	0.0174	0.0209	0.0128	249.980	121.100	XXX
53.9823	792.1500	N8	2t-ethylmethylcyclopentane	0.0271	0.0324	0.0199	250.160	121.200	XXX
54.4025	793.6800	N8	1,1-methylethylcyclopentane	0.0064	0.0075	0.0047	250.754	121.530	XXX
54.9183	795.5300	N8	1t,2-dimethylcyclohexane	0.0613	0.0725	0.0451	254.174	123.430	XXX

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900 Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
NOTE: Components with a Volume % of Less Than 0.00 Not Reported. Sample Wt: 5.68 Sample Den: 0.92

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
56.1789	800.0000	P8	n-octane	0.3683	0.4818	0.2664	258.224	125.680	XXX
56.3016	800.8300	N8	i-propylcyclopentane	0.0491	0.0581	0.0361	259.574	126.430	XXX
57.6242	809.6500		unknown	0.0077	0.0101	0.0057	259.574	126.430	XXX
57.7055	810.1900	I9	2,4,4-trimethylhexane	0.0076	0.0094	0.0049	32.000	0.000	XXX
58.8120	817.3800		unknown	0.0094	0.0124	0.0061	32.000	0.000	XXX
59.2227	820.0200	I9	2,3,4-trimethylhexane	0.0068	0.0085	0.0044	282.308	139.060	XXX
59.5475	822.0800	I9	2,2,3,4-tetramethylpentane	0.0089	0.0111	0.0057	271.454	133.030	XXX
59.8502	824.0000	N8	N8-[1]	0.0089	0.0105	0.0066	271.454	133.030	XXX
60.6134	828.7800	N8	1c,2-dimethylcyclohexane	0.0298	0.0344	0.0220	265.532	129.740	XXX
60.7131	829.4000	I9	2,3,5-trimethylhexane	0.0062	0.0079	0.0040	268.430	131.350	XXX
60.8340	830.1500	I9	2,2-dimethylheptane	0.0044	0.0057	0.0028	270.860	132.700	XXX
61.5044	834.2800		unknown	0.0186	0.0244	0.0120	270.860	132.700	XXX
61.5794	834.7400	N9	1,1,4-trimethylcyclohexane	0.0889	0.1058	0.0582	275.000	135.000	XXX
61.7549	835.8100	I9	2,2,3-trimethylhexane	0.0782	0.1004	0.0504	271.220	132.900	XXX
62.1588	838.2600	I9	2,4-dimethylheptane	0.0049	0.0063	0.0032	271.220	132.900	XXX
62.5398	840.5500	N8	n-propylcyclopentane	0.0695	0.0822	0.0512	267.728	130.960	XXX
62.9069	842.7500	I9	2,5-dimethylheptane	0.0570	0.0731	0.0367	276.800	136.000	XXX
63.1225	844.0400	N9	*1c,3c,5-trimethylcyclohexane	0.0048	0.0058	0.0032	281.174	138.430	XXX
63.1719	844.3300	I9	3,3-dimethylheptane	0.0059	0.0075	0.0038	278.636	137.020	XXX
63.4085	845.7300	I9	3,5-dimethylheptane	0.0065	0.0083	0.0042	276.800	136.000	XXX
63.6334	847.0600	I9	2,6-dimethylheptane	0.0107	0.0138	0.0069	275.396	135.220	XXX
63.8873	848.5500	N9	1,1,3-trimethylcyclohexane	0.0070	0.0082	0.0046	295.862	146.590	XXX
64.7360	853.4900	A8	ethylbenzene	0.0331	0.0351	0.0257	277.160	136.200	XXX
64.8110	853.9300	N9	1c,2t,4t-trimethylcyclohexane	0.0151	0.0177	0.0099	32.000	0.000	XXX
65.1918	856.1200	I9	I9-[1]	0.0297	0.0373	0.0191	32.000	0.000	XXX
65.5472	858.1500	N9	N9-[1]	0.0044	0.0052	0.0029	32.000	0.000	XXX
65.8528	859.8900	N9	N9-[2]	0.0043	0.0050	0.0028	32.000	0.000	XXX
66.2012	861.8600	A8	1,3-dimethylbenzene	0.1779	0.1892	0.1385	282.416	139.120	XXX
66.3941	862.9400	A8	1,4-dimethylbenzene	0.0942	0.1006	0.0733	281.048	138.360	XXX
66.7519	864.9500	I9	3,4-dimethylheptane	0.0076	0.0095	0.0049	285.080	140.600	XXX
66.8788	865.6500	N9	N9-[3]	0.0073	0.0086	0.0048	285.080	140.600	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Page: 8

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
67.2139	867.5200	I9	4-ethylheptane	0.0165	0.0211	0.0106	288.392	142.440	XXX
67.7023	870.2100	I9	4-methyloctane	0.0435	0.0556	0.0281	288.392	142.440	XXX
67.8683	871.1300	I9	2-methyloctane	0.0609	0.0785	0.0392	289.904	143.280	XXX
68.7576	875.9700	I9	3,3-diethylpentane	0.0105	0.0128	0.0068	270.842	132.690	XXX
68.9683	877.1000	I9	3-methyloctane	0.0825	0.1052	0.0532	291.614	144.230	XXX
69.2542	878.6400	N9	1c,2t,4c-trimethylcyclohexane	0.0050	0.0059	0.0032	275.000	135.000	XXX
69.7631	881.3600	N9	1,1,2-trimethylcyclohexane	0.0042	0.0048	0.0027	293.360	145.200	XXX
69.9351	882.2700	A8	1,2-dimethylbenzene	0.0632	0.0660	0.0492	291.974	144.430	XXX
70.0819	883.0500	I9	I9-[2]	0.0093	0.0117	0.0060	291.974	144.430	XXX
70.2053	883.7000	I9	I9-[3]	0.0082	0.0103	0.0053	291.974	144.430	XXX
70.5201	885.3600	N9	N9-[4]	0.0033	0.0038	0.0021	291.974	144.430	XXX
70.8754	887.2200	N9	N9-[5]	0.0183	0.0215	0.0120	291.974	144.430	XXX
71.0846	888.3200	N9	N9-[6]	0.0364	0.0429	0.0238	291.974	144.430	XXX
71.4624	890.2800	I9	I9-[4]	0.0192	0.0241	0.0124	291.974	144.430	XXX
71.5333	890.6400	I9	I9-[5]	0.0083	0.0105	0.0054	291.974	144.430	XXX
71.8823	892.4500	N9	i-butylcyclopentane	0.0037	0.0044	0.0024	298.346	147.970	XXX
73.1608	898.9600	I9	I9-[6]	0.0053	0.0067	0.0034	298.346	147.970	XXX
73.3658	900.0000	P9	n-nonane	0.2296	0.2940	0.1479	303.476	150.820	XXX
73.5123	901.1300	N9	1,1-methylethylcyclohexane	0.0077	0.0088	0.0051	305.924	152.180	XXX
74.0927	905.6000	N9	N9-[7]	0.0302	0.0351	0.0198	305.924	152.180	XXX
74.5209	908.8800	N9	N9-[8]	0.0104	0.0121	0.0068	305.924	152.180	XXX
75.1690	913.8000	A9	i-propylbenzene	0.0095	0.0101	0.0065	306.338	152.410	XXX
75.4625	916.0100	I10	I10-[1]	0.0074	0.0094	0.0043	306.338	152.410	XXX
75.7622	918.2600	N9	N9-[9]	0.0169	0.0197	0.0111	306.338	152.410	XXX
76.0384	920.3300	I10	I10-[2]	0.0146	0.0184	0.0085	306.338	152.410	XXX
76.3057	922.3200	I10	2,4-dimethyloctane	0.0154	0.0195	0.0089	312.620	155.900	XXX
76.7576	925.6700	N9	N9-[10]	0.0111	0.0129	0.0073	312.620	155.900	XXX
76.9067	926.7700	N9	N9-[11]	0.0037	0.0043	0.0024	312.620	155.900	XXX
77.2107	929.0000	I10	2,6-dimethyloctane	0.0057	0.0072	0.0033	320.738	160.410	XXX
77.3336	929.9000	I10	2,5-dimethyloctane	0.0200	0.0251	0.0116	317.300	158.500	XXX
77.5950	931.8100	N9	n-butylcyclopentane	0.0378	0.0443	0.0247	313.916	156.620	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Page: 9

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
77.8833	933.9100		unknown	0.0089	0.0117	0.0058	313.916	156.620	XXX
77.9559	934.4400	I10	I10-[3]	0.0128	0.0161	0.0074	313.916	156.620	XXX
78.1376	935.7600	N10	N10-[1]	0.0152	0.0174	0.0089	313.916	156.620	XXX
78.5046	938.4100	I10	I10-[4]	0.0061	0.0076	0.0035	313.916	156.620	XXX
78.6464	939.4300	I10	3,3-dimethyloctane	0.0622	0.0774	0.0361	322.160	161.200	XXX
78.8707	941.0400		unknown	0.0158	0.0207	0.0091	322.160	161.200	XXX
79.0794	942.5300		unknown	0.0053	0.0070	0.0031	322.160	161.200	XXX
79.2183	943.5200		unknown	0.0078	0.0102	0.0045	322.160	161.200	XXX
79.4461	945.1500		unknown	0.0071	0.0094	0.0041	322.160	161.200	XXX
79.5540	945.9100	N10	N10-[2]	0.0216	0.0248	0.0127	322.160	161.200	XXX
79.7339	947.1900	A9	n-propylbenzene	0.0196	0.0209	0.0135	318.632	159.240	XXX
80.0913	949.7200		unknown	0.0053	0.0069	0.0036	318.632	159.240	XXX
80.2539	950.8600	N10	N10-[3]	0.0084	0.0096	0.0049	318.632	159.240	XXX
80.4196	952.0200		unknown	0.0057	0.0075	0.0034	318.632	159.240	XXX
80.6383	953.5600	A9	1,3-methylethylbenzene	0.0367	0.0390	0.0252	322.394	161.330	XXX
80.9449	955.7000	A9	1,4-methylethylbenzene	0.0204	0.0217	0.0140	323.618	162.010	XXX
81.5015	959.5600		unknown	0.0057	0.0075	0.0039	323.618	162.010	XXX
81.5854	960.1400	N10	N10-[4]	0.0079	0.0090	0.0046	323.618	162.010	XXX
81.7199	961.0700	A9	1,3,5-trimethylbenzene	0.0647	0.0687	0.0445	328.532	164.740	XXX
82.0058	963.0400	I10	I10-[5]	0.0063	0.0079	0.0037	328.532	164.740	XXX
82.2034	964.3900	I10	I10-[6]	0.0052	0.0065	0.0030	328.532	164.740	XXX
82.2824	964.9400	I10	5-methylnonane	0.0119	0.0150	0.0069	329.180	165.100	XXX
82.5261	966.6000	I10	4-methylnonane	0.0461	0.0573	0.0268	32.000	0.000	XXX
82.8907	969.0800	A9	1,2-methylethylbenzene	0.0282	0.0294	0.0194	329.324	165.180	XXX
83.1245	970.6700	I10	2-methylnonane	0.0147	0.0186	0.0086	332.654	167.030	XXX
83.3684	972.3200	I10	3-ethyloctane	0.0097	0.0120	0.0056	331.700	166.500	XXX
83.7986	975.2100	I10	3-methylnonane	0.0293	0.0367	0.0170	334.040	167.800	XXX
83.9649	976.3300		unknown	0.0083	0.0109	0.0048	334.040	167.800	XXX
84.0524	976.9100	N10	N10-[5]	0.0065	0.0075	0.0038	334.040	167.800	XXX
84.4530	979.5800	I10	I10-[7]	0.0058	0.0072	0.0034	334.040	167.800	XXX
84.4826	979.7800		unknown	0.0073	0.0096	0.0042	334.040	167.800	XXX

Detailed Hydrocarbon Analysis Detail Report -

Report Date: 6/14/2020 10:55:52 PM

RawFile: Z:\CP32 Instruments\CARBURANE\DATA\2020\JUN-20\20-NEDR-814-18-D7900.0004.CDF Acquired: 06/14/20 22:09:52
Sample: 20-NEDR-814-18-D7900
Analyzed: 6/14/2020 10:55:52 PM
Processed 171 Peaks
Reference File: N:\GCGroup\gcadmin\DHA DRAGON Analyses\CARBURANE\References\D7900-REF-040220A.DHA
Comments: Shore Tank 1566 Line
Yield: 19.26
Int Std: MEK
Int Std Amt: 0.15
Sample Wt: 5.68
Sample Den: 0.92

NOTE: Components with a Volume % of Less Than 0.00 Not Reported.

Components Listed in Chromatographic Order

Minutes	Index	Group	Component	Mass %	Volume %	Mol %	BP(F)	BP(C)	CAS
84.8344	982.1200	I10	I10-[8]	0.0034	0.0043	0.0020	334.040	167.800	XXX
84.9920	983.1600	I10	I10-[9]	0.0022	0.0027	0.0013	334.040	167.800	XXX
85.2028	984.5500	A9	1,2,4-trimethylbenzene	0.0744	0.0781	0.0512	336.884	169.380	XXX
85.3620	985.6000	N10	i-butylcyclohexane	0.0179	0.0206	0.0105	340.340	171.300	XXX
85.5832	987.0500	I10	I10-[10]	0.0097	0.0120	0.0056	340.340	171.300	XXX
85.7846	988.3700	I10	I10-[11]	0.0167	0.0208	0.0097	340.340	171.300	XXX
86.2077	991.1300	N10	N10-[6]	0.0052	0.0060	0.0031	340.340	171.300	XXX
86.3510	992.0600		unknown	0.0030	0.0040	0.0018	340.340	171.300	XXX
86.5500	993.3500	I10	I10-[12]	0.0027	0.0033	0.0016	340.340	171.300	XXX
86.7414	994.5900		unknown	0.0026	0.0034	0.0067	340.340	171.300	XXX
86.9699	996.0700	A10	i-butylbenzene	0.0043	0.0046	0.0026	343.022	172.790	XXX
87.2259	997.7100	A10	sec-butylbenzene	0.0052	0.0056	0.0032	344.012	173.340	XXX
87.3569	998.5500		unknown	0.0050	0.0065	0.0031	344.012	173.340	XXX
87.5818	1000.0000	P10	n-decane	0.1767	0.2225	0.1027	345.470	174.150	XXX

APPENDIX C. UPL FLOOR CALCULATIONS

Listing of Calculation Sections:

- Summary of HAP% in liquid for each crude sample
- Calculation of UPL in liquid for each HAP
- Summary of HAP% in vapor for each crude sample
- Calculation of vapor weight % for each crude sample
- Calculation of UPL in vapor for each HAP
- Calculation of HAP emissions from marine loading

Summary of HAP% in Liquid

- Summary of Total and Individual Hazardous Air Pollutants in Liquid
  - Crude Information
  - Individual Hazardous Air Pollutants in Crude Samples

Summary of Total and Individual Hazardous Air Pollutants in Liquid

Crude Information

Crude Sample	Date of Sample	Location of Sample	Reid Vapor Pressure (psi)	Total HAP (wt%)
Kearl Heavy	5/19/2020	T-1571 Bayou Bridge Line	3.63	4.58%
Bakken 1554	5/18/2020	T-1554. DAPL Line	6.76	4.14%
WTI 1590	5/19/2020	T-1590 Line	4.76	3.96%
SGC CHOPS	5/19/2020	T-1543, CHOPS Line	4.06	1.83%
Eaglebine Light	5/19/2020	T-1553, Eagle "R" Line	6.56	2.83%
Bakken 1552	5/29/2020	Shore Tank 1552 Line	6.51	3.94%
WTI 1594	5/29/2020	Shore Tank 1594 Line	4.85	3.85%
Cold Lake 1567	6/3/2020	Shore Tank 1567 Line	3.06	2.17%
WCS 1556	6/7/2020	Shore Tank 1556 Line	2.52	2.10%
WTI 1549	6/9/2020	Shore Tank 1549 Line	4.71	3.01%
Bakken 1558	6/9/2020	Shore Tank 1558 Line	7.74	3.86%
WTS 1530	6/13/2020	Shore Tank 1530 Line	4.51	3.40%
AWB 1566	6/13/2020	Shore Tank 1566 Line	2.71	2.18%

Summary of Total and Individual Hazardous Air Pollutants in Liquid

Individual Hazardous Air Pollutants in Crude Samples

Crude Sample	Hexane	Benzene	Toluene	Ethylbenzene	1,2,4-Trimethylbenzene	1,3-dimethylbenzene	1,4-dimethylbenzene	1,2-dimethylbenzene	i-propylbenzene (Cumene)
	110543	**71432**	**108883**	**100414**	**95636**	**108383**	**106423**	**95476**	**98828**
Kearl Heavy	1.96%	0.22%	0.65%	0.13%	0.23%	0.43%	0.29%	0.18%	0.03%
Bakken 1554	2.04%	0.20%	0.43%	0.09%	0.44%	0.42%	0.28%	0.21%	0.04%
WTI 1590	1.79%	0.25%	0.69%	0.15%	0.23%	0.40%	0.24%	0.17%	0.04%
SGC CHOPS	1.01%	0.05%	0.16%	0.07%	0.12%	0.13%	0.19%	0.08%	0.02%
Eaglebine Light	1.18%	0.09%	0.41%	0.08%	0.24%	0.33%	0.31%	0.15%	0.02%
Bakken 1552	2.03%	0.20%	0.39%	0.08%	0.39%	0.38%	0.24%	0.19%	0.03%
WTI 1594	1.82%	0.22%	0.63%	0.14%	0.22%	0.38%	0.24%	0.16%	0.04%
Cold Lake 1567	1.24%	0.14%	0.31%	0.04%	0.08%	0.18%	0.10%	0.07%	0.01%
WCS 1556	1.22%	0.13%	0.30%	0.04%	0.08%	0.18%	0.09%	0.06%	0.01%
WTI 1549	1.33%	0.20%	0.51%	0.16%	0.18%	0.27%	0.18%	0.14%	0.04%
Bakken 1558	2.07%	0.18%	0.37%	0.08%	0.37%	0.36%	0.24%	0.17%	0.03%
WTS 1530	1.75%	0.17%	0.48%	0.11%	0.18%	0.33%	0.22%	0.14%	0.02%
AWB 1566	1.29%	0.14%	0.30%	0.03%	0.07%	0.18%	0.09%	0.06%	0.01%
Maximum HAP %	2.07%	0.25%	0.69%	0.16%	0.44%	0.43%	0.31%	0.21%	0.04%
Average HAP %	1.59%	0.17%	0.43%	0.09%	0.22%	0.31%	0.21%	0.14%	0.03%

Calculation of UPL in Liquid

- Prediction Summary of Hazardous Air Pollutant Concentrations in Crude Oil
- N-Hexane
    - 110543 HAP Analysis Data
    - 110543 HAP Averages and Calculation of UPL
- Benzene
    - 71432 HAP Analysis Data
    - 71432 HAP Averages and Calculation of UPL
- Toluene
    - 10883 HAP Analysis Data
    - 10883 HAP Averages and Calculation of UPL
- Ethylbenzene
    - 100414 HAP Analysis Data
    - 100414 HAP Averages and Calculation of UPL
- 1,2,4-trimethylbenzene
    - 95636 HAP Analysis Data
    - 95636 HAP Averages and Calculation of UPL
- 1,3-dimethylbenzene
    - 108383 HAP Analysis Data
    - 108383 HAP Averages and Calculation of UPL
- 1,4-dimethylbenzene
    - 106423 HAP Analysis Data
    - 106423 HAP Averages and Calculation of UPL
- 1,2-dimethylbenzene
    - 95476 HAP Analysis Data
    - 95476 HAP Averages and Calculation of UPL
- i-propylbenzene
    - 98828 HAP Analysis Data
    - 98828 HAP Averages and Calculation of UPL

Prediction Summary of Hazardous Air Pollutant Concentrations in Crude Oil

Confidence Level

HAP	CAS No.	99%
n-Hexane	110543	3.09
Benzene	71432	0.46
Toluene	108883	1.10
Ethylbenzene	100414	0.29
1,2,4-Trimethylbenzene	95636	0.76
1,3-dimethylbenzene	108383	0.79
1,4-dimethylbenzene	106423	0.57
1,2-dimethylbenzene	95476	0.37
i-propylbenzene	98828	0.08
Total		7.50

n-Hexane - 110543 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	110543	Sample #1	5/19/2020	1.956	0.67
Bakken 1554	110543	Sample #2	5/18/2020	2.041	0.71
WTI 1590	110543	Sample #3	5/19/2020	1.790	0.58
SGC CHOPS	110543	Sample #4	5/19/2020	1.010	0.01
Eaglebine Light	110543	Sample #5	5/19/2020	1.185	0.17
Bakken 1552	110543	Sample #6	5/29/2020	2.032	0.71
WTI 1594	110543	Sample #7	5/29/2020	1.819	0.60
Cold Lake 1567	110543	Sample #8	6/3/2020	1.239	0.21
WCS 1556	110543	Sample #9	6/7/2020	1.219	0.20
WTI 1549	110543	Sample #10	6/9/2020	1.334	0.29
Bakken 1558	110543	Sample #11	6/9/2020	2.067	0.73
WTS 1530	110543	Sample #12	6/13/2020	1.750	0.56
AWB 1566	110543	Sample #13	6/13/2020	1.294	0.26

HAP 110543 Averages and Calculation of UPL

Data Source	Pollutant CAS No.	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	110543	1.59	0.467	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	0.438		
Variance of natural log of test runs (σ^2)	0.064		
m (test runs in test condition)	1		
flatness of z distribution (β_{2z})	4.12		
Denominator for calculation of flatness of z distribution (β_{2z})	0.004		
Flatness of z distribution (β_{2z})	949.2		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	0.787		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp (μ + (σ/2))	1.60		
exp (2μ + σ^2)	2.56		
exp (σ^2) - 1	0.066		
(σ^2/n) + [σ^4/(2(n - 1))]	0.005		
Square root term	0.43		
Confidence Level	99%	99.9%	99.5%
UPL	3.09	3.43	3.21

Benzene - 71432 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	71432	Sample #1	5/19/2020	0.222	-1.51
Bakken 1554	71432	Sample #2	5/18/2020	0.195	-1.63
WTI 1590	71432	Sample #3	5/19/2020	0.253	-1.37
SGC CHOPS	71432	Sample #4	5/19/2020	0.049	-3.01
Eaglebine Light	71432	Sample #5	5/19/2020	0.094	-2.36
Bakken 1552	71432	Sample #6	5/29/2020	0.195	-1.63
WTI 1594	71432	Sample #7	5/29/2020	0.219	-1.52
Cold Lake 1567	71432	Sample #8	6/3/2020	0.136	-2.00
WCS 1556	71432	Sample #9	6/7/2020	0.126	-2.07
WTI 1549	71432	Sample #10	6/9/2020	0.197	-1.63
Bakken 1558	71432	Sample #11	6/9/2020	0.184	-1.69
WTS 1530	71432	Sample #12	6/13/2020	0.171	-1.77
AWB 1566	71432	Sample #13	6/13/2020	0.137	-1.99

HAP 71432 Averages and Calculation of UPL

Data Source	**Pollutant**	**Test Average**	**ln (Test Average)**	**Number of test runs in average**	**Num test runs - 1**	**Material**
Nederland Crude	71432	0.168	-1.79	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-1.86		
Variance of natural log of test runs (σ^2)	0.194		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	7.18		
Denominator for calculation of flatness of z distribution (β_{2z})	0.046		
Flatness of z distribution (β_{2z})	156.25		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.49		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.172		
$\exp(2\mu + \sigma^2)$	0.029		
$\exp(\sigma^2) - 1$	0.214		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.017		
Square root term	0.08		

Confidence Level	99%	99.9%	99.5%
UPL	0.46	0.53	0.48

Toluene - 10883 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	108883	Sample #1	5/19/2020	0.653	-0.43
Bakken 1554	108883	Sample #2	5/18/2020	0.431	-0.84
WTI 1590	108883	Sample #3	5/19/2020	0.686	-0.38
SGC CHOPS	108883	Sample #4	5/19/2020	0.160	-1.83
Eaglebine Light	108883	Sample #5	5/19/2020	0.405	-0.90
Bakken 1552	108883	Sample #6	5/29/2020	0.390	-0.94
WTI 1594	108883	Sample #7	5/29/2020	0.629	-0.46
Cold Lake 1567	108883	Sample #8	6/3/2020	0.310	-1.17
WCS 1556	108883	Sample #9	6/7/2020	0.296	-1.22
WTI 1549	108883	Sample #10	6/9/2020	0.514	-0.67
Bakken 1558	108883	Sample #11	6/9/2020	0.368	-1.00
WTS 1530	108883	Sample #12	6/13/2020	0.483	-0.73
AWB 1566	108883	Sample #13	6/13/2020	0.302	-1.20

HAP 108883 Averages and Calculation of UPL

Data Source	**Pollutant**	**Test Average**	**ln (Test Average)**	**Number of test runs in average**	**Num test runs - 1**	**Material**
Nederland Crude	10883	0.433	-0.84	13	12	Crude oil

Number of sources with test data			
n	13		
n-1	12		
Average of natural log of test run values (μ)	-0.91		
Variance of natural log of test runs (σ^2)	0.160		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	6.27		
Denominator for calculation of flatness of z distribution (β_{2z})	0.030		
Flatness of z distribution (β_{2z})	207.43		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.32		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.438		
$\exp(2\mu + \sigma^2)$	0.192		
$\exp(\sigma^2) - 1$	0.174		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.013		
Square root term	0.19		

Confidence Level	99%	99.9%	99.5%
UPL	1.10	1.25	1.16

Ethylbenzene - 100414 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	100414	Sample #1	5/19/2020	0.126	-2.07
Bakken 1554	100414	Sample #2	5/18/2020	0.092	-2.39
WTI 1590	100414	Sample #3	5/19/2020	0.149	-1.90
SGC CHOPS	100414	Sample #4	5/19/2020	0.072	-2.64
Eaglebine Light	100414	Sample #5	5/19/2020	0.081	-2.51
Bakken 1552	100414	Sample #6	5/29/2020	0.083	-2.49
WTI 1594	100414	Sample #7	5/29/2020	0.138	-1.98
Cold Lake 1567	100414	Sample #8	6/3/2020	0.042	-3.16
WCS 1556	100414	Sample #9	6/7/2020	0.036	-3.33
WTI 1549	100414	Sample #10	6/9/2020	0.157	-1.85
Bakken 1558	100414	Sample #11	6/9/2020	0.080	-2.53
WTS 1530	100414	Sample #12	6/13/2020	0.108	-2.22
AWB 1566	100414	Sample #13	6/13/2020	0.033	-3.41

HAP 100414 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	100414	0.092	-2.38	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-2.50
Variance of natural log of test runs (σ^2)	0.274
m (test runs in test condition)	1
Numerator for calculation of flatness of z distribution (β_{2z})	9.73
Denominator for calculation of flatness of z distribution (β_{2z})	0.099
Flatness of z distribution (β_{2z})	97.98
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.86

Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79

exp (μ + (σ/2))	0.094
exp (2μ + σ^2)	0.009
exp (σ^2) - 1	0.315
(σ^2/n) + [σ^4/(2(n - 1))]	0.024
Square root term	0.05

Confidence Level	99%	99.9%	99.5%
UPL	0.29	0.33	0.30

1,2,4-trimethylbenzene - 95636 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	95636	Sample #1	5/19/2020	0.232	-1.46
Bakken 1554	95636	Sample #2	5/18/2020	0.439	-0.82
WTI 1590	95636	Sample #3	5/19/2020	0.227	-1.48
SGC CHOPS	95636	Sample #4	5/19/2020	0.124	-2.08
Eaglebine Light	95636	Sample #5	5/19/2020	0.241	-1.42
Bakken 1552	95636	Sample #6	5/29/2020	0.393	-0.93
WTI 1594	95636	Sample #7	5/29/2020	0.223	-1.50
Cold Lake 1567	95636	Sample #8	6/3/2020	0.080	-2.52
WCS 1556	95636	Sample #9	6/7/2020	0.079	-2.54
WTI 1549	95636	Sample #10	6/9/2020	0.180	-1.72
Bakken 1558	95636	Sample #11	6/9/2020	0.367	-1.00
WTS 1530	95636	Sample #12	6/13/2020	0.175	-1.74
AWB 1566	95636	Sample #13	6/13/2020	0.074	-2.60

HAP 95636 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	95636	0.218	-1.52	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-1.68		
Variance of natural log of test runs (σ^2)	0.366		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	13.56		
Denominator for calculation of flatness of z distribution (β_{2z})	0.195		
Flatness of z distribution (β_{2z})	69.40		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	2.29		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.224		
$\exp(2\mu + \sigma^2)$	0.050		
$\exp(\sigma^2) - 1$	0.442		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.034		
Square root term	0.15		

Confidence Level	99%	99.9%	99.5%
UPL	0.76	0.89	0.81

1,3-dimethylbenzene - 108383 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	108383	Sample #1	5/19/2020	0.430	-0.85
Bakken 1554	108383	Sample #2	5/18/2020	0.419	-0.87
WTI 1590	108383	Sample #3	5/19/2020	0.402	-0.91
SGC CHOPS	108383	Sample #4	5/19/2020	0.127	-2.06
Eaglebine Light	108383	Sample #5	5/19/2020	0.334	-1.10
Bakken 1552	108383	Sample #6	5/29/2020	0.385	-0.96
WTI 1594	108383	Sample #7	5/29/2020	0.384	-0.96
Cold Lake 1567	108383	Sample #8	6/3/2020	0.183	-1.70
WCS 1556	108383	Sample #9	6/7/2020	0.178	-1.73
WTI 1549	108383	Sample #10	6/9/2020	0.270	-1.31
Bakken 1558	108383	Sample #11	6/9/2020	0.357	-1.03
WTS 1530	108383	Sample #12	6/13/2020	0.326	-1.12
AWB 1566	108383	Sample #13	6/13/2020	0.178	-1.73

HAP 108383 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	108383	0.306	-1.19	13	12	Crude oil

Number of sources with test data			
n	13		
n-1	12		
Average of natural log of test run values (μ)	-1.25		
Variance of natural log of test runs (σ^2)	0.167		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	6.43		
Denominator for calculation of flatness of z distribution (β_{2z})	0.033		
Flatness of z distribution (β_{2z})	195.43		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.36		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.310		
$\exp(2\mu + \sigma^2)$	0.096		
$\exp(\sigma^2) - 1$	0.181		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.014		
Square root term	0.14		

Confidence Level	99%	99.9%	99.5%
UPL	0.79	0.90	0.83

1,4-dimethylbenzene - 106423 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	106423	Sample #1	5/19/2020	0.287	-1.25
Bakken 1554	106423	Sample #2	5/18/2020	0.281	-1.27
WTI 1590	106423	Sample #3	5/19/2020	0.244	-1.41
SGC CHOPS	106423	Sample #4	5/19/2020	0.188	-1.67
Eaglebine Light	106423	Sample #5	5/19/2020	0.315	-1.16
Bakken 1552	106423	Sample #6	5/29/2020	0.244	-1.41
WTI 1594	106423	Sample #7	5/29/2020	0.239	-1.43
Cold Lake 1567	106423	Sample #8	6/3/2020	0.095	-2.35
WCS 1556	106423	Sample #9	6/7/2020	0.091	-2.40
WTI 1549	106423	Sample #10	6/9/2020	0.182	-1.70
Bakken 1558	106423	Sample #11	6/9/2020	0.237	-1.44
WTS 1530	106423	Sample #12	6/13/2020	0.225	-1.49
AWB 1566	106423	Sample #13	6/13/2020	0.094	-2.36

HAP 106423 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	106423	0.209	-1.56	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-1.64		
Variance of natural log of test runs (σ^2)	0.196		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	7.23		
Denominator for calculation of flatness of z distribution (β_{2z})	0.047		
Flatness of z distribution (β_{2z})	154.44		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.50		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.213		
$\exp(2\mu + \sigma^2)$	0.046		
$\exp(\sigma^2) - 1$	0.216		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.017		
Square root term	0.10		

Confidence Level	99%	99.9%	99.5%
UPL	0.57	0.66	0.60

1,2-dimethylbenzene - 95476 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	95476	Sample #1	5/19/2020	0.180	-1.72
Bakken 1554	95476	Sample #2	5/18/2020	0.206	-1.58
WTI 1590	95476	Sample #3	5/19/2020	0.169	-1.78
SGC CHOPS	95476	Sample #4	5/19/2020	0.079	-2.54
Eaglebine Light	95476	Sample #5	5/19/2020	0.148	-1.91
Bakken 1552	95476	Sample #6	5/29/2020	0.186	-1.68
WTI 1594	95476	Sample #7	5/29/2020	0.161	-1.83
Cold Lake 1567	95476	Sample #8	6/3/2020	0.069	-2.67
WCS 1556	95476	Sample #9	6/7/2020	0.063	-2.76
WTI 1549	95476	Sample #10	6/9/2020	0.137	-1.99
Bakken 1558	95476	Sample #11	6/9/2020	0.167	-1.79
WTS 1530	95476	Sample #12	6/13/2020	0.143	-1.94
AWB 1566	95476	Sample #13	6/13/2020	0.063	-2.76

HAP 95476 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	95476	0.136	-1.99	13	12	Crude oil

Number of sources with test data			
n	13		
n-1	12		
Average of natural log of test run values (μ)	-2.07		
Variance of natural log of test runs (σ^2)	0.194		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	7.16		
Denominator for calculation of flatness of z distribution (β_{2z})	0.046		
Flatness of z distribution (β_{2z})	156.96		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.49		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.139		
$\exp(2\mu + \sigma^2)$	0.019		
$\exp(\sigma^2) - 1$	0.214		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.016		
Square root term	0.07		

Confidence Level	99%	99.9%	99.5%
UPL	0.37	0.42	0.39

i-propylbenzene - 98828 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	98828	Sample #1	5/19/2020	0.029	-3.53
Bakken 1554	98828	Sample #2	5/18/2020	0.036	-3.34
WTI 1590	98828	Sample #3	5/19/2020	0.039	-3.25
SGC CHOPS	98828	Sample #4	5/19/2020	0.020	-3.94
Eaglebine Light	98828	Sample #5	5/19/2020	0.022	-3.83
Bakken 1552	98828	Sample #6	5/29/2020	0.032	-3.45
WTI 1594	98828	Sample #7	5/29/2020	0.036	-3.33
Cold Lake 1567	98828	Sample #8	6/3/2020	0.013	-4.37
WCS 1556	98828	Sample #9	6/7/2020	0.009	-4.77
WTI 1549	98828	Sample #10	6/9/2020	0.040	-3.22
Bakken 1558	98828	Sample #11	6/9/2020	0.028	-3.57
WTS 1530	98828	Sample #12	6/13/2020	0.023	-3.79
AWB 1566	98828	Sample #13	6/13/2020	0.010	-4.66

HAP 98828 Averages and Calculation of UPL

Data Source	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	98828	0.026	-3.66	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-3.77		
Variance of natural log of test runs (σ^2)	0.279		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	9.90		
Denominator for calculation of flatness of z distribution (β_{2z})	0.103		
Flatness of z distribution (β_{2z})	95.85		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.88		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.026		
$\exp(2\mu + \sigma^2)$	0.001		
$\exp(\sigma^2) - 1$	0.321		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.025		
Square root term	0.02		

Confidence Level	99%	99.9%	99.5%
UPL	0.08	0.09	0.09

Summary of HAP% in Vapor

- Summary of Total and Individual Hazardous Air Pollutants in Vapor
  - Crude Information
  - Individual Hazardous Air Pollutants in Crude Samples

Summary of Total and Individual Hazardous Air Pollutants in Vapor

Crude Information

Crude Sample	Date of Sample	Location of Sample	Reid Vapor Pressure (psi)	Total HAP (wt%)
Kearl Heavy	5/19/2020	T-1571 Bayou Bridge Line	3.63	3.60%
Bakken 1554	5/18/2020	T-1554. DAPL Line	6.76	2.33%
WTI 1590	5/19/2020	T-1590 Line	4.76	2.83%
SGC CHOPS	5/19/2020	T-1543, CHOPS Line	4.06	1.79%
Eaglebine Light	5/19/2020	T-1553, Eagle "R" Line	6.56	1.31%
Bakken 1552	5/29/2020	Shore Tank 1552 Line	6.51	2.40%
WTI 1594	5/29/2020	Shore Tank 1594 Line	4.85	2.83%
Cold Lake 1567	6/3/2020	Shore Tank 1567 Line	3.06	2.33%
WCS 1556	6/7/2020	Shore Tank 1556 Line	2.52	2.71%
WTI 1549	6/9/2020	Shore Tank 1549 Line	4.71	2.20%
Bakken 1558	6/9/2020	Shore Tank 1558 Line	7.74	2.04%
WTS 1530	6/13/2020	Shore Tank 1530 Line	4.51	2.66%
AWB 1566	6/13/2020	Shore Tank 1566 Line	2.71	2.68%

Summary of Total and Individual Hazardous Air Pollutants in Vapor

Individual Hazardous Air Pollutants in Crude Samples

Crude Sample	Hexane	Benzene	Toluene	Ethylbenzene	1,2,4-Trimethylbenzene	1,3-dimethylbenzene	1,4-dimethylbenzene	1,2-dimethylbenzene	i-propylbenzene (Cumene)
	110543	**71432**	**108883**	**100414**	**95636**	**108383**	**106423**	**95476**	**98828**
Kearl Heavy	3.11%	0.19%	0.20%	0.01%	0.01%	0.04%	0.03%	0.01%	0.001%
Bakken 1554	2.08%	0.11%	0.08%	0.01%	0.01%	0.02%	0.02%	0.01%	0.001%
WTI 1590	2.40%	0.18%	0.18%	0.01%	0.00%	0.03%	0.02%	0.01%	0.002%
SGC CHOPS	1.65%	0.04%	0.05%	0.01%	0.00%	0.01%	0.02%	0.01%	0.001%
Eaglebine Light	1.13%	0.05%	0.07%	0.01%	0.00%	0.02%	0.02%	0.01%	0.001%
Bakken 1552	2.15%	0.11%	0.08%	0.01%	0.01%	0.02%	0.01%	0.01%	0.001%
WTI 1594	2.44%	0.16%	0.16%	0.01%	0.00%	0.03%	0.02%	0.01%	0.002%
Cold Lake 1567	2.07%	0.12%	0.10%	0.00%	0.00%	0.02%	0.01%	0.01%	0.001%
WCS 1556	2.42%	0.13%	0.11%	0.00%	0.00%	0.02%	0.01%	0.01%	0.001%
WTI 1549	1.85%	0.15%	0.14%	0.01%	0.00%	0.02%	0.01%	0.01%	0.002%
Bakken 1558	1.84%	0.09%	0.06%	0.00%	0.01%	0.02%	0.01%	0.01%	0.001%
WTS 1530	2.35%	0.12%	0.13%	0.01%	0.00%	0.02%	0.02%	0.01%	0.001%
AWB 1566	2.40%	0.14%	0.11%	0.00%	0.00%	0.02%	0.01%	0.01%	0.001%
Maximum HAP %	3.11%	0.19%	0.20%	0.01%	0.01%	0.04%	0.03%	0.01%	0.002%
Average HAP %	2.15%	0.12%	0.11%	0.01%	0.00%	0.02%	0.02%	0.01%	0.001%

Calculation of Vapor Weight %

- Summary of Hazardous Air Pollutants in Vapor – Kearl Heavy Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Bakken 1554 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – WTI 1590 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – SGC CHOPS Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Eaglebine Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Bakken 1552 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Kearl Heavy Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – WTI 1594 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Cold Lake 1567 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – WCS 1556 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – WTI 1549 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – Bakken 1558 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – WTS 1530 Crude Sample
- Summary of Hazardous Air Pollutants in Vapor – AWB 1566 Crude Sample

Summary of Hazardous Air Pollutants in Vapor

Kearl Heavy Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
Hexane	1.9559	6.99	1216.92	227.45	2.56	86.17	0.023	0.068	0.174	0.021	1.826	3.114%
Benzene	0.2215	6.81	1090.43	197.15	1.37	78.11	0.003	0.008	0.012	0.001	0.111	0.189%
Toluene	0.6526	7.14	1457.29	231.83	0.49	92.14	0.007	0.021	0.010	0.001	0.118	0.201%
Ethylbenzene	0.1258	7.16	1559.55	228.58	0.17	106.16	0.001	0.004	0.001	0.000	0.008	0.013%
1,3-dimethylbenzene	0.4295	7.18	1573.02	226.67	0.14	106.16	0.004	0.012	0.002	0.000	0.022	0.038%
1,4-dimethylbenzene	0.2874	7.15	1553.95	225.23	0.15	106.16	0.003	0.008	0.001	0.000	0.015	0.026%
1,2-dimethylbenzene	0.1795	7.15	1566.59	222.60	0.11	106.16	0.002	0.005	0.001	0.000	0.007	0.012%
i-propylbenzene	0.0294	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.000	0.001	0.001%
1,2,4-trimethylbenzene	0.232	7.29	1763.35	230.25	0.04	120.19	0.002	0.006	0.000	0.000	0.003	0.006%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

Bakken 1554 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	2.0406	6.99	1216.92	227.45	2.56	86.17	0.024	0.062	0.158	0.012	1.032	2.076%
Benzene	0.195	6.81	1090.43	197.15	1.37	78.11	0.002	0.006	0.009	0.001	0.053	0.106%
Toluene	0.431	7.14	1457.29	231.83	0.49	92.14	0.005	0.012	0.006	0.000	0.042	0.085%
Ethylbenzene	0.0920	7.16	1559.55	228.58	0.17	106.16	0.001	0.002	0.000	0.000	0.003	0.006%
1,3-dimethylbenzene	0.4187	7.18	1573.02	226.67	0.14	106.16	0.004	0.010	0.001	0.000	0.012	0.024%
1,4-dimethylbenzene	0.2809	7.15	1553.95	225.23	0.15	106.16	0.003	0.007	0.001	0.000	0.008	0.017%
1,2-dimethylbenzene	0.2056	7.15	1566.59	222.60	0.11	106.16	0.002	0.005	0.001	0.000	0.005	0.009%
i-propylbenzene	0.0356	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.000	0.001	0.001%
1,2,4-trimethylbenzene	0.4387	7.29	1763.35	230.25	0.04	120.19	0.004	0.009	0.000	0.000	0.003	0.007%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

WTI 1590 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.7903	6.99	1216.92	227.45	2.56	86.17	0.021	0.059	0.151	0.01465	1.263	2.395%
Benzene	0.2534	6.81	1090.43	197.15	1.37	78.11	0.003	0.009	0.013	0.00123	0.096	0.182%
Toluene	0.6859	7.14	1457.29	231.83	0.49	92.14	0.007	0.021	0.010	0.00101	0.093	0.177%
Ethylbenzene	0.1489	7.16	1559.55	228.58	0.17	106.16	0.001	0.004	0.001	0.00007	0.007	0.013%
1,3-dimethylbenzene	0.4018	7.18	1573.02	226.67	0.14	106.16	0.004	0.011	0.002	0.00015	0.016	0.030%
1,4-dimethylbenzene	0.2437	7.15	1553.95	225.23	0.15	106.16	0.002	0.006	0.001	0.00009	0.010	0.019%
1,2-dimethylbenzene	0.169	7.15	1566.59	222.60	0.11	106.16	0.002	0.005	0.001	0.00005	0.005	0.010%
i-propylbenzene	0.0389	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.00001	0.001	0.002%
1,2,4-trimethylbenzene	0.2269	7.29	1763.35	230.25	0.04	120.19	0.002	0.005	0.000	0.00002	0.003	0.005%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

SGC CHOPS Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.0103	6.99	1216.92	227.45	2.56	86.17	0.012	0.063	0.162	0.009	0.815	1.651%
Benzene	0.0492	6.81	1090.43	197.15	1.37	78.11	0.001	0.003	0.005	0.000	0.021	0.043%
Toluene	0.1597	7.14	1457.29	231.83	0.49	92.14	0.002	0.009	0.005	0.000	0.025	0.050%
Ethylbenzene	0.0717	7.16	1559.55	228.58	0.17	106.16	0.001	0.004	0.001	0.000	0.004	0.008%
1,3-dimethylbenzene	0.1271	7.18	1573.02	226.67	0.14	106.16	0.001	0.006	0.001	0.000	0.006	0.012%
1,4-dimethylbenzene	0.1877	7.15	1553.95	225.23	0.15	106.16	0.002	0.010	0.001	0.000	0.009	0.018%
1,2-dimethylbenzene	0.0785	7.15	1566.59	222.60	0.11	106.16	0.001	0.004	0.000	0.000	0.003	0.006%
i-propylbenzene	0.0195	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.000	0.001	0.001%
1,2,4-trimethylbenzene	0.1244	7.29	1763.35	230.25	0.04	120.19	0.001	0.006	0.000	0.000	0.002	0.003%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

Eaglebine Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.1846	6.99	1216.92	227.45	2.56	86.17	0.014	0.045	0.117	0.007	0.596	1.132%
Benzene	0.0943	6.81	1090.43	197.15	1.37	78.11	0.001	0.004	0.005	0.000	0.025	0.048%
Toluene	0.4054	7.14	1457.29	231.83	0.49	92.14	0.004	0.015	0.007	0.000	0.039	0.075%
Ethylbenzene	0.0814	7.16	1559.55	228.58	0.17	106.16	0.001	0.003	0.000	0.000	0.003	0.005%
1,3-dimethylbenzene	0.3342	7.18	1573.02	226.67	0.14	106.16	0.003	0.010	0.001	0.000	0.009	0.018%
1,4-dimethylbenzene	0.3146	7.15	1553.95	225.23	0.15	106.16	0.003	0.010	0.001	0.000	0.009	0.017%
1,2-dimethylbenzene	0.1483	7.15	1566.59	222.60	0.11	106.16	0.001	0.005	0.001	0.000	0.003	0.006%
i-propylbenzene	0.0218	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.000	0.000	0.001%
1,2,4-trimethylbenzene	0.2408	7.29	1763.35	230.25	0.04	120.19	0.002	0.007	0.000	0.000	0.002	0.004%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

Bakken 1552 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	2.0316	6.99	1216.92	227.45	2.56	86.17	0.024	0.067	0.172	0.012	1.054	2.150%
Benzene	0.195	6.81	1090.43	197.15	1.37	78.11	0.002	0.007	0.010	0.001	0.054	0.111%
Toluene	0.3902	7.14	1457.29	231.83	0.49	92.14	0.004	0.012	0.006	0.000	0.039	0.080%
Ethylbenzene	0.083	7.16	1559.55	228.58	0.17	106.16	0.001	0.002	0.000	0.000	0.003	0.006%
1,3-dimethylbenzene	0.3847	7.18	1573.02	226.67	0.14	106.16	0.004	0.010	0.001	0.000	0.011	0.023%
1,4-dimethylbenzene	0.2444	7.15	1553.95	225.23	0.15	106.16	0.002	0.007	0.001	0.000	0.007	0.015%
1,2-dimethylbenzene	0.1862	7.15	1566.59	222.60	0.11	106.16	0.002	0.005	0.001	0.000	0.004	0.009%
i-propylbenzene	0.0317	7.11	1577.97	220.98	0.08	120.19	0.000	0.001	0.000	0.000	0.001	0.001%
1,2,4-trimethylbenzene	0.3929	7.29	1763.35	230.25	0.04	120.19	0.003	0.009	0.000	0.000	0.003	0.007%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

WTI 1594 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.8191	6.99	1216.92	227.45	2.564	86.17	0.0211	0.0608	0.1559	0.0146	1.2620	2.439%
Benzene	0.2188	6.81	1090.43	197.15	1.374	78.11	0.0028	0.0081	0.0111	0.0010	0.0813	0.157%
Toluene	0.6294	7.14	1457.29	231.83	0.495	92.14	0.0068	0.0197	0.0097	0.0009	0.0843	0.163%
Ethylbenzene	0.1376	7.16	1559.55	228.58	0.171	106.16	0.0013	0.0037	0.0006	0.0001	0.0064	0.012%
1,3-dimethylbenzene	0.3836	7.18	1573.02	226.67	0.143	106.16	0.0036	0.0104	0.0015	0.0001	0.0149	0.029%
1,4-dimethylbenzene	0.2386	7.15	1553.95	225.23	0.148	106.16	0.0022	0.0065	0.0010	0.0001	0.0096	0.018%
1,2-dimethylbenzene	0.1607	7.15	1566.59	222.60	0.111	106.16	0.0015	0.0044	0.0005	0.0000	0.0048	0.009%
i-propylbenzene	0.0359	7.11	1577.97	220.98	0.082	120.19	0.0003	0.0009	0.0001	0.0000	0.0008	0.002%
1,2,4-trimethylbenzene	0.2233	7.29	1763.35	230.25	0.040	120.19	0.0019	0.0054	0.0002	0.0000	0.0024	0.005%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

Cold Lake 1567 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.239	6.99	1216.92	227.45	2.56	86.17	0.014	0.068	0.174	0.015	1.295	2.074%
Benzene	0.1358	6.81	1090.43	197.15	1.37	78.11	0.002	0.008	0.011	0.001	0.076	0.122%
Toluene	0.3101	7.14	1457.29	231.83	0.49	92.14	0.003	0.016	0.008	0.001	0.063	0.100%
Ethylbenzene	0.0424	7.16	1559.55	228.58	0.17	106.16	0.000	0.002	0.000	0.000	0.003	0.005%
1,3-dimethylbenzene	0.1831	7.18	1573.02	226.67	0.14	106.16	0.002	0.008	0.001	0.000	0.011	0.017%
1,4-dimethylbenzene	0.0953	7.15	1553.95	225.23	0.15	106.16	0.001	0.004	0.001	0.000	0.006	0.009%
1,2-dimethylbenzene	0.0692	7.15	1566.59	222.60	0.11	106.16	0.001	0.003	0.000	0.000	0.003	0.005%
i-propylbenzene	0.0126	7.11	1577.97	220.98	0.08	120.19	0.000	0.000	0.000	0.000	0.000	0.001%
1,2,4-trimethylbenzene	0.0804	7.29	1763.35	230.25	0.04	120.19	0.001	0.003	0.000	0.000	0.001	0.002%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

WCS 1556 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.2185	6.99	1216.92	227.45	2.56	86.17	0.014	0.067	0.171	0.018	1.569	2.420%
Benzene	0.1259	6.81	1090.43	197.15	1.37	78.11	0.002	0.008	0.010	0.001	0.087	0.134%
Toluene	0.2961	7.14	1457.29	231.83	0.49	92.14	0.003	0.015	0.008	0.001	0.074	0.114%
Ethylbenzene	0.0358	7.16	1559.55	228.58	0.17	106.16	0.000	0.002	0.000	0.000	0.003	0.005%
1,3-dimethylbenzene	0.1781	7.18	1573.02	226.67	0.14	106.16	0.002	0.008	0.001	0.000	0.013	0.020%
1,4-dimethylbenzene	0.0905	7.15	1553.95	225.23	0.15	106.16	0.001	0.004	0.001	0.000	0.007	0.010%
1,2-dimethylbenzene	0.0634	7.15	1566.59	222.60	0.11	106.16	0.001	0.003	0.000	0.000	0.004	0.005%
i-propylbenzene	0.0085	7.11	1577.97	220.98	0.08	120.19	0.000	0.000	0.000	0.000	0.000	0.001%
1,2,4-trimethylbenzene	0.0788	7.29	1763.35	230.25	0.04	120.19	0.001	0.003	0.000	0.000	0.002	0.002%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

WTI 1549 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.334	6.99	1216.92	227.45	2.564	86.17	0.015	0.051	0.130	0.011	0.951	1.848%
Benzene	0.197	6.81	1090.43	197.15	1.374	78.11	0.003	0.008	0.011	0.001	0.075	0.146%
Toluene	0.5135	7.14	1457.29	231.83	0.495	92.14	0.006	0.018	0.009	0.001	0.071	0.137%
Ethylbenzene	0.1574	7.16	1559.55	228.58	0.171	106.16	0.001	0.005	0.001	0.000	0.007	0.015%
1,3-dimethylbenzene	0.2697	7.18	1573.02	226.67	0.143	106.16	0.003	0.008	0.001	0.000	0.011	0.021%
1,4-dimethylbenzene	0.1819	7.15	1553.95	225.23	0.148	106.16	0.002	0.006	0.001	0.000	0.007	0.015%
1,2-dimethylbenzene	0.1368	7.15	1566.59	222.60	0.111	106.16	0.001	0.004	0.000	0.000	0.004	0.008%
i-propylbenzene	0.0401	7.11	1577.97	220.98	0.082	120.19	0.000	0.001	0.000	0.000	0.001	0.002%
1,2,4-trimethylbenzene	0.1796	7.29	1763.35	230.25	0.040	120.19	0.001	0.005	0.000	0.000	0.002	0.004%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

Bakken 1558 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	2.0674	6.99	1216.92	227.45	2.56	0.024	0.065	0.167	0.010	0.046	0.886	1.840%
Benzene	0.1844	6.81	1090.43	197.15	1.37	0.002	0.006	0.009	0.001	0.002	0.042	0.088%
Toluene	0.3682	7.14	1457.29	231.83	0.49	0.004	0.011	0.005	0.000	0.001	0.030	0.063%
Ethylbenzene	0.0797	7.16	1559.55	228.58	0.17	0.001	0.002	0.000	0.000	0.000	0.002	0.005%
1,3-dimethylbenzene	0.3574	7.18	1573.02	226.67	0.14	0.003	0.009	0.001	0.000	0.000	0.009	0.018%
1,4-dimethylbenzene	0.2374	7.15	1553.95	225.23	0.15	0.002	0.006	0.001	0.000	0.000	0.006	0.012%
1,2-dimethylbenzene	0.1673	7.15	1566.59	222.60	0.11	0.002	0.004	0.000	0.000	0.000	0.003	0.006%
i-propylbenzene	0.0282	7.11	1577.97	220.98	0.08	0.000	0.001	0.000	0.000	0.000	0.000	0.001%
1,2,4-trimethylbenzene	0.3669	7.29	1763.35	230.25	0.04	0.003	0.008	0.000	0.000	0.000	0.002	0.005%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

WTS 1530 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.7496	6.99	1216.92	227.45	2.564	86.17	0.020	0.068	0.176	0.015	1.291	2.350%
Benzene	0.1711	6.81	1090.43	197.15	1.374	78.11	0.002	0.007	0.010	0.001	0.068	0.123%
Toluene	0.4830	7.14	1457.29	231.83	0.495	92.14	0.005	0.018	0.009	0.001	0.069	0.125%
Ethylbenzene	0.1084	7.16	1559.55	228.58	0.171	106.16	0.001	0.003	0.001	0.000	0.005	0.010%
1,3-dimethylbenzene	0.3257	7.18	1573.02	226.67	0.143	106.16	0.003	0.010	0.001	0.000	0.013	0.024%
1,4-dimethylbenzene	0.2249	7.15	1553.95	225.23	0.148	106.16	0.002	0.007	0.001	0.000	0.010	0.017%
1,2-dimethylbenzene	0.1430	7.15	1566.59	222.60	0.111	106.16	0.001	0.005	0.001	0.000	0.005	0.008%
i-propylbenzene	0.0225	7.11	1577.97	220.98	0.082	120.19	0.000	0.001	0.000	0.000	0.001	0.001%
1,2,4-trimethylbenzene	0.1751	7.29	1763.35	230.25	0.040	120.19	0.001	0.005	0.000	0.000	0.002	0.004%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).

Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Summary of Hazardous Air Pollutants in Vapor

AWB 1566 Crude Sample

HAP	Liquid Mass %	A[2]	B	C	Vapor Pressure (psi)[3]	Molar Mass (lbmol)	Liquid Moles (mol)[4]	Liquid Mole Fraction[5]	Partial Pressure (psi)[6]	Vapor Mole Fraction[7]	Vapor Molar Mass Contribution[8]	Vapor Mass %[9]
n-Hexane	1.2939	6.99	1216.92	227.45	2.56	86.17	0.015	0.067	0.172	0.018	1.548	2.396%
Benzene	0.1366	6.81	1090.43	197.15	1.37	78.11	0.002	0.008	0.011	0.001	0.088	0.136%
Toluene	0.3018	7.14	1457.29	231.83	0.49	92.14	0.003	0.015	0.007	0.001	0.070	0.108%
Ethylbenzene	0.0331	7.16	1559.55	228.58	0.17	106.16	0.000	0.001	0.000	0.000	0.003	0.004%
1,3-dimethylbenzene	0.1779	7.18	1573.02	226.67	0.14	106.16	0.002	0.007	0.001	0.000	0.012	0.018%
1,4-dimethylbenzene	0.0942	7.15	1553.95	225.23	0.15	106.16	0.001	0.004	0.001	0.000	0.007	0.010%
1,2-dimethylbenzene	0.0632	7.15	1566.59	222.60	0.11	106.16	0.001	0.003	0.000	0.000	0.003	0.005%
i-propylbenzene	0.0095	7.11	1577.97	220.98	0.08	120.19	0.000	0.000	0.000	0.000	0.000	0.001%
1,2,4-trimethylbenzene	0.0744	7.29	1763.35	230.25	0.04	120.19	0.001	0.003	0.000	0.000	0.001	0.002%

[1] Vapor Mass % was evaluated for all components in crude sample; displaying only hazarous air pollutants.

[2] Antoine constants determined for each species at Temperature of 72.66 degrees Fahrenheit.

[3] Calculation for vapor pressure, AP 42 Chapter 7 equation (1-26).
Vapor Pressure (psi) = A-(B/(T +C)) X 14.7 psi/760 mmHg

[4] Liquid Moles = Liquid %wt / Molecular Weight

[5] Liquid Mole Fraction (mole frac.) = Liquid Moles / Total Liquid Moles

[6] Partial Pressure (psia) = Vapor Pressure X Liquid Mole Fraction

[7] Vapor Mole Fraction = Partial Pressure of HAP/ Total Vapor Pressure of Crude

[8] Vapor Molar Mass Contribution = Vapor Mole Fraction X Molecular Weight

[9] Vapor Mass % = Vapor Molar Mass Contribution of HAP/ Total Vapor Molar Mass

Calculation of UPL in Vapor

- Prediction Summary of Hazardous Air Pollutant Concentrations in Crude Oil
- N-Hexane
  - 110543 HAP Analysis Data
  - 110543 HAP Averages and Calculation of UPL
- Benzene
  - 71432 HAP Analysis Data
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- Toluene
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- Ethylbenzene
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- 1,2,4-trimethylbenzene
  - 95636 HAP Analysis Data
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- 1,3-dimethylbenzene
  - 108383 HAP Analysis Data
  - 108383 HAP Averages and Calculation of UPL
- 1,4-dimethylbenzene
  - 106423 HAP Analysis Data
  - 106423 HAP Averages and Calculation of UPL
- 1,2-dimethylbenzene
  - 95476 HAP Analysis Data
  - 95476 HAP Averages and Calculation of UPL
- i-propylbenzene
  - 98828 HAP Analysis Data
  - 98828 HAP Averages and Calculation of UPL

Prediction Summary of Hazardous Air Pollutant Concentrations in Crude Oil

Confidence Level

HAP	CAS No.	99%
n-Hexane	110543	4.09%
Benzene	71432	0.34%
Toluene	108883	0.29%
Ethylbenzene	100414	0.02%
1,2,4-Trimethylbenzene	95636	0.01%
1,3-dimethylbenzene	108383	0.05%
1,4-dimethylbenzene	106423	0.03%
1,2-dimethylbenzene	95476	0.02%
i-propylbenzene	98828	0.003%
Total		4.86%

n-Hexane - 110543 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	110543	Sample #1	5/19/2020	3.11%	-3.47
Bakken 1554	110543	Sample #2	5/18/2020	2.08%	-3.87
WTI 1590	110543	Sample #3	5/19/2020	2.40%	-3.73
SGC CHOPS	110543	Sample #4	5/19/2020	1.65%	-4.10
Eaglebine Light	110543	Sample #5	5/19/2020	1.13%	-4.48
Bakken 1552	110543	Sample #6	5/29/2020	2.15%	-3.84
WTI 1594	110543	Sample #7	5/29/2020	2.44%	-3.71
Cold Lake 1567	110543	Sample #8	6/3/2020	2.07%	-3.88
WCS 1556	110543	Sample #9	6/7/2020	2.42%	-3.72
WTI 1549	110543	Sample #10	6/9/2020	1.85%	-3.99
Bakken 1558	110543	Sample #11	6/9/2020	1.84%	-4.00
WTS 1530	110543	Sample #12	6/13/2020	2.35%	-3.75
AWB 1566	110543	Sample #13	6/13/2020	2.40%	-3.73

HAP 110543 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	110543	0.02	-3.84	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-3.87		
Variance of natural log of test runs (σ^2)	0.06		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	4.05		
Denominator for calculation of flatness of z distribution (β_{2z})	0.00		
Flatness of z distribution (β_{2z})	1061.76		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	0.76		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp ($\mu + (\sigma/2)$)	0.022		
exp ($2\mu + \sigma^2$)	0.0005		
exp (σ^2) - 1	0.062		
(σ^2/n) + [$\sigma^4/(2(n - 1))$]	0.005		
Square root term	0.01		

Confidence Level	99%	99.9%	99.5%
UPL	4.1%	4.5%	4.3%

Benzene - 71432 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	71432	Sample #1	5/19/2020	0.189%	-6.27
Bakken 1554	71432	Sample #2	5/18/2020	0.106%	-6.85
WTI 1590	71432	Sample #3	5/19/2020	0.182%	-6.31
SGC CHOPS	71432	Sample #4	5/19/2020	0.043%	-7.75
Eaglebine Light	71432	Sample #5	5/19/2020	0.048%	-7.64
Bakken 1552	71432	Sample #6	5/29/2020	0.111%	-6.81
WTI 1594	71432	Sample #7	5/29/2020	0.157%	-6.46
Cold Lake 1567	71432	Sample #8	6/3/2020	0.122%	-6.71
WCS 1556	71432	Sample #9	6/7/2020	0.134%	-6.62
WTI 1549	71432	Sample #10	6/9/2020	0.146%	-6.53
Bakken 1558	71432	Sample #11	6/9/2020	0.088%	-7.04
WTS 1530	71432	Sample #12	6/13/2020	0.123%	-6.70
AWB 1566	71432	Sample #13	6/13/2020	0.136%	-6.60

HAP 71432 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Fuel
Nederland Crude	71432	0.00	-6.71	13	12	Material

Number of sources with test data			
n	13		
n-1	12		
Average of natural log of test run values (μ)	-6.79		
Variance of natural log of test runs (σ^2)	0.20		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	7.49		
Denominator for calculation of flatness of z distribution (β_{2z})	0.05		
Flatness of z distribution (β_{2z})	144.74		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.54		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp ($\mu + (\sigma/2)$)	0.001		
exp ($2\mu + \sigma^2$)	0.000002		
exp (σ^2) - 1	0.227		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.018		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.0034	0.0039	0.0036

Toluene - 10883 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	108883	Sample #1	5/19/2020	0.201%	-6.21
Bakken 1554	108883	Sample #2	5/18/2020	0.085%	-7.07
WTI 1590	108883	Sample #3	5/19/2020	0.177%	-6.34
SGC CHOPS	108883	Sample #4	5/19/2020	0.050%	-7.59
Eaglebine Light	108883	Sample #5	5/19/2020	0.075%	-7.20
Bakken 1552	108883	Sample #6	5/29/2020	0.080%	-7.13
WTI 1594	108883	Sample #7	5/29/2020	0.163%	-6.42
Cold Lake 1567	108883	Sample #8	6/3/2020	0.100%	-6.91
WCS 1556	108883	Sample #9	6/7/2020	0.114%	-6.78
WTI 1549	108883	Sample #10	6/9/2020	0.137%	-6.59
Bakken 1558	108883	Sample #11	6/9/2020	0.063%	-7.37
WTS 1530	108883	Sample #12	6/13/2020	0.125%	-6.68
AWB 1566	108883	Sample #13	6/13/2020	0.108%	-6.83

HAP 10883 Averages and Calculation of UPL

UnitID	**Pollutant**	**Test Average**	**ln (Test Average)**	**Number of test runs in average**	**Num test runs - 1**	**Material**
Nederland Crude	10883	0.00	-6.78	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-6.86
Variance of natural log of test runs (σ^2)	0.17
m (test runs in test condition)	1
Numerator for calculation of flatness of z distribution (β_{2z})	6.50
Denominator for calculation of flatness of z distribution (β_{2z})	0.03
Flatness of z distribution (β_{2z})	191.15
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.37

Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79

$\exp(\mu + (\sigma/2))$	0.001
$\exp(2\mu + \sigma^2)$	0.0000
$\exp(\sigma^2) - 1$	0.184
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.014
Square root term	0.00

Confidence Level	99%	99.9%	99.5%
UPL	0.0029	0.0033	0.0031

Ethylbenzene - 100414 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	100414	Sample #1	5/19/2020	0.013%	-8.92
Bakken 1554	100414	Sample #2	5/18/2020	0.006%	-9.68
WTI 1590	100414	Sample #3	5/19/2020	0.013%	-8.93
SGC CHOPS	100414	Sample #4	5/19/2020	0.008%	-9.46
Eaglebine Light	100414	Sample #5	5/19/2020	0.005%	-9.87
Bakken 1552	100414	Sample #6	5/29/2020	0.006%	-9.74
WTI 1594	100414	Sample #7	5/29/2020	0.012%	-9.00
Cold Lake 1567	100414	Sample #8	6/3/2020	0.005%	-9.96
WCS 1556	100414	Sample #9	6/7/2020	0.005%	-9.96
WTI 1549	100414	Sample #10	6/9/2020	0.015%	-8.83
Bakken 1558	100414	Sample #11	6/9/2020	0.005%	-9.96
WTS 1530	100414	Sample #12	6/13/2020	0.010%	-9.24
AWB 1566	100414	Sample #13	6/13/2020	0.004%	-10.10

HAP 100414 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	100414	0.00	-9.41	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-9.51		
Variance of natural log of test runs (σ^2)	0.22		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	7.95		
Denominator for calculation of flatness of z distribution (β_{2z})	0.06		
Flatness of z distribution (β_{2z})	130.90		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.61		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp (μ + (σ/2))	0.000		
exp ($2\mu + \sigma^2$)	0.0000		
exp (σ^2) - 1	0.246		
(σ^2/n) + [σ^4/(2(n - 1))]	0.019		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.00023	0.00027	0.00024

1,2,4-trimethylbenzene - 95636 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	95636	Sample #1	5/19/2020	0.006%	-9.75
Bakken 1554	95636	Sample #2	5/18/2020	0.007%	-9.56
WTI 1590	95636	Sample #3	5/19/2020	0.005%	-9.95
SGC CHOPS	95636	Sample #4	5/19/2020	0.003%	-10.35
Eaglebine Light	95636	Sample #5	5/19/2020	0.004%	-10.23
Bakken 1552	95636	Sample #6	5/29/2020	0.007%	-9.64
WTI 1594	95636	Sample #7	5/29/2020	0.005%	-9.96
Cold Lake 1567	95636	Sample #8	6/3/2020	0.002%	-10.76
WCS 1556	95636	Sample #9	6/7/2020	0.002%	-10.61
WTI 1549	95636	Sample #10	6/9/2020	0.004%	-10.15
Bakken 1558	95636	Sample #11	6/9/2020	0.005%	-9.88
WTS 1530	95636	Sample #12	6/13/2020	0.004%	-10.21
AWB 1566	95636	Sample #13	6/13/2020	0.002%	-10.74

HAP 95636 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	95636	0.00	-10.07	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-10.14
Variance of natural log of test runs (σ^2)	0.16
m (test runs in test condition)	1
Numerator for calculation of flatness of z distribution (β_{2z})	6.22
Denominator for calculation of flatness of z distribution (β_{2z})	0.03
Flatness of z distribution (β_{2z})	211.33
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.31

Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79

$\exp(\mu + (\sigma/2))$	0.000
$\exp(2\mu + \sigma^2)$	0.0000
$\exp(\sigma^2) - 1$	0.172
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.013
Square root term	0.00

Confidence Level	99%	99.9%	99.5%
UPL	0.00011	0.00012	0.00011

1,3-dimethylbenzene - 108383 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	108383	Sample #1	5/19/2020	0.038%	-7.87
Bakken 1554	108383	Sample #2	5/18/2020	0.024%	-8.34
WTI 1590	108383	Sample #3	5/19/2020	0.030%	-8.11
SGC CHOPS	108383	Sample #4	5/19/2020	0.012%	-9.06
Eaglebine Light	108383	Sample #5	5/19/2020	0.018%	-8.63
Bakken 1552	108383	Sample #6	5/29/2020	0.023%	-8.39
WTI 1594	108383	Sample #7	5/29/2020	0.029%	-8.15
Cold Lake 1567	108383	Sample #8	6/3/2020	0.017%	-8.67
WCS 1556	108383	Sample #9	6/7/2020	0.020%	-8.53
WTI 1549	108383	Sample #10	6/9/2020	0.021%	-8.47
Bakken 1558	108383	Sample #11	6/9/2020	0.018%	-8.63
WTS 1530	108383	Sample #12	6/13/2020	0.024%	-8.32
AWB 1566	108383	Sample #13	6/13/2020	0.018%	-8.60

HAP 108383 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	108383	0.00	-8.40	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-8.44		
Variance of natural log of test runs (σ^2)	0.09		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	4.66		
Denominator for calculation of flatness of z distribution (β_{2z})	0.01		
Flatness of z distribution (β_{2z})	514.59		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	0.96		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp (μ + (σ/2))	0.000		
exp ($2\mu + \sigma^2$)	0.0000		
exp (σ^2) - 1	0.095		
(σ^2/n) + [σ^4/(2(n - 1))]	0.007		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.00048	0.00053	0.00050

1,4-dimethylbenzene - 106423 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	106423	Sample #1	5/19/2020	0.026%	-8.24
Bakken 1554	106423	Sample #2	5/18/2020	0.017%	-8.71
WTI 1590	106423	Sample #3	5/19/2020	0.019%	-8.58
SGC CHOPS	106423	Sample #4	5/19/2020	0.018%	-8.64
Eaglebine Light	106423	Sample #5	5/19/2020	0.017%	-8.66
Bakken 1552	106423	Sample #6	5/29/2020	0.015%	-8.81
WTI 1594	106423	Sample #7	5/29/2020	0.018%	-8.60
Cold Lake 1567	106423	Sample #8	6/3/2020	0.009%	-9.29
WCS 1556	106423	Sample #9	6/7/2020	0.010%	-9.17
WTI 1549	106423	Sample #10	6/9/2020	0.015%	-8.83
Bakken 1558	106423	Sample #11	6/9/2020	0.012%	-9.01
WTS 1530	106423	Sample #12	6/13/2020	0.017%	-8.65
AWB 1566	106423	Sample #13	6/13/2020	0.010%	-9.20

HAP 106423 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	106423	0.00	-8.76	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-8.80		
Variance of natural log of test runs (σ^2)	0.09		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	4.63		
Denominator for calculation of flatness of z distribution (β_{2z})	0.01		
Flatness of z distribution (β_{2z})	530.84		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	0.95		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp ($\mu + (\sigma/2)$)	0.000		
exp ($2\mu + \sigma^2$)	0.0000		
exp (σ^2) - 1	0.093		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.007		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.00033	0.00037	0.00035

1,2-dimethylbenzene - 95476 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	95476	Sample #1	5/19/2020	0.012%	-9.00
Bakken 1554	95476	Sample #2	5/18/2020	0.009%	-9.31
WTI 1590	95476	Sample #3	5/19/2020	0.010%	-9.23
SGC CHOPS	95476	Sample #4	5/19/2020	0.006%	-9.80
Eaglebine Light	95476	Sample #5	5/19/2020	0.006%	-9.70
Bakken 1552	95476	Sample #6	5/29/2020	0.009%	-9.37
WTI 1594	95476	Sample #7	5/29/2020	0.009%	-9.28
Cold Lake 1567	95476	Sample #8	6/3/2020	0.005%	-9.90
WCS 1556	95476	Sample #9	6/7/2020	0.005%	-9.82
WTI 1549	95476	Sample #10	6/9/2020	0.008%	-9.41
Bakken 1558	95476	Sample #11	6/9/2020	0.006%	-9.65
WTS 1530	95476	Sample #12	6/13/2020	0.008%	-9.39
AWB 1566	95476	Sample #13	6/13/2020	0.005%	-9.89

HAP 95476 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	95476	0.00	-9.48	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-9.52		
Variance of natural log of test runs (σ^2)	0.08		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	4.52		
Denominator for calculation of flatness of z distribution (β_{2z})	0.01		
Flatness of z distribution (β_{2z})	591.50		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	0.91		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
exp (μ + (σ/2))	0.000		
exp (2μ + σ^2)	0.0000		
exp (σ^2) - 1	0.087		
(σ^2/n) + [σ^4/(2(n - 1))]	0.007		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.00016	0.00018	0.00017

i-propylbenzene - 98828 HAP Crude Oil Analysis Data

Crude Sample	Pollutant CAS No.	Sample Number	Test Date	Test Run Emission Value (Mass %)	ln (Run Value)
Kearl Heavy	98828	Sample #1	5/19/2020	0.0015%	-11.11
Bakken 1554	98828	Sample #2	5/18/2020	0.0012%	-11.36
WTI 1590	98828	Sample #3	5/19/2020	0.0017%	-11.00
SGC CHOPS	98828	Sample #4	5/19/2020	0.0010%	-11.49
Eaglebine Light	98828	Sample #5	5/19/2020	0.0007%	-11.92
Bakken 1552	98828	Sample #6	5/29/2020	0.0011%	-11.44
WTI 1594	98828	Sample #7	5/29/2020	0.0015%	-11.08
Cold Lake 1567	98828	Sample #8	6/3/2020	0.0007%	-11.90
WCS 1556	98828	Sample #9	6/7/2020	0.0005%	-12.13
WTI 1549	98828	Sample #10	6/9/2020	0.0018%	-10.94
Bakken 1558	98828	Sample #11	6/9/2020	0.0008%	-11.73
WTS 1530	98828	Sample #12	6/13/2020	0.0010%	-11.55
AWB 1566	98828	Sample #13	6/13/2020	0.0006%	-12.09

HAP 98828 Averages and Calculation of UPL

UnitID	Pollutant	Test Average	ln (Test Average)	Number of test runs in average	Num test runs - 1	Material
Nederland Crude	98828	0.00	-11.44	13	12	Crude oil

Number of sources with test data	
n	13
n-1	12

Average of natural log of test run values (μ)	-11.52		
Variance of natural log of test runs (σ^2)	0.17		
m (test runs in test condition)	1		
Numerator for calculation of flatness of z distribution (β_{2z})	6.53		
Denominator for calculation of flatness of z distribution (β_{2z})	0.03		
Flatness of z distribution (β_{2z})	189.11		
Skewness of z distribution ($\sqrt{\beta_{1z}}$)	1.37		
Confidence level	normalization >0.99	normalization >0.999	normalization >0.995
Smallest value in column A that is larger than confidence level	0.991	0.999	0.996
z-value	3.48	4.29	3.79
$\exp(\mu + (\sigma/2))$	0.000		
$\exp(2\mu + \sigma^2)$	0.0000		
$\exp(\sigma^2) - 1$	0.186		
$(\sigma^2/n) + [\sigma^4/(2(n - 1))]$	0.014		
Square root term	0.00		

Confidence Level	99%	99.9%	99.5%
UPL	0.00003	0.00003	0.00003

Calculation of HAP Emissions from Marine Loading

- Normal Operations Emission Calculations: BMOP – Loading Operations
- Hazardous Air Pollutants

Normal Operations Emission Calculations

BMOP - Loading Operations

Maximum Hourly Loading Rate [1]	=	80,000	bbl/hr
	=	3,360	1,000 gal/hr
Maximum Annual Loading Rate [1]	=	700,800,000	bbl/yr
	=	29,433,600	1,000 gal/yr

Crude Oil Loading Specifications		Maximum	Annual	
Arrival Emission Factor [2]	=	0.86	0.86	
Loading Temperature [1]	=	550	532	°R
Vapor Molecular Weight [1]	=	50	50	lb/lbmol
Crude Oil Liquid Molecular Weight [1]	=	207	207	lb/lbmol
True Vapor Pressure [1]	=	10.99	9.00	psia
Liquid H_2S Partition [3]	=	25	21	
H2S Molecular Weight	=	34.1	34.1	lb/lbmol

Criteria Pollutants

Pollutant	Emission Factor Basis		Hourly Emission Factor		Annual Emission Factor		Hourly Loading Emission	Annual Loading Emission
			Value	Units	Value	Units	(lb/hr)	(tons/yr)
VOC	AP-42	[2]	1.61	lb/1,000 gal	1.48	lb/1,000 gal	5,422	21,840
H_2S	Site Specific	[3], [4]	125	ppmw	5.00	ppmw	70.15	9.49

[1] Based on current project design specifications, provided by BMOP. Molecular weight referenced from AP-42, Chapter 7, Table 7.1-2.

[2] Per AP-42, Table 5.2-3 for crude oil loading into ships (uncleaned). Total loading loss based on AP-42, Section 5.2 Equations 2 and 3 (06/08).

[3] Mass balance based and liquid H_2S partion factors from the Petroleum Processing Handbook, McGraw-Hill, New York, Figure 12-71, page 12-93. Short-term H2S concentration from Nederland permit basis.

[4] Annual mass H2S emissions calculated from a conservative assumption of 5 ppmw. The average of all samples from Nederland (>3000 samples) is 1.31 ppmw.

Normal Operations Emission Calculations

BMOP - Loading Operations

Hazardous Air Pollutants

Crude Oil HAP Speciation (%)[5]			99% UPL[6]	99% UPL[7]	Nederland Basis[8]	Maximum HAP[9]	Hourly Emissions[10]	Annual Emissions
HAP	**Mass %, liquid**	**Mass %, vapor**	**Mass %, liquid**	**Mass %, vapor**	**Mass %, vapor**	**Mass %, vapor**	**lb/hr**	**tpy**
Hexane	2.07%	3.11%	3.09%	4.09%	3.38%	4.09%	221.8	893.2
Benzene	0.25%	0.19%	0.46%	0.34%	0.80%	0.80%	43.40	174.8
Toluene	0.69%	0.20%	1.10%	0.29%	0.36%	0.36%	19.27	77.61
Ethylbenzene	0.16%	0.01%	0.29%	0.02%	0.05%	0.05%	2.69	10.85
1,2,4-Trimethylbenzene	0.44%	0.007%	0.76%	0.01%		0.01%	0.58	2.33
1,3-dimethylbenzene	0.43%	0.04%	0.79%	0.05%		0.05%	2.58	10.41
1,4-dimethylbenzene	0.31%	0.03%	0.57%	0.03%		0.03%	1.80	7.25
1,2-dimethylbenzene (Xylene)	0.21%	0.01%	0.37%	0.02%	0.21%	0.21%	11.26	45.36
i-propylbenzene (Cumene)	0.04%	0.002%	0.08%	0.003%	0.006%	0.01%	0.32	1.28
Biphenyl[6]					0.00002%	0.00002%	0.001	0.004
Cresols[6]					0.0007%	0.001%	0.04	0.16
Naphthalene[6]					0.0006%	0.001%	0.03	0.14
Phenol[6]					0.001%	0.001%	0.08	0.33
Total HAP	**4.59%**	**3.60%**	**7.50%**	**4.86%**	**4.80%**	**5.60%**	**303.8**	**1,224**

[5] Maximum mass % in liquid of individual HAP from 13 samples of various crude types taken at Nederland from May and June 2020 and analyzed per Method D7900, *Standard Test Method for Determination of Light Hydrocarbons in Stabilized Crude Oils by Gas Chromatography*.
Vapor weight percent calculated assuming annual average temperature.

[6] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in liquid, based on the results of the 13 samples from Nederland, by individual HAP.

[7] Calculation of the 99% Upper Prediction Limit (UPL) mass percent in vapor, based on the calculated vapor speciation using results of the 13 samples from Nederland, by individual HAP.

[8] Speciated VOC components, vapor weight %, from the permit basis for the Nederland Terminal, which references Table 3-1 of API Publication 1673 (May 1998), and factors obtained from Mr. James Durham, EPA Office of Air Quality Planning and Standards.

[9] The maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP.

[10] Calculated as a percent of VOC emissions, as the crude samples demonstrated >99.9% is VOC.
Note that the "Total HAP" is the sum of all max individual HAP from the 13 samples.

APPENDIX D. VAPOR CAPTURE AND CONTROL ANALYSIS

VCU Platform Drawings

- WC509 VCU Isometric
- WC509 VCU Platform Layout
- WC509 VCU Plot

REFERENCE DRAWINGS

REV	DESCRIPTION	BY	DATE	CHK'D	APP'D
1	ISSUED FOR PERMIT	BWC			
0	ISSUED FOR PERMIT	BWC			

FACILITY CODE OR ACCOUNT NO:

CONSTRUCTION YEAR: –

	BY	DATE
DRAWN	BWC	07–16–2020
CHECK	EZ	
APPROVED	EZ	–

SCALE: AS SHOWN

PROJECT CONSULTING SERVICES, INC.
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002–7406
(504) 833–5321 Fax (504) 833–4940
www.projectconsulting.com

BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
FILED ISOMETRIC
WITH VAPOR CONTROL

WBS NO.

OLD DRAWING NO.

DRAWING NO.
BMOP-WC509.006

REV. NO.
1

FILENAME: P:\Workspaces\BCook\18220_STINGRAY OFFSHORE\18220_ET WC509.006.dwg PLOTTED: 9/11/2020 8:43:12 AM PLOTTED BY: ––––

09–11–20 8:28 18220 08 BWC 18220_ET WC509.006.DWG

REFERENCE DRAWINGS

REV	DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT	BWC	07-01-20	EZ	

FACILITY CODE OR ACCOUNT NO:
CONSTRUCTION YEAR: –

	BY	DATE
DRAWN	BWC	03-12-2020
CHECK	EZ	
APPROVED	EZ	–

SCALE: AS SHOWN

PROJECT CONSULTING SERVICES, INC.
3300 WEST ESPLANADE AVE., S., SUITE 500
METAIRIE, LA 70002-7406
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www.projectconsulting.com

BLUE MARLIN
OFFSHORE
PORT LLC

BLUE MARLIN OFFSHORE PORT LLC
BMOP PROJECT (PRIMARY OPTION)
WC509B DEEPWATER PORT (DWP)
COMPLEX ISOMETRIC
WITH VAPOR CONTROL

WBS NO.
OLD DRAWING NO.
DRAWING NO. BMOP-WC509.007
REV. NO. 0

FILENAME: P:\Workspaces\BCook\18220_STINGRAY OFFSHORE\18220_ET WC509.007.dwg PLOTTED: 7/30/2020 3:16:55 PM PLOTTED BY: ----

07-30-20 15:12 18220 05 BWC 18220_ET WC509.007.DWG

COORDINATE PROJECTION: UTM,
NAD83, ZONE 15, US FOOT;
CENTRAL MERIDIAN 93°W –
LAT-LONG SHOWN IN NAD27

DWG. NO.	REFERENCE DRAWING TITLE	NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
		C	REVISE VCU PLATFORM, RISERS AND BRIDGE LOCATION, UPDATE VCU RISER'S #1 AND #2 LAT-LON'S AND 20" VAPOR RETURN ROUTE #1 AND #2 LENGTHS	GJD	8-4-20	JHE	TO
		B	REVISE PLEM #2 LOCATION, UPDATE LAT-LONGS	GJD	7-21-20	JHE	TO
		A	ISSUED FOR REVIEW	GJD	6-15-20	JHE	TO

DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	BY	DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE: FILE NAME:					

P.L./STA. NO.
ACCOUNT NO.
CONSTRUCTION YEAR

	BY	DATE
DESIGN	JHE	06-15-20
DRAWN	GJD	06-15-20
ASBUILT		

FILE NO.
SCALE:

ENERGY TRANSFER™

BLUE MARLIN OFFSHORE PORT
(BMOP)
CRUDE OIL PIPELINE
WC509 VCU PIPELINE ROUTES
WEST CAMERON BLOCK 509 SURVEY AREA

PROJECT NO.
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO.
BMOP-WC509-VCU
C
SHEET 1 OF 1

08-04-20 08:30 4 GJD 18220 18220_BMOP-WC509-VCU.DWG

Vapor Capture and Control Cost Analysis

- Cost Evaluation for Control of Vapors from Loading Crude Oil into VLCCs
- Estimated VCU-Related Downtime

[redacted]

[redacted]

Environmental Impacts of Vapor Capture and Control

- Vapor Combustion Unit Emissions
- VCU Platform Diesel Generator Emissions
- Fuel Supply Vessel Transport Emissions
  - Criteria and Greenhouse Gas Emissions
  - Hazardous Air Pollutant Emissions
- VCU Additional Air Emissions Summary

Blue Marlin Offshore Port, LLC
Vapor Combustion Unit Emissions

VCU Additional Emissions Summary

EPN	NO_X	CO	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
	tpy	tpy	tpy	tpy	tpy
VCU-1	27.43	125.9	3.03	3.41	75,382
VCU-2	27.43	125.9	3.03	3.41	75,382
VCU-3	27.43	125.9	3.03	3.41	75,382

Loading Losses

Annual Loading Loss[1]	Loading Loss w/ VCU Outages[2]
tpy	tpy
21,840	10,467

[1] The annual loading loss of VOC emissions from marine loading at the design Project capacity. Basis for John Zink VCU specifications.

[2] The annual loading loss of VOC emissions from marine loading at the reduced operating capacity of the Project due to reduced availability with vapor capture.

SO_2

Maximum Mass Ratio of H_2S in Crude Oil[3]	Maximum Mass Ratio of SO_2 in Crude Oil	SO_2 Annual Emissions
lb H_2S/lb VOC	lb SO_2/lb VOC	tpy
4.35E-04	8.69E-04	9.10

[3] Based on 5 ppmw H_2S in crude oil.

NO_X & CO (per VCU)

NO_X EF[1] lb/MMBtu	CO EF[4] lb/MMBtu	Max Hourly Firing Rate[1] MMBtu/hr	Annual Average Firing Rate[5] MMBtu/yr	NO_X Annual Emissions tpy	CO Annual Emissions tpy	PM EF[6] lb/MMBtu	PM Annual Emissions tpy
0.06	0.28	218	914,315	27.43	125.9	0.01	3.41

[4] TCEQ publication RG-360A/11, Revised February 2012, page A-54.

[5] The maximum hourly firing rate based on VCU design specifications, based on the hours of operation in consideration of VCU outages.

[6] Total PM from AP-42, Section 1.4, *National Gas Combustion*, Table 1.4-2.

GHG per VCU

Heat Rate	CO_2 EF[7]	CH_4 EF[7]	N_2O EF[7]	GWP			CO_2 Annual Emissions	CH_4 Annual Emissions	N_2O EF Annual Emissions	CO_2e Annual Emissions
MMBtu/yr	kg/MMBtu	kg/MMBtu	kg/MMBtu	CO2	CH4	N2O	tpy	tpy	tpy	tpy
914,315	74.54	0.003	0.0006	1	25	298	75,126	3.02	0.60	75,382

[7] Emission factors from 40 CFR 98 Subpart C

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VCU Platform Diesel Generator

		Cat 3512C	
Engine Rating [1]	=	1,360	kW
	=	1,824	HP
Total Operating Time [1]	=	4,198	hrs/yr
Operating load [1]	=	100%	
Total number Main Engines [1]	=	1	
Fuel Type [1]	=	Diesel	
Average Brake-Specific Fuel Consumption [2]	=	7,000	Btu/HP-hr
Average Higher Heating Value (HHV) [2]	=	19,300	Btu/lb

Criteria Pollutants

Pollutant	Emission Factor Basis		Emission Factor Value	Emission Factor Units	Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
PM $_{\text{Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
$PM_{10,\text{ Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
$PM_{2.5,\text{ Filterable}}$	EPA	[3]	0.03	g/HP-hr	0.12	0.25
PM $_{\text{Condensable}}$	AP-42	[2]	5.39E-05	lb/HP-hr	0.10	0.21
NO_x	EPA	[3]	5.46	g/HP-hr	21.95	46.08
SO_2	Fuel S Content	[4]	7.11E-04	lb/HP-hr	1.30	2.72
CO	EPA	[3]	0.48	g/HP-hr	1.93	4.05
VOC	EPA	[3]	0.12	g/HP-hr	0.48	1.01
H_2SO_4	Fuel S Content	[4]	2.22E-05	lb/HP-hr	0.04	8.50E-02

[1] Based on VCU blower power needs.

[2] Emission factors are based on AP-42 Chapter 3, Tables 3.4-1 and 2, Emission Factors for Large Stationary Diesel and all Stationary Dual-fuel Engines (October 1996). An average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-

[3] Per 40 CFR 60.4205(b) and Table 1 of 40 CFR 89.112. Conservatively assume that NO_X and VOC emissions are equivalent to the NMHC + NO_X emissions limit. Conservatively assume that filterable $PM=PM_{10}=PM_{2.5}$.

[4] Sulfur content of 0.1 % is used for all diesel combustion sources per IMO 2015 standards. Emissions calculated based on a max 1000 ppm S in diesel fuel assuming that 98 percent of sulfur in the fuel is oxidized to SO2 (MW=32 g/mol) and 2 percent of sulfur in the fuel is oxidized to H2SO4 (MW=98 g/mol) based on Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines, EPA420-R-03-008, April

[5] Per footnote f of AP-42 Chapter 3, Table 3.4-1, non methane VOC emission factor has calculated as 91% of TOC emission factor.

Hazardous Air Pollutants

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
Acetaldehyde	AP-42	[6], [7]	2.52E-05	lb/MMBtu	3.22E-04	6.75E-04
Acrolein	AP-42	[6], [7]	7.88E-06	lb/MMBtu	1.01E-04	2.11E-04
Benzene	AP-42	[6], [7]	7.76E-04	lb/MMBtu	9.91E-03	2.08E-02
Formaldehyde	AP-42	[6], [7]	7.89E-05	lb/MMBtu	1.01E-03	2.11E-03
Toluene	AP-42	[6], [7]	2.81E-04	lb/MMBtu	3.59E-03	7.53E-03
Xylenes	AP-42	[6], [7]	1.93E-04	lb/MMBtu	2.46E-03	5.17E-03
Total PAH	AP-42	[6], [7]	2.12E-04	lb/MMBtu	2.71E-03	5.68E-03
Total VOC HAPs					**2.01E-02**	**4.22E-02**

[6] Emission factors based on AP-42, Chapter 3, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (October 1996).

[7] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

Greenhouse Gases

Pollutant	Emission Factor Basis		Emission Factor		Hourly Emissions	Annual Emissions
			Value	Units	(lb/hr)	(tons/yr)
CO_2	EPA	[8], [11]	73.96	kg/MMBtu	2,082	4,369.5
CH_4	EPA	[9], [11]	3.00E-03	kg/MMBtu	8.44E-02	0.18
N_2O	EPA	[9], [11]	6.00E-04	kg/MMBtu	1.69E-02	0.04
CO_2e	EPA	[10]			**2,089**	**4,384.5**

[8] Emission factor based on 40 CFR 98 Subpart C, Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. The emission factor for Distillate Fuel Oil No. 2 was used to calculate emissions.

[9] Emission factors based on 40 CFR 98 Subpart C, Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel. The emission factor for petroleum (All types in table C-1) was used to calculate emissions.

[10] CH_4, CO_2 and N_2O are included in the emissions of CO_2 equivalent (CO_2e), weighted according to their global warming potential (GWP). The GWP was obtained from table A-1 to Subpart A of Part 98. This is consistent with TCEQ 2015 guidance: https://www.tceq.texas.gov/assets/public/permitting/air/factsheets/factsheets-psdghg-6291.pdf

[11] An average BSFC of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr to calculate emissions.

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Fuel Supply Vessel Transport from Port of New Orleans to WC509VCU - Criteria and Greenhouse Gas Emissions

	Emission Factors (g/kw-hr)[1]								
	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	N_2O	CH_4
Main Engine	13	0.27	2.5	0.3	0.3	1.3	690	0.02	0.09
Auxiliary Engines	10	0.27	1.7	0.4	0.4	1.3	690	0.02	0.09

Supply Vessel Engine Data[2]	
Main Engine Power (kW)	1,125
Main Engines per Vessel	2
Auxiliary Engine Power (kW)	100
Auxiliary Engines per Vessel	2
No. of Calls for Fuel Supply/year	63

Travel Segment[3]	Distances (nautical miles)
Port of New Orleans to WC509	276
Reduced Speed Zone	
New Orleans, LA	*30*
WC509	*20*
Total RSZ	50
Cruise Zone Distance	226

Emissions Input[4]

Mode	Cruise	RSZ	Maneuver	Hotel
Time (per call)	31.17	8.33	4.00	3.00
Speed (knots)	14.5	12.0	8.0	0.0
Load Factors				
Main Engine[5]	0.83	0.47	0.14	0.00
Auxiliary Engine[6]	0.17	0.27	0.45	0.22

Mode	Emission Rates[7]								
	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$	CO_2	N_2O	CH_4
Cruise (g/call)	147,440	767,919	77,110	16,015	17,901	17,901	40,927,561	1,186	5,338
RSZ (g/call)	22,833	119,254	12,060	2,505	2,828	2,828	6,401,290	186	835
Maneuver (g/call)	3,751	19,921	2,100	436	521	521	1,114,646	32	145
Hotel (g/call)	224	1,320	172	36	53	53	91,080	3	12
Total (g/call)	174,248	908,414	91,442	18,992	21,302	21,302	48,534,577	1,407	6,331
Total (tons/call)	0.19	1.00	0.10	0.02	0.02	0.02	53.50	0.002	0.01

Annual Emissions (tons/yr)									
Pollutant	CO	NO_x	SO_2	VOC	PM_{10}	$PM_{2.5}$	CO_2	N_2O	CH_4
Total	12.10	63.09	6.35	1.32	1.48	1.48	3370.51	0.10	0.44

1. Tier 0 emission factors (Category 1) from Table 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

2. Obtained from WC509 offshore fuel consumption data provided by the client. Auxiliary Engine data is from Table 3-10 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

3. Distance based on searoutes.com. Reduced Speed Zone distance is based on a conservative estimate. Cruise Zone Distance is difference between Port of New Orleans to WC509 and Total RSZ distances.

4. Time (per call) is for round-trip (Distance/Speed x 2). Speed for each mode is based on Tables 2-5 and 2-6 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. Time (per call) for maneuvering and hoteling modes are based on a conservative estimates.

5. Per Section 2-7.3 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

Calculated using Propeller Law:

$LF = (AS/MS)^3$

Where;

LF = Load Factor

AS = Actual Speed (knots)

MS = Maximum Speed (knots)

6. From Table 2-7 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

7. Emission rates were calculated using the following equation:

$E (g/call) = P_{Main} * LF_{Main} * A * EF_{Main} + P_{Aux} * LF_{Aux} * A * EF_{Aux}$

Where

P = Engine Power Rating (kW)

LF = Load Factor

A = Activity (hours)

EF = Emission Factor

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Fuel Supply Vessel Transport from New Orleans to WC509VCU - Hazardous Air Pollutant Emissions

	Emission Factors (g/hp-hr)[1]								
	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Main Engine	-	8.00E-05	2.50E-05	2.46E-03	2.51E-04	-	6.73E-04	8.92E-04	6.13E-04
Auxiliary Engines	1.24E-04	2.44E-03	2.94E-04	2.96E-03	3.75E-03	2.69E-04	5.33E-04	1.30E-03	9.05E-04

Supply Vessel Engine Data[2]	
Main Engine Power (hp)	1,125
Main Engines per Vessel	2
Auxiliary Engine Power (hp)	100
Auxiliary Engines per Vessel	2
No. of Calls for Fuel Supply/year	63

Travel Segment[3]	Distances (nautical miles)
Port of New Orleans to WC509	276
Reduced Speed Zone[4]	
New Orleans, LA	*30*
WC509	*20*
Total RSZ	50
Cruise Zone Distance	226

Emissions Input[4]

Mode	Cruise	RSZ	Maneuver	Hotel
Time (per call)	31.17	8.33	4.00	3.00
Speed (knots)	14.5	12.0	8.0	0.0
Load Factors				
Main Engine[5]	0.83	0.47	0.14	0.00
Auxiliary Engine[6]	0.17	0.27	0.45	0.22

Mode	Emission Rates[7]								
	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Cruise (g/call)	0.13	7.24	1.77	146.68	18.57	0.29	39.78	53.35	36.66
RSZ (g/call)	0.06	1.80	0.35	23.08	3.90	0.12	6.18	8.46	5.82
Maneuver (g/call)	0.04	0.98	0.14	4.16	1.66	0.10	1.04	1.59	1.10
Hotel (g/call)	0.02	0.32	0.04	0.39	0.49	0.04	0.07	0.17	0.12
Total (g/call)	0.25	10.34	2.30	174.31	24.62	0.54	47.07	63.57	43.69
Total (tons/call)	2.74E-07	1.14E-05	2.53E-06	1.92E-04	2.71E-05	5.94E-07	5.19E-05	7.01E-05	4.82E-05

Annual Emissions (tons/yr)									
Pollutant	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Naphthalene	PAH	Toluene	Xylenes
Total	1.73E-05	7.18E-04	1.60E-04	1.21E-02	1.71E-03	3.74E-05	3.27E-03	4.41E-03	3.03E-03

1. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

2. Obtained from WC509 offshore fuel consumption data provided by the client. Auxiliary Engine data is from Table 3-10 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

3. Distance based on searoutes.com. Reduced Speed Zone distance is based on a conservative estimate. Cruise Zone Distance is difference between Port of New Orleans to WC509 and Total RSZ distances.

4. From Table 2-18 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
The barges do not enter open ocean.

5. Per Section 2-7.3 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
Calculated using Propeller Law:
$LF = (AS/MS)^3$
Where;
LF = Load Factor
AS = Actual Speed (knots)
MS = Maximum Speed (knots)

6. From Table 2-7 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

7. Emission rates were calculated using the following equation:
$E\ (g/call) = P_{Main} * LF_{Main} * A * EF_{Main} + P_{Aux} * LF_{Aux} * A * EF_{Aux}$
Where
P = Engine Power Rating (kW)
LF = Load Factor
A = Activity (hours)
EF = Emission Factor

Blue Marlin Offshore Port, LLC
Environmental Impacts of Vapor Capture and Control - Additional Air Emissions

	NO_X (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10}[1] (tpy)	$PM_{2.5}$[1] (tpy)	CO_2e (tpy)
Marine Vapor Combustion Units						
MVCU1	27.43	125.9	3.03	3.41	3.41	75,382
MVCU2	27.43	125.9	3.03	3.41	3.41	75,382
MVCU3	27.43	125.9	3.03	3.41	3.41	75,382
VCU Platform Sources						
Diesel Generator	46.08	4.05	2.72	0.46	0.46	4,384
Fuel Delivery Supply Vessel						
Main and Auxiliary Engines	63.09	12.10	6.35	1.48	1.48	3,412
Total	**191.5**	**394.0**	**18.17**	**12.16**	**12.16**	**233,941**

[1] PM_{10} and $PM_{2.5}$ emissions are represented as the sum of filterable PM_{10}/$PM_{2.5}$ and condensable emissions

APPENDIX E. VOC BEST MANAGEMENT PLAN

In order to ensure VOC air emissions are minimized from loading crude oil into VLCCs and other crude-carrying vessels, BMOP will implement the following VOC Best Management Plan (BMP). Vessel loading at a CALM buoy requires communication and coordination of activities with the vessel crew. Accordingly, this VOC BMP addresses BMOP's actions, and refers to a vessel-specific VOC Management Plan, as well.

1. Prior to loading, BMOP will review and maintain a record of the following:
    a. Ensure the vessel follows a VOC Management Plan that conforms to the requirements of MEPC.185(59), to maintain positive pressure in an inert tank while minimizing releases.
    b. Ensure that submerged fill can and will be utilized, discuss vessel-specific plan, and BMOP BMPs. Confirm these BMPs are addressed at a minimum, document confirmation.
    c. Verify and record that the marine vessel has passed an annual vapor tightness test within the previous 12-months and properly operates an inert gas system.
    d. Have a completed Standard Tanker Chartering Questionnaire form (Q88), or equivalent.
    e. Discuss the allowable cargo tank pressure range.
    f. Discuss monitored parameters and accountability for communication during loading.
2. During Loading, BMOP will monitor and record the following parameters:
    a. Product loading rate (not to exceed 80,000 bbl/hr averaged over each vessel's loading duration)
    b. Hawser load
    c. Navigation aids
3. During loading, the marine vessel being loaded will monitor the following parameters:
    a. Cargo tank pressure within design constraints
        i. The pressure of an inerted marine vessel being loaded must be maintained such that the pressure in the vessel's cargo tanks do not go below 0.2 pounds per square inch gauge (psig) or exceed 80% of the lowest setting of any of the vessel's pressure relief valves. The lowest vessel cargo tank or vent header pressure relief valve setting for the vessel being loaded shall be recorded.
    b. Gas detector
    c. Loading hose connections checked

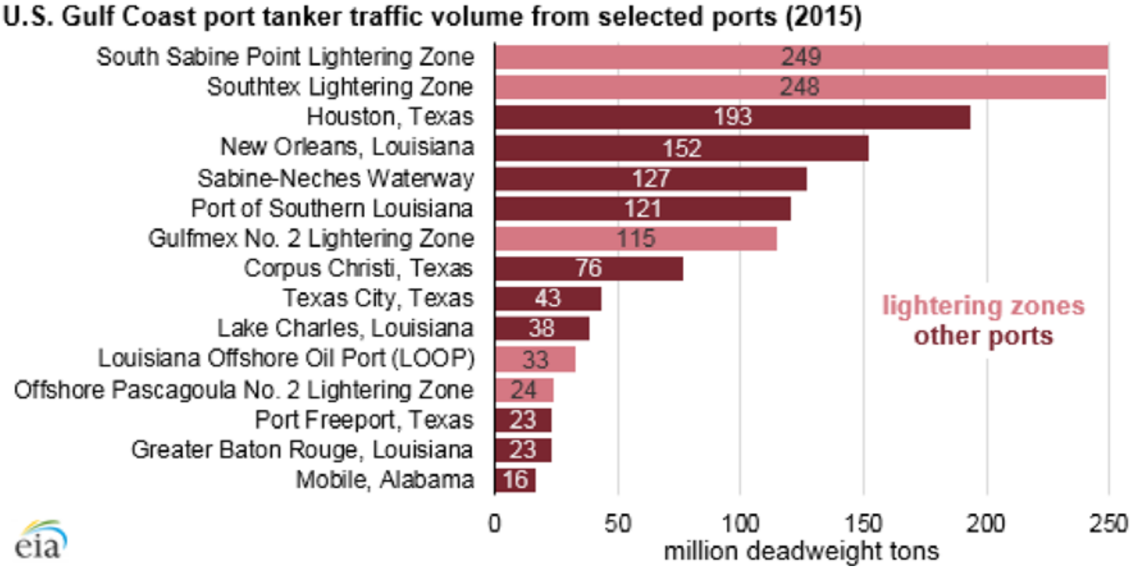
During maintenance activities requiring pigging, BMOP will utilize marine vessels for collection of the liquid pushed by the pigs. BMOP will follow the same VOC BMP outlined above and identify records as "maintenance." Because potential VOC and HAP emissions have been calculated based on continuous loading, emissions from loading losses as a result of pigging are included in the BMOP potential emissions.

APPENDIX F. PROJECT COMPARISON TO REVERSE LIGHTERING

The following sections contain a detailed description of the alternative crude loading scenarios considered for the BMOP Project and the methodology used to calculate emissions for these activities.

As mentioned in Section 2, the purpose of the proposed SPM buoy system will be to fully and directly load VLCCs with crude oil for export. Because of their ~2,000,000 bbl size and deep draft when fully loaded, current common practice dictates that VLCCs are loaded by reverse lightering offshore, which is the process of using smaller ships to shuttle crude oil from onshore terminals out to the VLCC. As part of the reverse lightering process, crude oil is loaded onto the VLCC via ship-to-ship transfer in offshore lightering zones with water depths that VLCCs can navigate through while fully loaded. The extensive use of lightering for crude oil export is demonstrated in the following chart.[172]

Figure F-1. Potential Scenarios Emissions Comparison



The use of reverse lightering operations for the export of large volumes of crude oil is not considered a control technology. However, given that it represents a strategy for the export of large volumes of crude oil, BMOP has considered reverse lightering operations emissions estimates and environmental impacts to understand and compare overall impacts of the proposed Project to the different reverse lightering methods.

F.1 Reverse Lightering Scenarios

This section provides a detailed description of the lightering methodologies and scenarios considered in lieu of the proposed CALM buoy system.

To develop reverse lightering emission calculations, the BMOP Project scenario as well as two reverse lightering scenarios were considered for the export of crude oil equivalent to the maximum annual

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[172] U.S. Energy Information Administration, based on U.S. Maritime Administration (MARAD), referenced at “Today in Energy – U.S. Gulf Coast port limitations impose additional costs on rising U.S. crude oil exports,” May 16, 2018.

throughout rate of the proposed DWP project (700,800,000 bbl/yr). The reverse lightering scenario descriptions are presented in the following table.

Table F-1. Lightering Scenarios Summary

Scenario	Description
Project Scenario	VLCCs are directly loaded with 700,800,000 bbl/yr of crude via CALM Buoys.
Reverse Lightering Scenario 1	VLCCs are reverse lightered with 700,800,000 bbl/yr of crude via Aframax vessels.
Reverse Lightering Scenario 2	VLCCs are partially loaded onshore with 350,400,000 bbl/yr of crude and reverse lightered with 350,400,000 bbl/yr via Aframax vessels.

Reverse Lightering Scenario 1 assumes complete reverse lightering will be utilized to load the VLCCs by way of ship to ship transfer in lieu of the use of CALM buoys. In this scenario, Aframax vessels are loaded at an onshore dock (e.g., Nederland Terminal) before travelling to and transferring the crude oil to the VLCCs via ship-to-ship transfer in a lightering zone (e.g., South Sabine Point Lightering Zone).

Reverse Lightering Scenario 2 assumes the partial loading of VLCCs at the onshore dock, where the VLCC is loaded halfway, down to a specified hull depth. The remaining load is completed by the onshore loading of Aframax vessels and subsequent ship-to-ship transfer of crude oil to the VLCCs in a lightering zone offshore.

For purposes of this analysis, the nominal capacity of an Aframax tanker is assumed to be 500,000 bbl whereas the nominal capacity of a VLCC is 2,000,000 bbl. A partially loaded VLCC receives a partial load of 1,000,000 bbl onshore and the remainder of its load via reverse lightering. For purposes of this comparison, the analysis assumes the VLCC's are loaded with 350,400,000 bbl/yr onshore and loaded with 350,400,000 bbl/yr offshore via reverse lightering. Note that this is a hypothetical comparison only, as there are limited existing terminals that can accommodate a partially loaded VLCC (3 or fewer in the GOM), and none with existing authorized capacity to increase annual loading 350,400,000 bbl/yr. This hypothetical is presented only for comparative purposes to demonstrate that even partial reverse lightering leads to far greater total environmental impact.

The following are the quantitative and qualitative categories of impacts that were assessed. Air emissions as well as logistics impacts are quantified:

- ► Air emissions from proposed scenarios
  - Offshore loading emissions with submerged fill
  - Onshore loading emissions controlled by onshore VCU
  - Vessel engine emissions for shuttling between an onshore terminal and offshore lightering zone
- ► Logistics impacts: Anticipated business impacts of time taken for completion of full VLCC loading.

F.2 Air Quality Emissions

Quantification of air emissions from each scenario are summarized in the following sections.

F.2.1 Project Scenario

Emissions from the project scenario can be broken down into loading emissions and mobile source emissions. Specific descriptions for the emissions quantified in each category are listed below.

- Loading Emissions (VLCC Offshore)
  - Loading emissions include emissions generated from VLCC loading activities from the CALM buoys. All 700,800,000 bbl/yr are loaded directly into the VLCCs at the buoys with submerged fill. For this scenario, emissions are assumed to be emitted directly from the VLCC without capture or control consistent with the emissions calculation methodologies explained in Section 2.
- Mobile Source Emissions
  - Mobile source emissions include emissions generated from ancillary engine activities associated with the loading scenario. For this scenario, mobile source emission sources include the following:
    - Tugboat / Support Vessel Engines
    - 4-Point Dive Support Engines and Generators
    - Supply Vessel Engines
    - Helicopter Engines
    - VLCC Engines
  - Mobile source engine emissions are calculated based on assumed duration and load according to the current project design specifications. Additional detail for mobile source emissions associated with the Project are detailed in Topic Report 11 of Volume IIa of the MARAD filing.

F.2.2 Reverse Lightering Scenario 1

Emissions from the Reverse Lightering Scenario 1 can be broken down into loading emissions and mobile source emissions. Specific descriptions for the emissions quantified in each category are listed below.

- Loading Emissions (Aframax Onshore)
  - This loading scenario begins with loading Aframax vessels at an onshore terminal. Since emissions are loaded onshore, loading emissions are assumed to be captured (99% capture) and controlled (99%) with a VCU. All 700,800,000 bbl/yr are loaded onto Aframax vessels in this scenario.
- Loading Emissions (VLCC Offshore)
  - VLCCs are loaded in this scenario by reverse lightering from Aframax vessels. All 700,800,000 bbl/yr are loaded into the VLCCs from Aframax vessels via reverse lightering. Loading emissions are assumed to be emitted directly from the VLCC without capture or control.
- Mobile Source Emissions
  - Mobile source emissions include emissions generated from ancillary engine activities associated with the loading scenario. For this scenario, mobile source emissions include the following:
    - Aframax Engines
      - Transit to and from onshore terminal and lightering zone
      - During onshore loading
      - During reverse lightering operations
    - VLCC Engines
      - During reverse lightering operations
    - Mooring Assist Tugboat Engines
    - Lightering Support Vessel Engines
      - Transit to and from onshore terminal and lightering zone
      - During reverse lightering operations

  - Mobile source emissions are calculated based on assumed duration and load based on operational knowledge and assumption of distance from Nederland Terminal to the South Sabine Point Lightering Zone.

F.2.3 Reverse Lightering Scenario 2

Emissions from the Reverse Lightering Scenario 2 can be broken down into loading emissions and mobile source emissions. Specific descriptions for the emissions quantified in each category are listed below.

- Loading Emissions (Aframax Onshore)
  - This loading scenario assumes half of the annual throughput will be loaded onto Aframax vessels at an onshore terminal. Since emissions are loaded onshore, loading emissions are assumed to be captured (99% capture) and controlled (99%) with a VCU. Half of the annual throughput (350,400,000 bbl/yr) is loaded onto Aframax vessels in this scenario.
- Loading Emissions (VLCC Onshore)
  - This loading scenario assumes half the annual throughput will be loaded onto VLCCs at an onshore terminal. Since emissions are loaded onshore, loading emissions are assumed to be captured (99% capture) and controlled (99%) with a VCU. Half of the annual throughput (350,400,000 bbl/yr) is loaded onto VLCCs onshore in this scenario.
  - Note that while the VLCCs are loaded halfway onshore, the total emissions generated (pre-control) are not equal to half of the emissions from loading the entire VLCC. This is because emissions from the loading operations are not uniform throughout the loading operations. Per equation 2 in AP-42 Chapter 5.2, there are two contributors to the emissions generated from loading, arrival emissions and generated emissions. In the first half of the loading, the emissions from the VLCC will be those vapors which were present in the tank when it arrived at the onshore terminal (arrival emissions). Generated emissions would not be emitted from the VLCC during the first half of the load since it takes time for vapors to evaporate in the headspace of the tank and the generated emissions are generally more dense than the vapors which would be in the tank upon arrival (would stay close to the liquid level).[173]
  - As such, it is estimated that during the VLCC loading that occurs onshore, the only emissions that will occur (and thus be controlled by the onshore VCU) are those from the arrival emissions. Generated emissions are accounted for in the emissions estimates for the VLCC loading offshore during reverse lightering.
- Loading Emissions (VLCC Offshore)
  - VLCCs are loaded in this scenario by reverse lightering from Aframax vessels. In this scenario, 350,400,000 bbl/yr are loaded into the VLCCs from Aframax vessels via reverse lightering. Loading emissions are assumed to be emitted directly from the VLCC without any capture or control.
  - As noted above, both arrival and generated emissions are accounted for during this portion of the load. Note that since the VLCC is already loaded halfway at this point, only half of the arrival emissions are accounted for the VLCC loading offshore during reverse lightering. Any additional emissions that have been generated in the VLCC tanks from transit with only partially loaded tanks has been assumed to be negligible for the purposes of this analysis.
- Mobile Source Emissions
  - Mobile source emissions include emissions generated from ancillary engine activities associated with the loading scenario. For this scenario, mobile source emissions include the following:

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[173] Marine Board, National Research Council, “Controlling Hydrocarbon Emissions from Tank Vessel Loading,” 1987, page 82. (Docket A-90-44, II-I-4).

  - Aframax Engines
    - Transit to and from onshore terminal and lightering zone
    - During onshore loading
    - During reverse lightering operations
  - VLCC Engines
    - Transit to and from onshore terminal and lightering zone
    - During onshore loading
    - During reverse lightering operations
  - Mooring Assist Tugboat Engines
  - Lightering Support Vessel Engines
    - Transit to and from onshore terminal and lightering zone
    - During reverse lightering operations
- Mobile source emissions are calculated based on assumed duration and load based on operational knowledge and assumption of distance from Nederland Terminal to the South Sabine Point Lightering Zone.

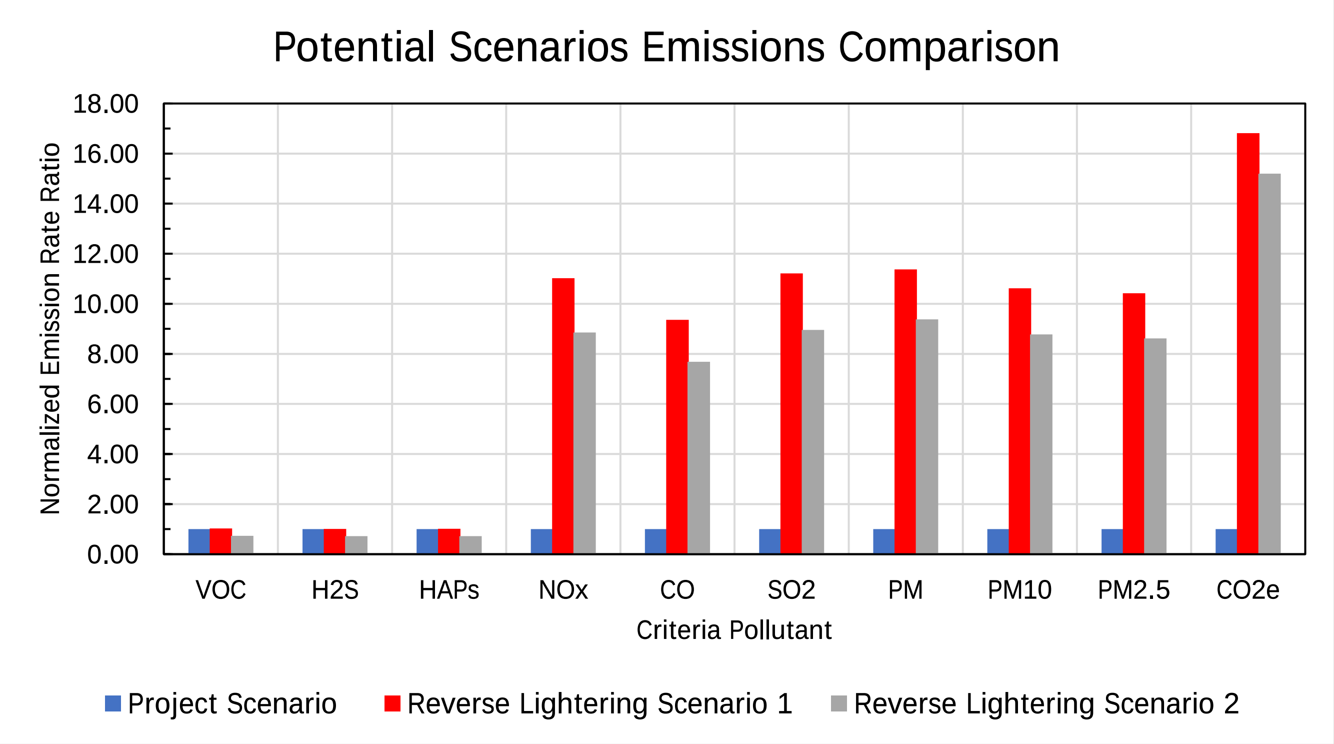
Potential emissions from loading activities and mobile sources from the project scenario and each of the considered scenarios are quantified and summarized in Table F-2 and Figure F-1 below. Figure F-1 illustrates the emissions comparison normalized to the project scenario emissions.

Table F-2. Potential Scenarios Emissions Comparison Summary

Criteria Pollutant	Project Scenario	Reverse Lightering Scenario 1	Reverse Lightering Scenario 2
	(tpy)	(tpy)	(tpy)
NO_x	738.3	8,426	6,769
CO	169.5	2,127	1,748
SO_2	21.71	262.13	209.34
PM_{10}	13.92	159.27	131.58
$PM_{2.5}$	13.81	155.18	128.31
VOC	21,862	22,496	16,032
H_2S	9.49	9.59	6.82
HAPs	1,225	1,252	891.09
CO_{2e}	34,974	865,771	782,517

The higher emissions from both reverse lightering scenarios are driven by ship traffic to onshore terminals. As a result, the higher emissions will also occur closer to shore, exacerbating onshore air quality impacts.

Figure F-1. Potential Scenarios Emissions Comparison



As shown above, the potential emissions from the project scenario are, overall, much less than either one of the reverse lightering scenarios analyzed. Even though VOC, HAP, and H_2S emissions from Reverse Lightering Scenario 2 are marginally lower than the project scenario, this decrease in emissions is offset by the much larger increase in all other pollutants as a result of the increased mobile source operations. Since reverse lightering is already occurring as the current method for crude oil export, the project scenario would represent a significant decrease in overall emissions.

F.3 Logistics and Timing Comparison

This section provides a comparison of the logistics and timing required for the proposed project and each of the proposed reverse lightering scenarios.

The time required for each of the scenarios analyzed was estimated through operational knowledge and conservative assumptions. The following assumptions were utilized throughout:

- Sufficient Aframax vessels are available such that the VLCC is not waiting for another to arrive after reverse lightering completes with one Aframax. This would require a spot-charter for multiple Aframax (at least three), which would triple the cost differential.
- Time for loading line connections at the lightering zone are conservatively assumed to be zero.
- 82 nautical mile transit from onshore terminal to lightering zone at average speed of 8 knots.
- Onshore terminal dock capacity was assumed to always be available.
- Weather and channel related delays and closures were not considered in this analysis for conservatism.
- Other conservative assumptions are described in detail in the following sections.

F.3.1 Project Scenario

The specific descriptions for the timing required for the project scenario are listed below:

- Loading at SPM Buoy System
  - The time required to fully load a 2,000,000 bbl VLCC via the SPM Buoy System is based on a maximum hourly loading rate of 80,000 bbl/hr.

$$Time\ required(hrs) = \frac{2{,}000{,}000\ bbl}{80{,}000\,\frac{bbl}{hr}} = 25\ hours$$

F.3.2 Reverse Lightering Scenario 1

The specific descriptions for the timing required for the Reverse Lightering Scenario 1 are listed below:

- Loading (Aframax Onshore)
  - An initial 3 hours of mooring operations are assumed for Aframax vessels to dock at the onshore terminal.
  - The time required to load the initial Aframax vessel is approximately 6.25 hours. This is calculated based on an 80,000 bbl/hr loading rate onto a 500,000 bbl Aframax vessel. Note that this loading rate is unlikely to be available for existing onshore terminals.
  - It is conservatively assumed the onshore loading of subsequent Aframax vessels can occur concurrently with the transit of the first Aframax. Therefore, these times are not accounted for in the total time to complete this scenario.
- Transit to Lightering Zone
  - The transit time for the initial loaded Aframax vessel is approximately 10.25 hours. The transit time is calculated based on an 82 nautical mile transit to the South Sabine Point lightering zone at average speed of 8 knots.
  - It is conservatively assumed that the transit times of subsequent Aframax vessels can occur concurrently with previous vessel operations. Therefore, these times are not accounted for in the total time required for this scenario.
- Reverse Lightering
  - The time required to load the VLCC is approximately 6.25 hours for each Aframax vessel. This is calculated based on an 80,000 bbl/hr loading rate for each 500,000 bbl Aframax vessels onto the VLCC. Achieving this loading rate for ship-to-ship transfers is conservative.
  - Since only one Aframax vessel can be reverse lightered at a time, the reverse lightering times for each of the four Aframax vessels are accounted for in this scenario.
- Unloaded Transit to Loading Terminal
  - The transit time back to the onshore terminal after reverse lightering for unloaded Aframax vessels is approximately 10.25 hours, similar to transit to the lightering zone. Only the transit time for the final Aframax vessel is accounted for since it is conservatively assumed that the transit for the other vessels can occur concurrently with the remainder of the reverse lightering and transit times of previous vessels.

The time required to load one VLCC via Reverse Lightering Scenario 1 is presented below.

$$Time\ required(hrs) = 3\ hr + 6.25\ hr + 10.25\ hr + 4 \text{ x } 6.25\ hr + 10.25\ hr = 54.75\ hours$$

F.3.3 Reverse Lightering Scenario 2

The specific descriptions for the timing required for the Reverse Lightering Scenario 2 are listed below:

- Loading (VLCC Onshore)
  - An initial 3 hours of mooring operations are assumed for the VLCC to dock at the onshore terminal.
  - The time required to load the VLCC halfway is approximately 12.5 hours. This is calculated based on an 80,000 bbl/hr loading rate and half of the VLCC volume (1,000,000 bbl).
- Loading (Aframax Onshore)
  - Since it is conservatively assumed Aframax loading can occur concurrently with VLCC loading and subsequent transit, these times are not accounted for in the total time for this scenario.
- Transit to Lightering Zone (VLCC)
  - The transit time for the partially loaded VLCC is approximately 10.25 hours. This is calculated based on an 82 nautical mile transit to the South Sabine Point lightering zone at an average speed of 8 knots.
- Transit to Lightering Zone (Aframax)
  - Since the transit times for the Aframax can occur concurrently during the VLCC transit and reverse lightering, these times are not accounted for in the total time for this scenario.
- Reverse Lightering
  - The reverse lightering time required to load the VLCC is approximately 6.25 hours for each Aframax vessel. This is calculated based on an 80,000 bbl/hr loading rate for loading a 500,000 bbl Aframax vessel onto the VLCC.
  - Since only one Aframax vessel can be reverse lightered at a time, the reverse lightering times for each of the two Aframax vessels are accounted for in this scenario.
- Unloaded Transit to Loading Terminal
  - The transit time back to the onshore terminal after reverse lightering for unloaded Aframax vessels is approximately 10.25 hours, similar to transit to the lightering zone. Only the transit time for the final Aframax vessel is accounted for since it is conservatively assumed that the transits for the other vessels can occur concurrently with the remainder of the reverse lightering and transit times of previous vessel.

The time required to load one VLCC via Reverse Lightering Scenario 2 is presented below.

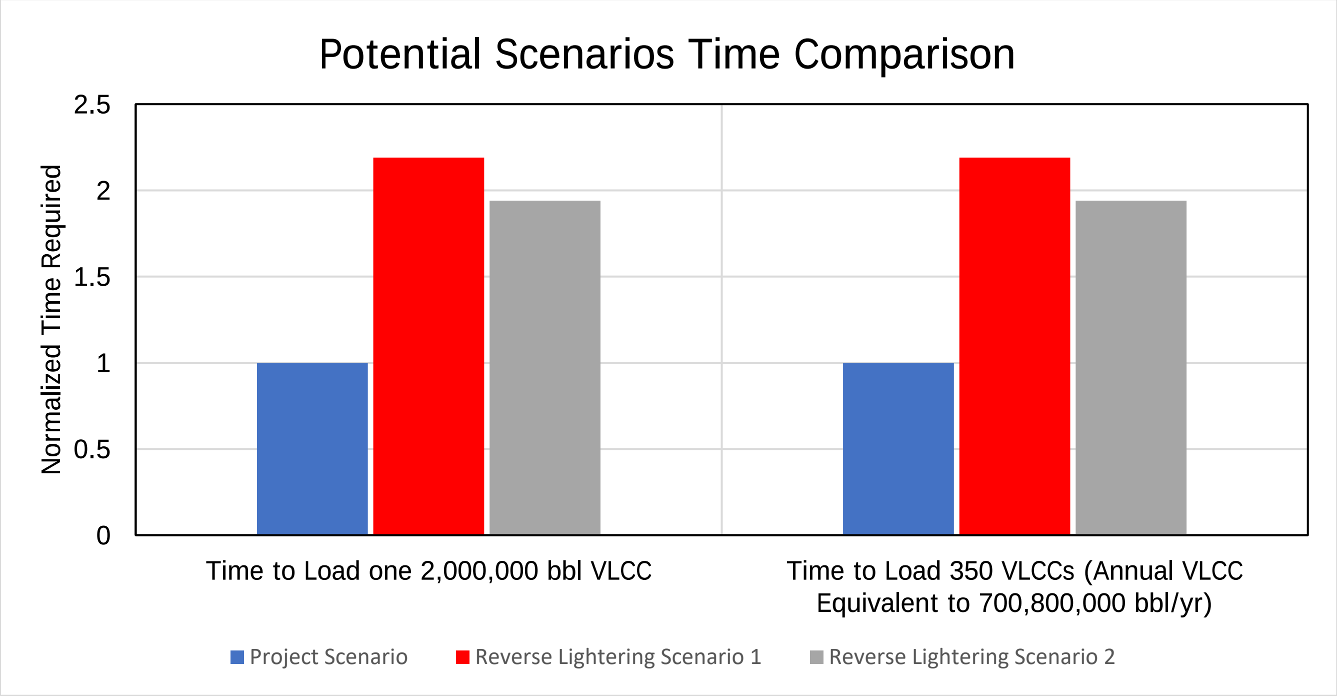
$$Time\ required(hrs) = 3\ hr + 12.5\ hr + 10.25\ hr + 2 \text{ x } 6.25\ hr + 10.25\ hr = 48.5\ hours$$

Table F-3 and Figure F-2 below provide a timing comparison between the project scenario and the two proposed reverse lightering scenarios. Figure F-2 illustrates the time comparison normalized to the project scenario emissions.

Table F-3. Potential Scenarios Time Comparison Summary

Operation	Project Scenario	Reverse Lightering Scenario 1	Reverse Lightering Scenario 2
Time to Load one 2,000,000 bbl VLCC	25 hours	54.75 hours	48.50 hours
Time to Load 350 VLCCs (Annual VLCC Equivalent to 700,800,000 bbl/yr)	8,760 hours	19,163 hours	16,975 hours

Figure F-3. Potential Scenarios Time Comparison



As shown above, the proposed project scenario utilizing the CALM buoys enables a much more efficient VLCC loading process compared to the reverse lightering scenarios analyzed – even when using unrealistic, conservative assumptions in an attempt to draw a uniform comparison. This is a result of a more efficient process that eliminates the need for multiple Aframax vessels to travel to and from an onshore terminal and the lightering zone to fully load a VLCC. In actual practice, fully loading a VLCC through reverse lightering takes at least 12 days, and often VLCCs are stationary in the GOM for a full month.[174] The added costs for spot chartering and demurrage fees for reverse lightering result in an alternative to crude oil export that is higher cost, less efficient, poses greater safety risks, and increased environmental impact.

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[174] RBN Energy LLC, “Deep Water – The Race to Build VLCC-Ready Terminals,” 2018.

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APPENDIX C-7

BSEE ROW Grant Modification Permit Application for ROW Grant G02122

Note: Filed as privileged and confidential

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APPENDIX C-8

BSEE ROW Grant Modification Permit Application for ROW Grant G02122c

Note: Filed as privileged and confidential