

**CONOCOPHILLIPS COMPANY
PROJECT GUMBO
CAMERON PARISH, LOUISIANA**



**LOUISIANA DEPARTMENT OF
ENERGY AND NATURAL RESOURCES,
OFFICE OF COASTAL MANAGEMENT**

**NEEDS, ALTERNATIVES, AND JUSTIFICATION ANALYSIS
P20230793**

January 2024

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1.0 INTRODUCTION

1.1 Purpose and Scope

This report addresses the Louisiana Department of Energy and Natural Resources (LDENR) **Office of Coastal Management's (OCM) request for a** New Commercial Development all-inclusive Category 3 alternatives assessment and complex justification analysis. This report summarizes the alternative sites investigated and the criteria used to ensure the site would meet the objective of the proposed project. Responses to the Justification Analysis portion **of OCM's guidance document are provided.**

1.2 Background

ConocoPhillips Company (ConocoPhillips) is the world's largest independent oil and natural gas exploration and production company headquartered in Houston, Texas. The company has operations and activities in 13 countries, with most of its production in Alaska and the Lower 48 states. ConocoPhillips is focused on exploration for and production of oil, natural gas, natural gas liquids, liquefied natural gas, and bitumen.

ConocoPhillips employs the latest technology in both conventional and unconventional developments. All operations strive to improve subsurface understanding, leverage existing infrastructure, and reduce our environmental impact.

ConocoPhillips strives to operate safely, reliably, and responsibly – achieving operational excellence through continuous improvement and ongoing learning. This means understanding how work is done, being mindful of risks, and predicting potential errors so we can minimize or eliminate unexpected events.

ConocoPhillips manages operations to reduce environmental impact and prevent, control, and mitigate unintentional releases from our infrastructure. ConocoPhillips monitors, assesses, and seeks to mitigate impacts throughout the lifecycles of assets.

Carbon capture and sequestration (CCS) is recognized as viable strategy for industrial decarbonization to reduce greenhouse gas (GHG) emissions on a global scale. CCS is a process that captures carbon dioxide (CO₂) emissions from industrial sources (and/or the atmosphere) and permanently stores it in geologic environments. Under permit application P20230793 / SWG-2023-00278, submitted on September 27, 2023, ConocoPhillips is proposing to construct a well pad and access route to facilitate the drilling of a site characterization well (appraisal well) in Cameron Parish, Louisiana to further evaluate the subsurface formations and assess the viability of permanent geologic sequestration of CO₂. The scope of work includes construction of a 4.07-acre pad and 0.71-mile access area to accommodate a vertical appraisal well and all associated equipment.

ConocoPhillips has identified the subsurface beneath the onshore area of southwest Cameron Parish as potentially suitable for permanent geologic sequestration of CO₂ through an extensive regional screening effort (Exhibit A). ConocoPhillips is targeting permanent sequestration in deep saline aquifers. The purpose of the appraisal well is to further characterize the subsurface geology and evaluate the feasibility of the target formation. In

accordance with Environmental Protection Agency (EPA) and LDENR Office of Conservation, Injection and Mining Division (IMD) rules and guidance, ConocoPhillips plans to conduct coring, logging, formation testing, and injectivity tests to obtain detailed geological information to further evaluate the capacity, injectivity and containment of the subsurface geology.

2.0 ALTERNATIVE SITE ANALYSIS

2.1 Guidance Document Questions

1. *Define the project objective(s) and identify the proposed features required to meet the objective(s). Identify any project objectives that may limit the range of alternatives to be considered.*

Project Objective

The reduction of GHG emissions has become a national and state priority. While various solutions have been recognized as a means to address this objective, industrial decarbonization is vital to the state of Louisiana given the significant presence of power **and manufacturing industries in the state's Coastal Zone. In relation to these efforts**, both the state of Louisiana and the federal government have underscored the societal net benefits of CCS. The federal Council on Environmental Quality, in its interim guidance on CCUS, 87 Fed. Reg. 8808 (Feb. 16, 2022), acknowledged that to reach the goal of net-zero emissions economy-wide by 2050, permanent sequestration of CO₂ will be necessary. Similarly, the Louisiana Legislature determined that CCS projects are favored as a matter of state public policy. La. R.S. 30:1102(A) elaborated on this, stating **that, "It is declared to be in the public interest for a public purpose and the policy of Louisiana that . . . [t]he geologic storage of carbon dioxide will benefit the citizens of the state and the state's environment by reducing GHG emissions."** Furthermore, Executive Order JBE 2020-18 noted that Louisiana must proactively work to reduce the GHG emissions. EO JBE 2020-18 established the Climate Initiatives Task Force to develop the Louisiana Climate Action Plan to achieve a net zero GHG emissions by 2050 goal. The Climate Action Plan recognizes CCS as playing a critical role in decarbonizing the global economy. Consistent with the national and state objectives to reduce GHG emissions, ConocoPhillips is seeking to assess the viability of a CCS project. The objective of the proposed project is to construct a well pad and access route to accommodate an appraisal well that will assess the viability of permanent geologic sequestration of CO₂. This project is a necessary prerequisite to advancing the Louisiana CCS infrastructure needed to support industrial decarbonization to achieve GHG emissions reduction goals.

In alignment with national and state priorities to reduce GHG emissions, ConocoPhillips is seeking to implement a CCS project in proximity to GHG gas emission sources along Sabine Pass (Figure 1). ConocoPhillips is leveraging its technical expertise, project development skills, and commitment to safety to potentially provide future cost-effective and permanent carbon storage services to industrial sites.

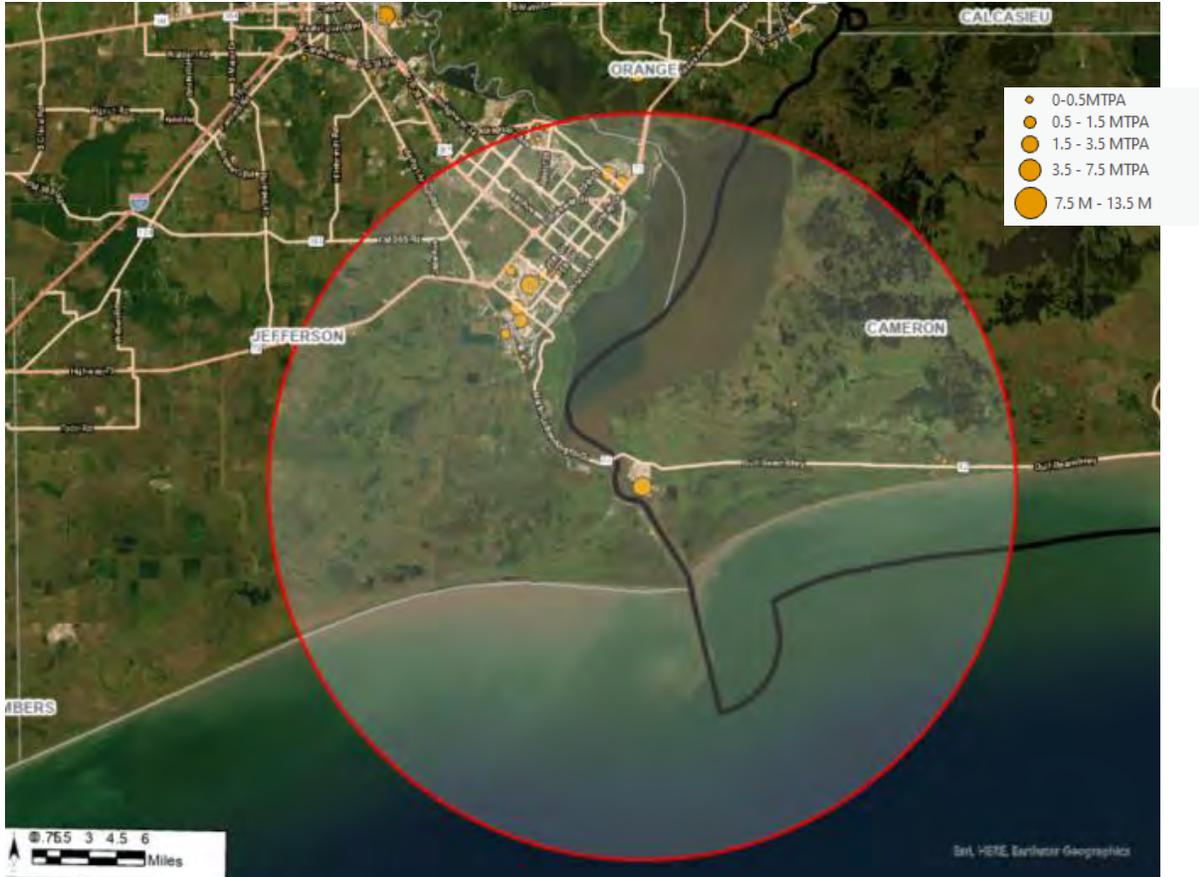


Figure 1: EPA 2020 Flight CO₂ Emissions for Sabine Pass Region

Project Description and Proposed Features

ConocoPhillips proposes to construct a 4.07-acre pad and 0.71-mile access route to facilitate drilling a vertical appraisal well and accommodate all associated equipment. After completion of the appraisal program, the appraisal well will be plugged and abandoned in accordance with LAC 43:XIX.137. The pad and access route were sited to accomplish the requirements of an appraisal program and designed to minimize wetlands/biodiversity impacts as practicable to maintain safe operations. To meet the stringent regulatory requirements for implementing a future Class VI carbon sequestration well, ConocoPhillips must further appraise the area of interest (AOI) with an appraisal well. The appraisal program will consist of permitting and drilling a Class V Stratigraphic Test Well with IMD to further characterize the subsurface of the AOI and assess the viability of permanent sequestration.

Project Objective Limiting Factors (Siting Criteria)

ConocoPhillips is seeking to implement a CCS project in proximity to major GHG emission sources along Sabine Pass (Figure 1). Through an extensive regional

screening effort, ConocoPhillips has identified the subsurface beneath the onshore area of southwestern Cameron Parish as potentially suitable for permanent geologic sequestration of CO₂. As further described in the Regional Screening Evaluation (Exhibit A), an AOI identified for a potential CCS project must meet specific criteria to ensure the subsurface is suitable to store and permanently sequester injected CO₂. To expeditiously progress a CCS project that adheres to CO₂ geologic sequestration regulations while also meeting the needs and goals of the state, ConocoPhillips analyzed potential AOIs for a CCS project utilizing the following criteria:

- Distance to major sources of GHG emissions;
- Availability of existing support infrastructure;
- Areas with existing seismic to assist with subsurface evaluations;
- Lower population density;
- Areas with low subsurface structural complexity;
- Favorable subsurface containment;
- Minimal proximity to existing wellbores; and
- Land availability

ConocoPhillips identified the AOI in southwestern Cameron Parish, **referred to as “Project Gumbo”, based on the above listed criteria and evaluation described** in the Regional Screening Evaluation (Exhibit A). The next step was to identify the location of an appraisal well that would minimize adverse impacts to coastal resources wherever possible while meeting the objectives and requirements of an appraisal program.

Site-specific information collected from a Class V Stratigraphic Test Well is required by regulations to assess the viability of permanent geologic sequestration of CO₂. An appraisal program is therefore proposed to gather key geologic and engineering information about potential injection and confining zones to further determine the suitability of a site for CO₂ sequestration. Geologic and reservoir engineering data, such as porosity, permeability, and injectivity, will be collected through coring, electrical logging and formation testing in the appraisal well. As such, the proposed well pad and access route for a future appraisal well must be located to meet the objectives of an appraisal program.

Since the main objective of this project is to collect additional data to further determine the feasibility of implementing a CCS project at the AOI, ConocoPhillips evaluated potential sites for an appraisal program based on the following criteria:

- a. Proximity to Existing Wellbores: to reduce the risk of interference on injectivity tests to be performed in the proposed appraisal well, IMD and industry guidance recommend locating the proposed appraisal well greater than approximately 0.25 miles away from any existing hydrocarbon or deep saltwater disposal wells. The purpose for the 0.25 mile buffer from existing wellbores is to minimize potential reservoir boundary effects imparted by existing wells on proposed injectivity tests to be performed in the proposed appraisal well. If the appraisal well is located too close to an existing well that interferes with the injectivity tests, the test might produce

inaccurate data that does not satisfy regulatory requirements to determine the suitability of a site for CO₂ sequestration.

- b. Proximity to Faults: locating the subject appraisal well greater than approximately 1,000 ft away from faults minimizes the potential risk of reservoir boundary effects imparted by faults on injectivity tests to be performed in the proposed appraisal well. If the appraisal well is located too close to a fault system that interferes with the injectivity tests, the test might produce inaccurate data that does not satisfy regulatory requirements to determine the suitability of a site for CO₂ sequestration.
 - c. Minimize Disturbance to Wetlands: prioritize locations near existing highways or roads to minimize surface disturbance to the wetlands.
 - d. Minimize Site Construction Complexity: locate appraisal wells away from surface risks such as existing pipelines and complex topography.
2. Identify, on a map, the location of each site considered for development. If less than the minimum number of sites, as specified above, have been considered, please explain why and provide documentation demonstrating the efforts made to find alternate sites.

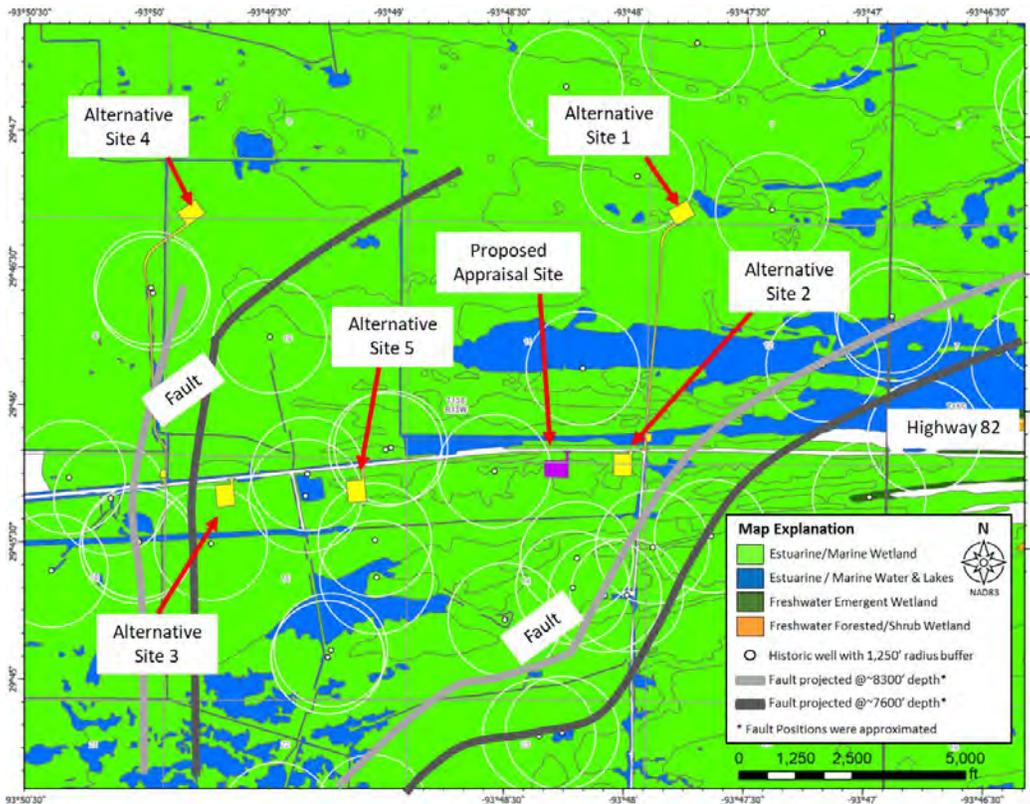


Figure 2: Location Map of Proposed and Alternative Sites

3. *Describe each site considered. Include parcel size relative to development size, topography, water/wetland features, habitat type(s) present and amount of impact to each. If access to the property is limited or unavailable, explain the limitations and provide any information that can be gained about the site using current photography and topographic and habitat maps. Identify any limiting factors and explain how those factors limit development.*

See Sections 3.0 through 8.0

4. *Identify the availability and capacity of existing infrastructure (roads, utilities, water, sewer, etc.). Describe any new infrastructure required (excluding tie-in from individual units to existing infrastructure)*

See Sections 3.0 through 8.0

5. *Describe the surrounding land use with one (1) mile of each site considered. Include type and extent of existing use and any planned future uses, if known.*

See Attachment B

6. *Identify the current zoning of the site and indicate if any zoning variances will be required prior to development.*

See Attachment B

7. *Explain how the use will affect existing infrastructure, including evacuation and identify any additional permits required (e. g. DOTD driveway permit). Describe any secondary infrastructure (excluding tie-in from individual units) that may be required to service the development. Include location and/or route of the needed infrastructure and type and extent of impacts associated with installation of that infrastructure.*

See Sections 3.0 through 8.0

8. *Provide a narrative explaining the reasons for the elimination of each site considered but not selected for development. Please note that the factors used to compare each site should be identified and should be consistent among sites.*

See Sections 3.0 through 8.0

2.2 Method

Per OCM's NAJ guidelines, feasible sites are defined as “any available parcel of land within the general vicinity of the proposed site that can support the main objective of the proposed project.” Using this guidance, five sites were selected and evaluated alongside the proposed project site using the criteria described in the above sections. The purpose of this activity was to determine the location with the least amount of adverse impacts to coastal resources while allowing the project to fulfill its objectives.

Each site, including the proposed project site, was compared equally using the same four criteria described above.

3.0 ALTERNATIVE APPRAISAL SITE 1

3.1 Site Description

Alternative Appraisal Site 1 is centered at Latitude 29° 46' 43.68" N; Longitude 93° 47' 46.92" W approximately 1.20 miles northeast of the proposed project site. Alternative Appraisal Site 1 is located approximately 1.15 miles north of Highway 82 and would require construction of a new access road. The total potential surface disturbance for the new access road and pad is approximately 9.73 acres (Attachment A). The habitat composition is comprised of Emergent Herbaceous Wetlands (Attachment B). This site is positioned to provide the most relevant subsurface information pertinent to CO₂ injection and sequestration.

3.2 Siting Criteria

Proximity to Existing Wellbores

Alternative Appraisal Site 1 is located away from any existing hydrocarbon or deep saltwater disposal wells that may interfere with injectivity tests.

Proximity to Faults

Alternative Appraisal Site 1 is located away from any fault structures that present a potential risk for pressure and flow interference during the injectivity test to be performed in the appraisal well.

Minimize Disturbance to Wetlands

This location would require construction of a new 1.15 mile access road to reach Alternative Appraisal Site 1. Construction of the new access road and well pad would result in the greatest amount of total surface disturbance of all the sites evaluated.

Minimize Site Construction Risks

ConocoPhillips evaluated all alternative sites for any potential surface risks. A comprehensive search of public and historic records did not result in any findings of surface risks at Alternative Appraisal Site 1.

In summary, Alternative Appraisal Site 1 is preferred for collection of site-specific subsurface data and is located away from existing well bores and faults. This site would require construction of a new 1.15 mi access route since there are no existing roads nearby. Given the potential surface disturbance associated with this Alternative relative to the other Alternatives evaluated in this study, this location was not selected as the proposed appraisal location.

4.0 ALTERNATIVE APPRAISAL SITE 2

4.1 Site Description

Alternative Appraisal Site 2 is centered at Latitude 29° 45' 47.62" N; Longitude 93° 48' 02.00" W approximately 0.25 miles east of the proposed project site, directly south of Highway 82. The total potential surface disturbance required for this alternative is approximately 4.67 acres (Attachment A). The habitat composition is comprised of Emergent Herbaceous Wetlands (Attachment B).

4.2 Siting Criteria

Proximity to Existing Wellbores

Alternative Appraisal Site 2 is located away from any existing hydrocarbon or deep saltwater disposal wells that may interfere with injectivity tests.

Proximity to Faults

Alternative Appraisal Site 2 is located approximately 500' from a large subsurface fault to the South at the top of first potential test zone which presents the risk of pressure and flow interference during the injectivity test to be performed in the appraisal well.

Minimize Disturbance to Wetlands

Alternative Appraisal Site 2 is located directly south of Highway 82 with comparable total surface disturbance as the proposed site.

Minimize Site Construction Risks

ConocoPhillips evaluated all alternative sites for any potential surface risks. A comprehensive search of public and historic records did not result in any findings of surface risks at Alternative Appraisal Site 2.

In summary, although Alternative Appraisal Site 2 met majority of the siting criteria, the site is not a suitable alternative site to meet the proposed project objectives due to the proximity to an existing fault that may result in interference during injectivity testing.

5.0 ALTERNATIVE APPRAISAL SITE 3

5.1 Site Description

Alternative Appraisal Site 3 is centered at Latitude 29° 45' 40.76" N; Longitude 93° 49' 41.47" W approximately 1.5 miles west of the proposed project site, directly south of Highway 82. The total potential surface disturbance required for this alternative is approximately 4.75 acres (Attachment A). The habitat composition is comprised of Emergent Herbaceous Wetlands (Attachment B).

5.2 Siting Criteria

Proximity to Existing Wellbores

Alternative Appraisal Site 3 is located away from any existing hydrocarbon or deep saltwater disposal wells that may interfere with injectivity tests.

Proximity to Faults

Alternative Appraisal Site 3 **is located approximately 1,000' from a large fault** to the West which presents a potential risk for pressure and flow interference during the injectivity test to be performed in the appraisal well.

Minimize Disturbance to Wetlands

Alternative Appraisal Site 3 is located directly south of Highway 82 with comparable total surface disturbance as the proposed site.

Minimize Site Construction Risks

ConocoPhillips evaluated all alternative sites for any potential surface risks. Part of this analysis included *magnetic* surveys of the construction area. A magnetic survey conducted on 03/06/2023 revealed an abandoned pipeline beneath the site. A comprehensive search of public and historical records did not result in any further information on the abandoned pipeline.

In summary, Alternative Appraisal Site 3 is not a suitable alternative site to meet the proposed project objectives due to the proximity to an existing fault that may result in interference during injectivity testing and the unidentified abandoned pipeline in the area which poses a safety risk to construction operations.

6.0 ALTERNATIVE APPRAISAL SITE 4

6.1 Site Description

Alternative Appraisal Site 4 is centered **at Latitude 29° 46' 42.92" N; Longitude 93° 49' 49.78" W** approximately 1.85 miles northwest of the proposed project site. Alternative Appraisal Site 4 is located approximately 1.12 miles north of Highway 82. There is approximately 0.9 miles of existing road near this site which could be utilized for access; however, an existing well pad with existing wellbores is located along the existing road. Due to the risk of reservoir boundary effects imparted by existing wells on injectivity tests to be performed in the proposed appraisal well, Alternative Appraisal Site 4 requires construction of 0.25 miles of new road to locate the appraisal well beyond the recommended 0.25-mile buffer from existing wellbores. The total potential surface disturbance required for this site is approximately 10.89 acres (Attachment A). In addition, this site is located on the west side of a subsurface fault with potentially different saline aquifer pressure and is therefore geologically less suitable compared to other alternatives. The habitat composition is comprised of Emergent Herbaceous Wetlands (Attachment B).

6.2 Siting Criteria

Proximity to Existing Wellbores

Alternative Appraisal Site 4 has been located away from any existing hydrocarbon or deep saltwater disposal wells that may interfere with injectivity tests.

Proximity to Faults

Alternative Appraisal Site 4 is located away from any fault structures that present a potential risk for pressure and flow interference during the injectivity test to be performed in the appraisal well.

Minimize Disturbance to Wetlands

The need for a 1.15 mile access road at Alternative Appraisal Site 4 results in a greater amount of total surface disturbance compared to the proposed site.

Minimize Site Construction Risks

ConocoPhillips evaluated all alternative sites for any potential surface risks. A comprehensive search of public and historic records did not result in any findings of surface risks at Alternative Appraisal Site 4.

In summary, Alternative Appraisal Site 4 is not a suitable alternative site to meet the proposed project objectives. This Alternative would require the construction of 0.25 miles of new access road to extend the existing road to meet the siting criteria for the proposed project. Given the potential surface disturbance associated with this Alternative and sub-optimal subsurface positioning relative to the proposed locations evaluated in this study, Alternative Appraisal Site 4 is not a favorable alternative site to meet the proposed project objectives.

7.0 ALTERNATIVE APPRAISAL SITE 5

7.1 Site Description

Alternative Appraisal Site 5 is centered at Latitude 29° 45' 43.72" N; Longitude 93° 49' 08.85" W approximately 0.85 miles west of the proposed project site. Alternative Appraisal Site 5 is located approximately 0.1 miles south of Highway 82. This site requires a short (0.05 mile) access road from Highway 82; however, it is in close proximity to three existing wellbores, with the nearest existing wellbore approximately 0.24 miles away. The total potential combined access road and pad surface disturbance required for this site is approximately 4.99 acres (Attachment A). The habitat composition is comprised of Emergent Herbaceous Wetlands (Attachment B).

7.2 Siting Criteria

Proximity to Existing Wellbores

Alternative Appraisal Site 5 is located in close proximity to three existing wellbores, with the nearest existing wellbore being approximately 0.24 miles away from the site. This proximity increases potential reservoir boundary effects imparted by existing wells on proposed injectivity tests to be performed in the proposed appraisal well. This increases the potential for an inconclusive injection test and production of inaccurate data that is required by regulations to determine the suitability of a site for CO₂ sequestration.

Proximity to Faults

Alternative Appraisal Site 5 is located away from any fault structures that present a potential risk for pressure and flow interference during the injectivity test to be performed in the appraisal well.

Minimize Disturbance to Wetlands

Alternative Appraisal Site 5 requires a 0.05 mile access road to locate the well further from existing wellbores. Alternative Appraisal Site 5 requires a greater amount of total surface disturbance compared to the proposed site.

Minimize Site Construction Risks

ConocoPhillips evaluated all alternative sites for any potential surface risks. A comprehensive search of public and historic records did not result in any findings of surface risks at Alternative Appraisal Site 5.

In summary, Alternative Appraisal Site 5 is less suitable for collecting appraisal data, as it is located approximately 0.24 miles away from an existing wellbore and requires the construction of a 0.05 miles access route to locate the well away from the existing wellbores. Given the potential surface disturbance associated with this Alternative relative to the other Alternatives evaluated in this study, Alternative Appraisal Site 5 is not a feasible alternative site to meet the proposed project objectives.

8.0 PROPOSED SITE

8.1 Site Description

The proposed site is centered at Latitude 29° 45' 47.54" N, 93° 48' 18.10" W, approximately twenty miles west from Holly Beach on the south side of Louisiana Highway 82. Primary access to the pad for the proposed site is via Louisiana Highway 82. A connection off Louisiana Highway **82 will be constructed along with approximately 200' of access** route. ConocoPhillips will obtain the necessary approvals for the proposed connection to Louisiana Highway 82. The proposed site will impact approximately 4.71 acres of emergent wetlands and will be constructed on land leased by ConocoPhillips (Attachment A). The habitat composition is comprised of Estuarine and Marine Wetlands (Attachment B).

8.2 Siting Criteria

Proximity to Existing Wellbores

The proposed site is located away from any existing hydrocarbon or deep saltwater disposal wells that may interfere with injectivity tests.

Proximity to Faults

The proposed site location was selected to minimize potential reservoir boundary effects imparted by faults on the proposed injectivity tests to be performed in the proposed appraisal well. The proposed site is located approximately **1500'** at the top of first potential test zone from the nearest mapped fault at the Lower Miocene depth.

Minimize Disturbance to Wetlands

The proposed site is located in close proximity to Louisiana Highway 82 to minimize surface disturbance to the coastal zone and wetlands. The proposed site has the least amount of impact to wetlands of all the alternatives evaluated.

Minimize Site Construction Risks

ConocoPhillips evaluated the proposed site for any potential surface risks. A comprehensive search of public and historical records did not result in any findings of surface risks at the proposed site.

*In summary, the Proposed Site for drilling the proposed appraisal well is located immediately south of Highway 82 and has the potential to impact approximately 4.71 acres of emergent wetlands, which is the least amount of impact **evaluated in this study. The site is >2,000' from the nearest** existing plugged and abandoned well and is **approximately 1500' at the** top of the potential future CO₂ sequestration zone from the nearest mapped fault. An appraisal well placed in this site is expected to penetrate Lower Miocene sands and shales, which are the target formations to test the potential CO₂ storage capacity of the target sands and sealing effectiveness of the shales. Therefore, this site was selected as the Proposed Site for placing the proposed appraisal well.*

9.0 ALTERNATIVE SITE SUMMARY

As stated in Section 1.1, OCM requested an all-inclusive Category 3 assessment along with a complex justification analysis per the New Commercial Development Section of the OCM NAJ Guidelines for the proposed project. As OCM is aware, the goal of an Alternatives Analysis is to identify a location for a proposed development which results in the least amount of adverse impact to coastal resources while allowing the project to fulfill its main objective(s). To satisfy the Alternatives component of this requirement, ConocoPhillips reviewed the feasibility of using five alternative locations using a specific set of siting criteria. **Below is a “Stoplight” Table summarizing the most to least favorable attributes of the siting criteria for each of the alternative locations. It is ConocoPhillips’ position that the proposed site is the least damaging feasible alternative that**

satisfies the project’s main objectives, affords the opportunity to expeditiously progress a CCS project that meets the GHG emissions reduction needs and goals of the state as pronounced in EO JBE 2020-18 and laid forth in the state’s Climate Action Plan.

| Criterion | Preferred Site | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|-----------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|
| Minimized Disturbance to Wetlands | Green | Yellow | Green | Green | Yellow | Yellow |
| Proximity to Faults | Green | Green | Yellow | Yellow | Green | Green |
| Proximity to Existing Wells | Green | Green | Green | Green | Green | Yellow |
| Site Construction Complexity | Green | Green | Green | Red | Green | Green |

Table 1: “Stoplight” Table of Proposed and Alternative Sites

10.0 MODERATE JUSTIFICATION ANALYSIS

10.1 NAJ Guidance Document Questions

1. State the objective(s) of the coastal use (what products and/or services will the development provide) and describe or identify on a map the market to which the products and/or service will be provided.

The reduction of GHG emissions to limit the impacts of climate change has become a priority across the globe. While various solutions have been recognized as a means to address this objective, industrial decarbonization is vital to the state of Louisiana given the significant **presence of power and manufacturing industries in the state’s Coastal Zone**. EO JBE 2020-18 emphasized the importance of reducing GHG emissions, **balanced with maintaining Louisiana’s position as a world leader in energy, industry, agriculture, and transportation**. To meet the net-zero by 2050 GHG emissions reduction goals set forth in JBE 2020-18, implementation of applied solutions to decarbonizing industrial facilities, such as CCS, is critical. The Louisiana Climate Action Plan was developed by the Climate Initiatives Task Force to set forth a strategy to achieve net zero GHG emissions by 2050. The Climate Action Plan recognizes CCS as playing a critical role in meeting these goals. Furthermore, the Louisiana Legislature determined that carbon sequestration projects are favored as a matter of state public policy. La. R.S. **30:1102(A) elaborated on this point, stating that, “It is declared to be in the public interest for a public purpose and the policy of Louisiana that . . . [t]he geologic storage of carbon dioxide will benefit the citizens of the state and the state’s environment by reducing greenhouse gas emissions.”**

The objective of the proposed project is to facilitate the drilling of an appraisal well to perform site characterization operations to further evaluate the subsurface formations

and assess the viability of injection and permanent geologic sequestration of CO₂. The proposed well pad and access route for an appraisal well are a necessary prerequisite **to advancing the Louisiana CCS infrastructure needed to achieve the state's GHG emissions reduction goals.** If appraisal confirms the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to major GHG emission sources within the Sabine Pass region (Figure 1).

According to statewide data, in 2021 Louisiana was the 3rd largest producer of natural gas in the United States and among the top 10 crude oil producing states. As the home of 14 refineries, Louisiana processes nearly 3.2 million barrels of crude oil per day. As the oil and natural gas industry continues to innovate and reduce emissions, CCS will **have an important role in maintaining Louisiana's status as a leading energy state.** CCS technology could work to capture nearly 40 million metric tons of CO₂ emissions annually. **To put that into perspective, that's the equivalent of the CO₂ sequestered by 47 million acres of U.S. forests annually.** The proposed well pad and access route for an appraisal well will improve the existing data on CCS viability in this area, which is prerequisite to **expanding Louisiana's CCS capacity in the vicinity of refineries.** Providing refineries with a path to reduce GHG emissions via CCS allows Louisiana the opportunity to maintain its status as a leading energy state on the forefront of GHG emissions reductions.

2. *Identify on a map all competitor facilities (those providing the same or similar products and/or services to the same market). Provide a narrative explaining the **competitor's location(s) relative to the proposed facility and include any identifiable limitations of each competitor.***

There are no active CCS projects in the Study Area. However, several projects have initiated planning and permitting for their appraisal programs and Class VI UIC Geologic Sequestration Wells in response to the state priorities to reduce GHG emissions, as pronounced in Executive Order JBE 2020-18 and laid forth in the state's Climate Action Plan.

3. *Provide a narrative explaining how the proposed development will introduce or enhance the existing availability of products and/or services in the market area. Include in the narrative an explanation of the coastal water dependent nature of the proposed development (i.e. why the development must be located within or near coastal waters), difference in transport time between that offered by the new development compared to that offered by existing facilities and any other information that the applicant feels demonstrates a demand for the products and/or services to be provided. If proposing a multiple-use development, provide data for each different type of use proposed.*

Both EO JBE 2020-18 and the Louisiana Climate Action Plan emphasized the need for CCS projects to meet the net-zero GHG emissions reduction goals. Furthermore, the Louisiana Legislature determined that carbon sequestration projects are favored as a matter of state public policy. La. R.S. 30:1102(A) elaborated on this point, stating that, **"It is declared to be in the public interest for a public purpose and the policy of Louisiana**

that . . . [t]he geologic storage of carbon dioxide will benefit the citizens of the state and **the state’s environment by reducing greenhouse gas emissions.”**

The proposed well pad and access route for an appraisal well is a necessary prerequisite to advancing the Louisiana CCS infrastructure needed to achieve national and state GHG emissions reduction goals. If appraisal confirms the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to major GHG emission sources within the Sabine Pass region (Figure 1).

4. *Indicate the density and % occupancy of any residential developments identified in #1 and an estimate of how long those developments have been available. If not residential, indicate the type and nature of the existing developments identified in #1 and provide an estimate of available customers that may be drawn to the proposed development.*

While the proposed project is for construction of an appraisal well pad and access route, should appraisal results indicate the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to major GHG emission sources within the Sabine Pass region (Figure 1).

5. *Include a map showing the geographic area identified in #1 above to which the development will provide goods and/or services. Identify on this map the location of other similar existing facilities.*

While the proposed project is for construction of an appraisal well pad and access route, should appraisal results indicate the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to major GHG emission sources within the Sabine Pass region (Figure 1).

6. *Provide the anticipated volume of users from various driving distances and various socio-economic groups within the target geographic area.*

While the proposed project is for construction of an appraisal well pad and access route, should appraisal results indicate the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to major GHG emission sources along the Sabine Pass region (Figure 1). An essential component for any CCS project is transportation of CO₂, and pipelines are a likely means to connect emissions sources with storage facilities. The House Committee on Transportation and Infrastructure, Subcommittee on Railroads, Pipelines, and Hazardous Materials emphasized at the March 2023 hearing on pipeline safety that, **“The safe transmission of carbon dioxide to sequester locations is vital to meeting our carbon reduction goals.”** In a similar vein, the Building American Energy Security Act of 2023 (S. 1399, 118th Congress) would prioritize CO₂ transportation projects as **“strategic national importance.”**

According to a study completed by the Great Plains Institute, the buildout of a CCS network across Louisiana will not only serve as an important source of job growth and emissions reduction but could also generate nearly \$14 billion in private investment

across many communities as facilities are retrofitted with new equipment and CO₂ pipelines are constructed.

If appraisal indicates the site is suitable for CCS, ConocoPhillips will analyze various options for CO₂ transportation. The analysis will consider cumulative impacts, safety, and all applicable regulations for CO₂ pipelines.

7. *Provide existing retail goods and services expenditures trends over the last ten years for the target geographic area.*

Providing industrial facilities with a path to reduce GHG emissions via CCS allows Louisiana the opportunity to maintain its status as a leading energy state on the forefront of GHG emissions reductions. The Louisiana Climate Action Plan notes that industrial **sector emissions are Louisiana's largest contributing source of GHG emissions, and** facilities that have been permitted, but not yet built, could potentially add 100 MMT CO₂e to industrial emissions. CCS is recognized by the state as a solution to reducing GHG emissions that would otherwise be emitted to the environment. If appraisal confirms the site is suitable for CCS, ConocoPhillips aims to implement a CCS project in proximity to emission sources within the Sabine Pass region, providing industrial facilities with a path to reduce GHG emissions via CCS.

8. *Provide population trend data and household income trend data over the last ten years.*

N/A

9. *Provide labor force trend data over the last ten years in the target geographic area.*

While the proposed project is for construction of an appraisal well pad and access route, should appraisal results confirm the site is suitable for CCS, ConocoPhillips would seek to provide a service to offtake CO₂ emissions within the Sabine Pass region. The advancement of the Louisiana CCS infrastructure needed to achieve national and state GHG emissions reduction goals has the potential to create jobs, as well as draw on the **state's industrial and manufacturing workforce strengths**. Several studies and analyses in the Climate Action Plan highlight job creation around CCS and the skillset needed to meet the GHG emissions reduction goals.

10. *If a multiple-use development is proposed, provide letters of intent from potential tenants (indicate if confidential).*

N/A

11.0 JUSTIFICATION SUMMARY

According to OCM's *Guide to Developing Alternatives and Justification Analyses for Proposed Uses within the Louisiana Coastal Zone*, the goal of a Justification Analysis is to ensure that there is a

public need and demand for goods to be provided by the development and that there is a reasonable chance that the development will be successful.

Both EO JBE 2020-18 and the Louisiana Climate Action Plan emphasized the need for CCS projects to meet the net-zero GHG emissions reduction goals. Furthermore, the Louisiana Legislature determined that carbon sequestration projects are favored as a matter of state public policy. La. R.S. **30:1102(A) elaborated on this point, stating that, "It is declared to be in the public interest for a public purpose and the policy of Louisiana that . . . [t]he geologic storage of carbon dioxide will benefit the citizens of the state and the state's environment by reducing GHG emissions."**

The proposed well pad and access route for an appraisal well is a necessary prerequisite to advancing the Louisiana CCS infrastructure needed to achieve national and state GHG emissions reduction goals.

12.0 CONCLUSION

OCM is responsible for determining if a project adheres to Coastal Use Guidelines and minimizing adverse impacts to coastal resources wherever possible. Pursuant to La. RS 49:214.27.B and C., OCM uses the Coastal Use Guidelines, in LAC Title 43, Part I, Chapter 7, Subpart B, §701-719, to determine the type of information needed to fully evaluate a particular use and the adverse impacts that must be avoided to the maximum extent practicable.

Part of these guidelines, §701.H, charges OCM with ensuring that the public benefits of a proposed coastal use clearly outweigh any adverse impacts to public resources resulting from that use.

Based on the information included in Joint Permit Application and figures and the information presented in this report, it is ConocoPhillips' **position that the proposed project at the** proposed site has avoided/minimized impacts to coastal resources to the maximum extent practicable and the need for this project has been clearly demonstrated. Therefore, the proposed project adheres to the Coastal Use Guidelines mentioned above and meets the requirements defined in the NAJ Guidance Document.

13.0 REFERENCES

Carbon Capture, Utilization, and Sequestration Guidance, 87 Fed. Reg. 8808 (proposed February 16, 2022) <https://www.federalregister.gov/documents/2022/02/16/2022-03205/carbon-capture-utilization-and-sequestration-guidance>

LA. REV. STAT. § 30:1102(A) (2022) <http://legis.la.gov/legis/Law.aspx?d=670788>

Louisiana Exec. Order No. JBE 2020-18 (August 19, 2020), <https://gov.louisiana.gov/assets/ExecutiveOrders/2020/JBE-2020-18-Climate-Initiatives-Task-Force.pdf>

"Louisiana Climate Action Plan." Climate Initiatives Task Force, Office of the Governor (February 2022), https://gov.louisiana.gov/assets/docs/CCI-Task-force/CAP/Climate_Action_Plan_FINAL_3.pdf

Blondes, M. et. al & Geological Survey issuing body (2013). *National assessment of geologic carbon dioxide storage resources : Methodology implementation*. U.S. Department of the Interior, U.S. Geological Survey. <https://permanent.fdlp.gov/gpo41260/OF13-1055.pdf>

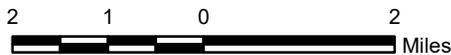
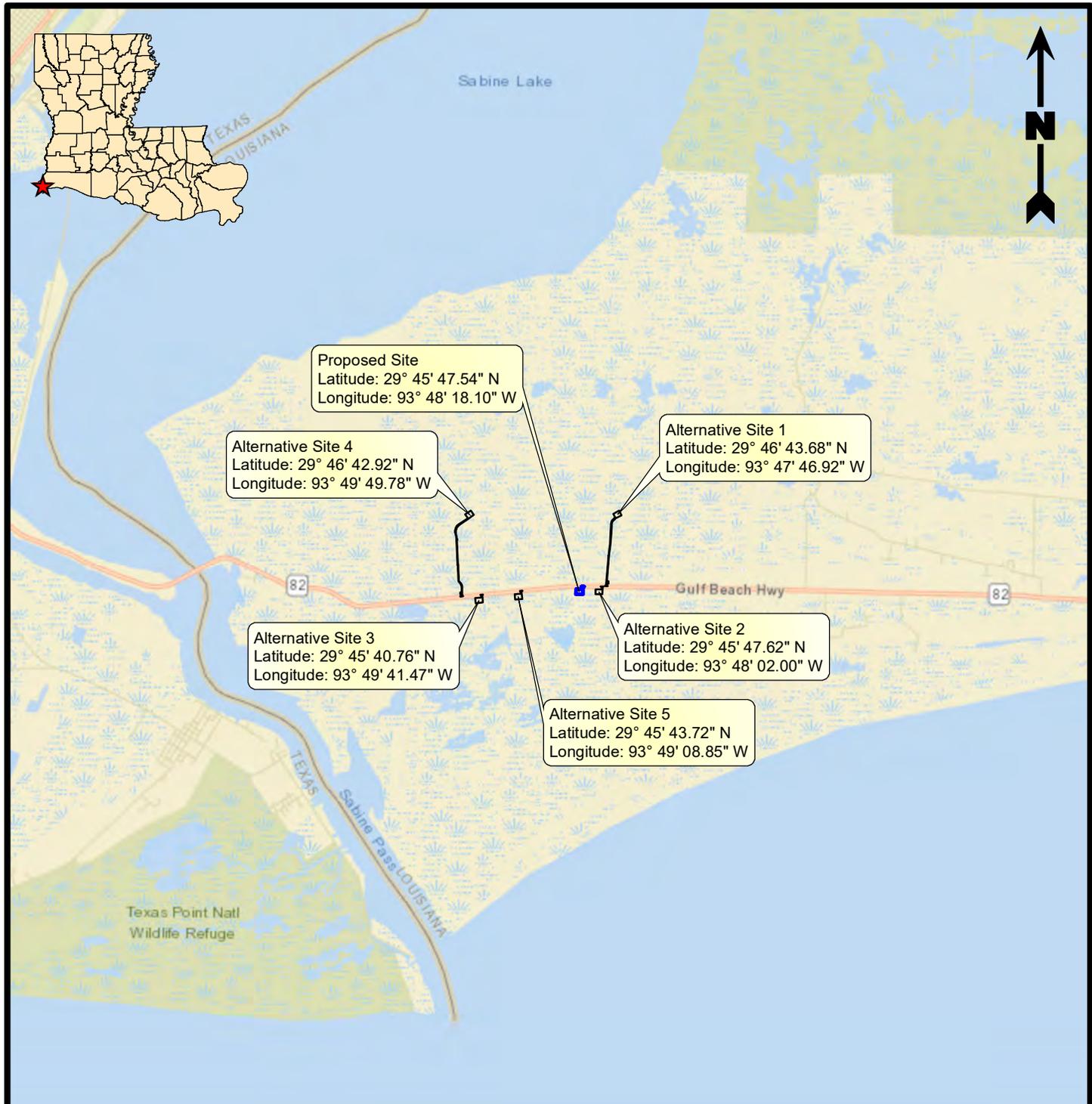
Roberts-Ashby, T. & Geological Survey issuing body. (2014). *Geologic framework for the national assessment of carbon dioxide storage resources*. Chapter H. U.S. Gulf Coast. U.S. Department of the Interior, Geological Survey. <https://permanent.fdlp.gov/gpo111309/ofr2012-1024h.pdf>

Zulqarnain, M, Sears, S. O., Zeidouni, M., Hughes, R. G., Carlson, D., & Rivera, C. F. (2023). GCS site selection in saline Miocene formations in South Louisiana. *International Journal of Greenhouse Gas Control*, 122, 103818. <https://doi.org/10.1016/j.ijggc.2022.103818>

U.S House Committee on Transportation and Infrastructure, Subcommittee on Railroads, Pipelines, and Hazardous Materials, *Pipeline Safety: Reviewing Implementation of the PIPES Act of 2020 and Examining Future Safety Needs*. (HHRG-118-PW14-20230308; March 8, 2023) <https://transportation.house.gov/calendar/eventsingle.aspx?EventID=406183>

S.1899 – 118th Congress (2023 - 2024): Building American Energy Security Act of 2023, S. 1899, 118th Cong. (2023), <https://www.energy.senate.gov/services/files/3B223C58-3777-4371-B680-49619A88059D>

ATTACHMENT A
ALTERNATIVE SITES HABITAT ASSESSMENT AND PROPOSED IMPACTS



Legend

Proposed Site Alternative Site

Note

All coordinates shown are referenced to geographic coordinate system (NAD83).

Reference

Base map comprised of ESRI StreetMap USA data.

Vicinity Map

Needs, Alternatives, and Justification Analyses
Habitat Assessment and Proposed Impacts
Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company

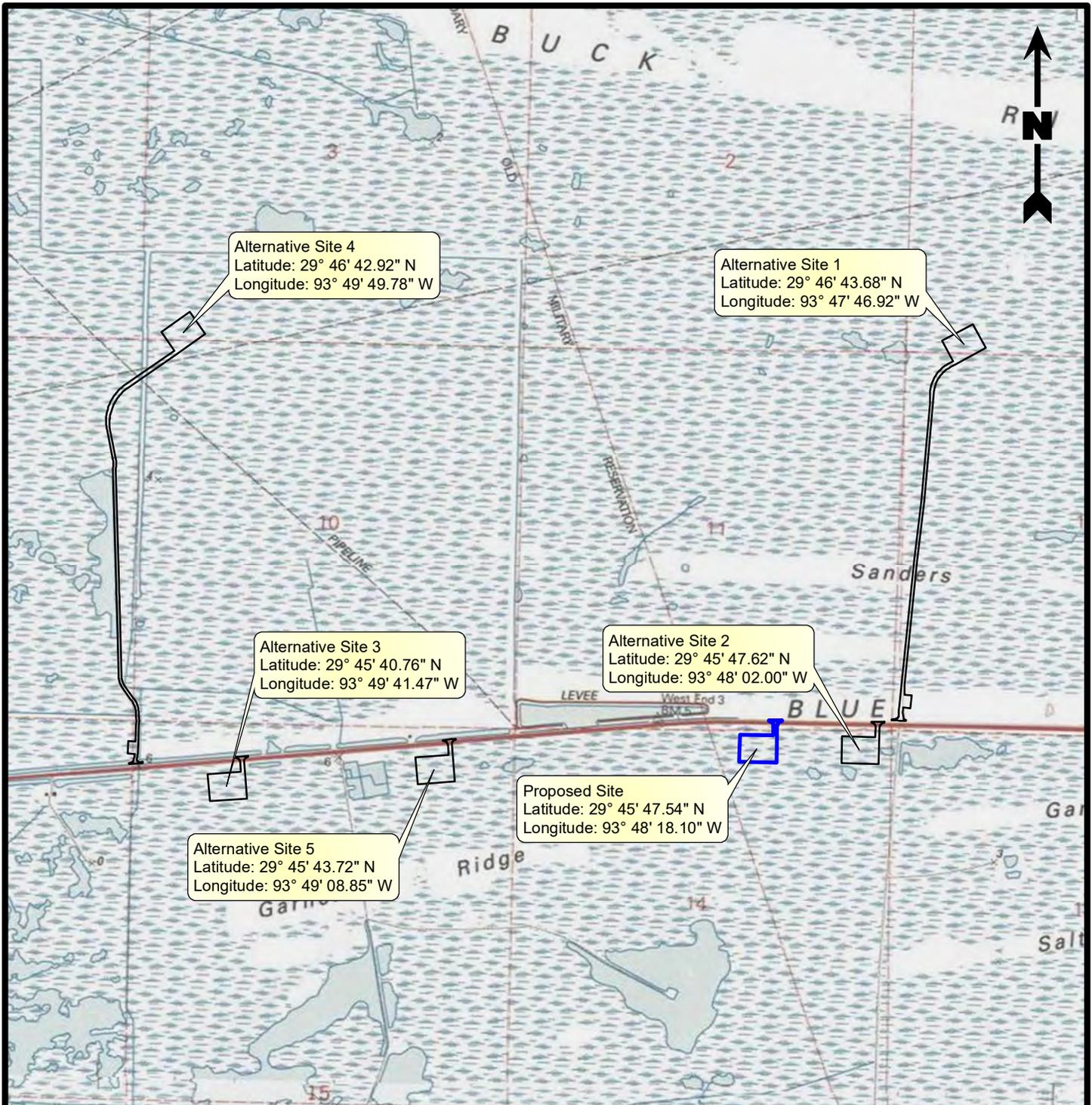
Project Gumbo North



PROVIDENCE

| | | |
|-------------|-----|----------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |

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|---------------------------------|--------------------|
| Project Number 1429-007 | 1 Figure |
| Drawing Number 1429-007-A043 | |



Alternative Site 4
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 Longitude: 93° 49' 49.78" W

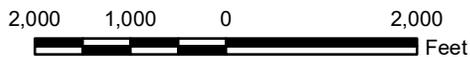
Alternative Site 1
 Latitude: 29° 46' 43.68" N
 Longitude: 93° 47' 46.92" W

Alternative Site 3
 Latitude: 29° 45' 40.76" N
 Longitude: 93° 49' 41.47" W

Alternative Site 2
 Latitude: 29° 45' 47.62" N
 Longitude: 93° 48' 02.00" W

Alternative Site 5
 Latitude: 29° 45' 43.72" N
 Longitude: 93° 49' 08.85" W

Proposed Site
 Latitude: 29° 45' 47.54" N
 Longitude: 93° 48' 18.10" W



Legend

 Proposed Site  Alternative Site

Note

All coordinates shown are referenced to geographic coordinate system (NAD83).

Reference

Base map comprised of U.S.G.S. 7.5-minute topographic maps, "West of Johnsons Bayou, LA" and "Texas Point, LA".

Site Location Map

Needs, Alternatives, and Justification Analyses
 Habitat Assessment and Proposed Impacts
 Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company

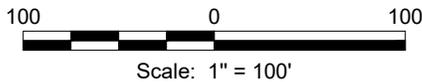
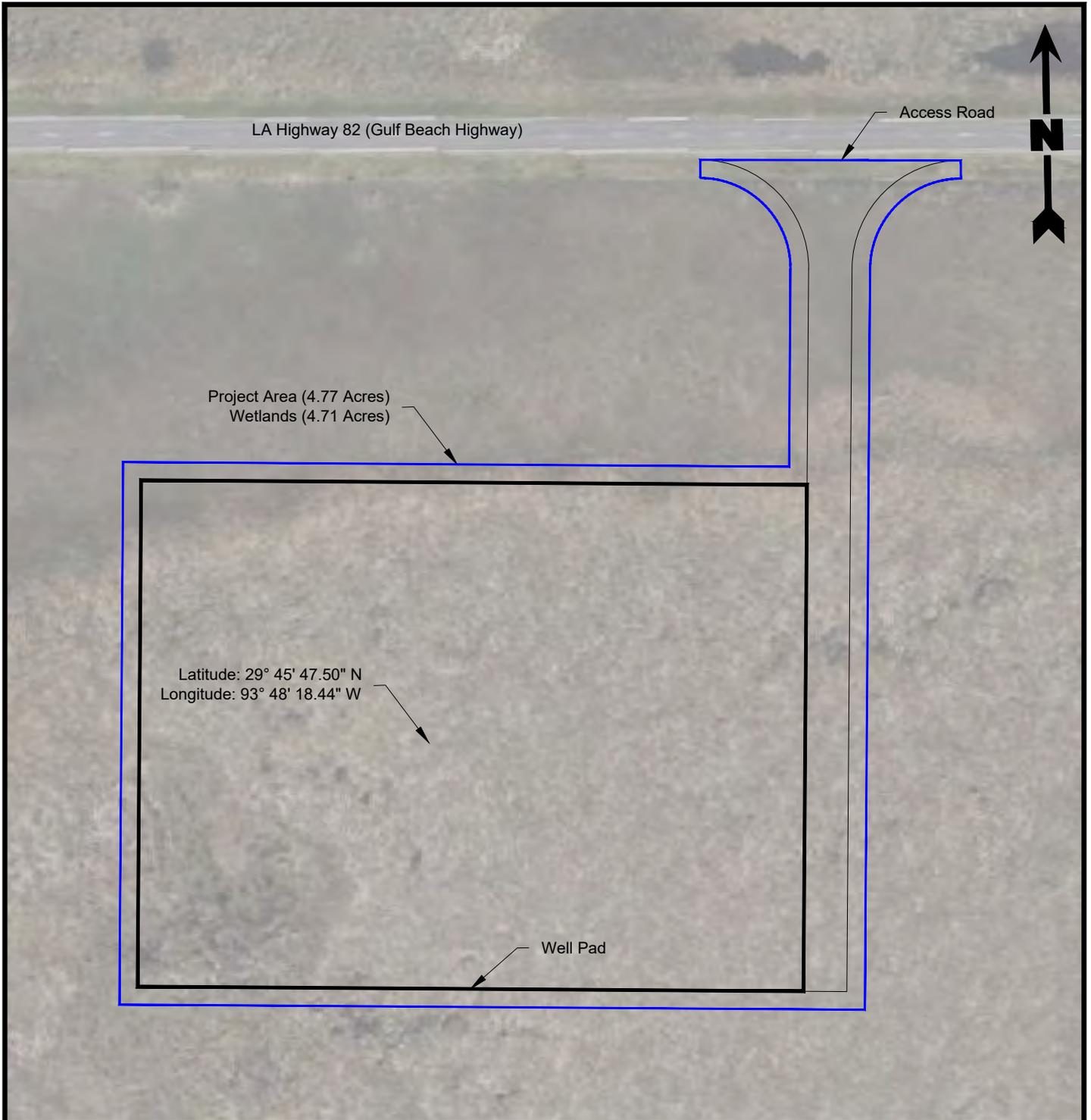
Project Gumbo North



PROVIDENCE

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| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |

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|---------------------------------|--------------------|
| Project Number 1429-007 | 2 Figure |
| Drawing Number 1429-007-A044 | |



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

**Proposed Site
(Gumbo North)**
Needs, Alternatives, and Justification Analyses
Habitat Assessment and Proposed Impacts
Johnson Bayou, Cameron Parish, Louisiana

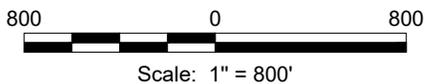
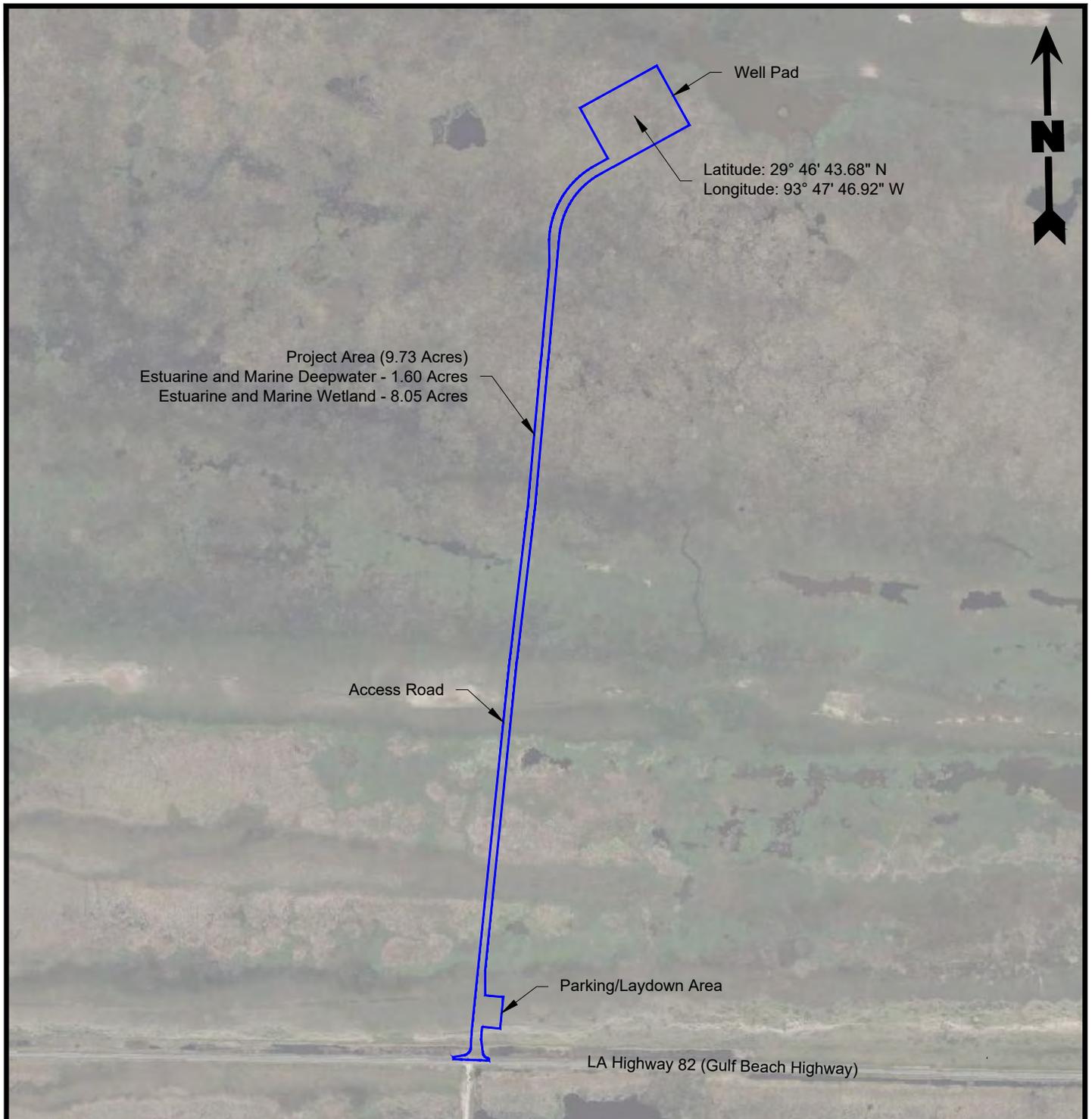
ConocoPhillips Company
Project Gumbo North

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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |



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| Project Number 1429-007 |
| Drawing Number 1429-007-A045 |

3
Figure



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

Alternative Site No. 1

**Needs, Alternatives, and Justification Analyses
Habitat Assessment and Proposed Impacts
Johnson Bayou, Cameron Parish, Louisiana**

ConocoPhillips Company

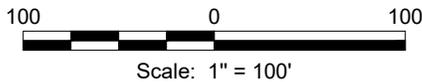
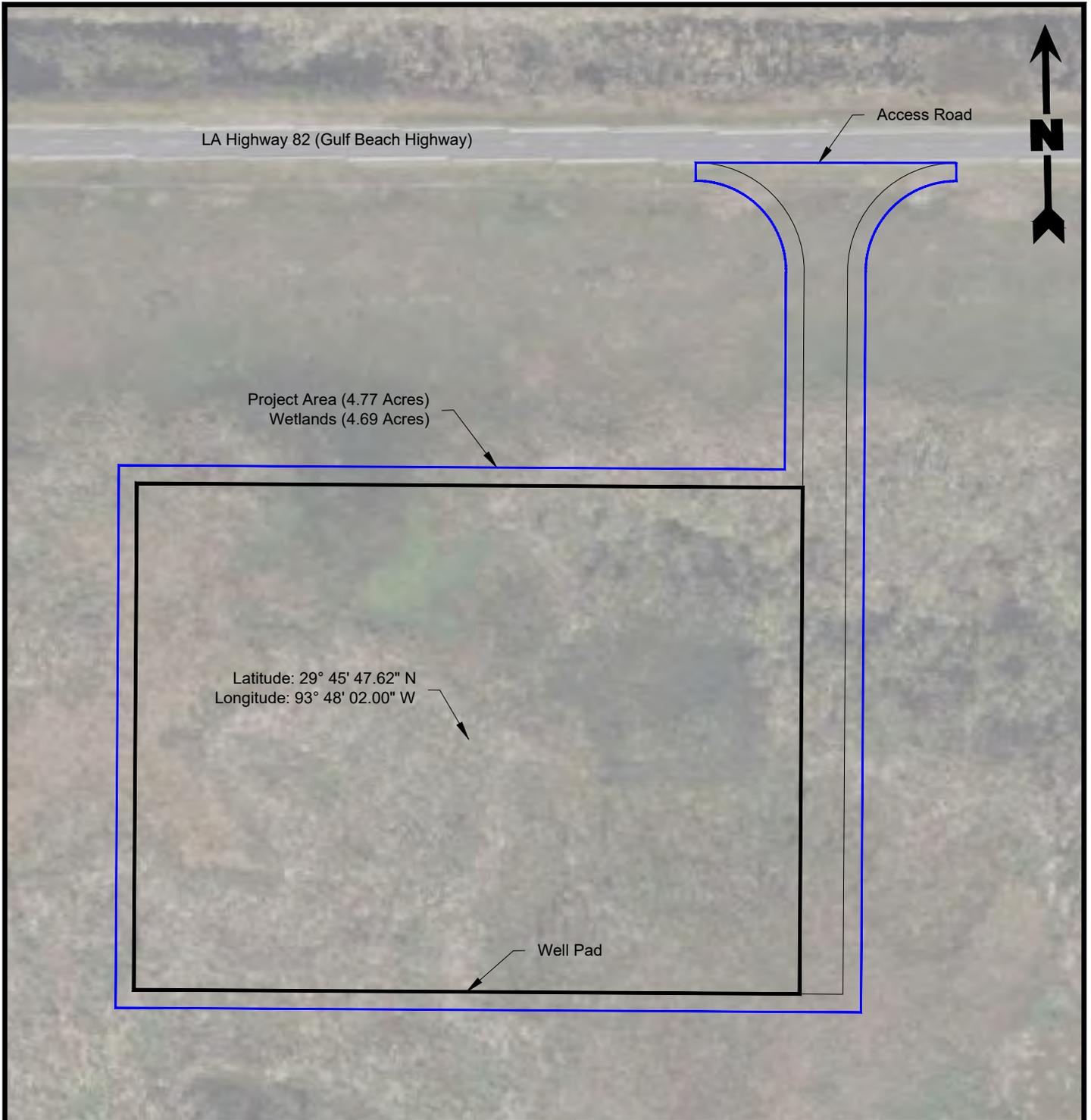
Project Gumbo North

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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |



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| Project Number 1429-007 |
| Drawing Number 1429-007-A048 |

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| 4 |
| Figure |



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

Alternative Site No. 2

Needs, Alternatives, and Justification Analyses
 Habitat Assessment and Proposed Impacts
 Johnson Bayou, Cameron Parish, Louisiana

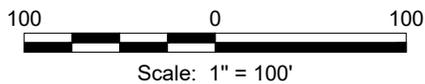
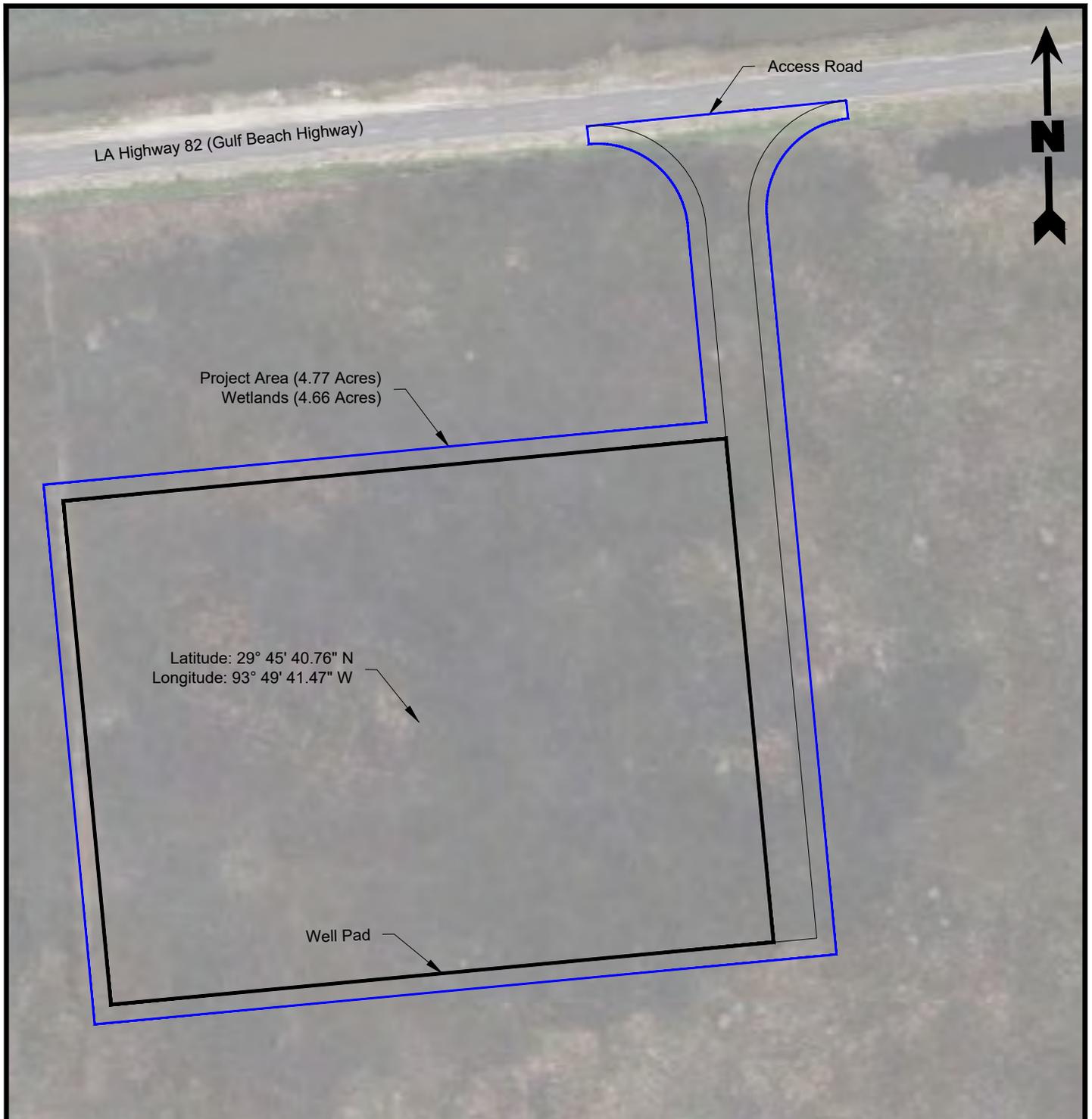
ConocoPhillips Company

Project Gumbo North



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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |

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|---------------------------------|--------------------|
| Project Number 1429-007 | 5 Figure |
| Drawing Number 1429-007-A047 | |



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

Alternative Site No. 3

Needs, Alternatives, and Justification Analyses
 Habitat Assessment and Proposed Impacts
 Johnson Bayou, Cameron Parish, Louisiana

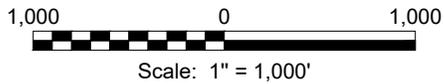
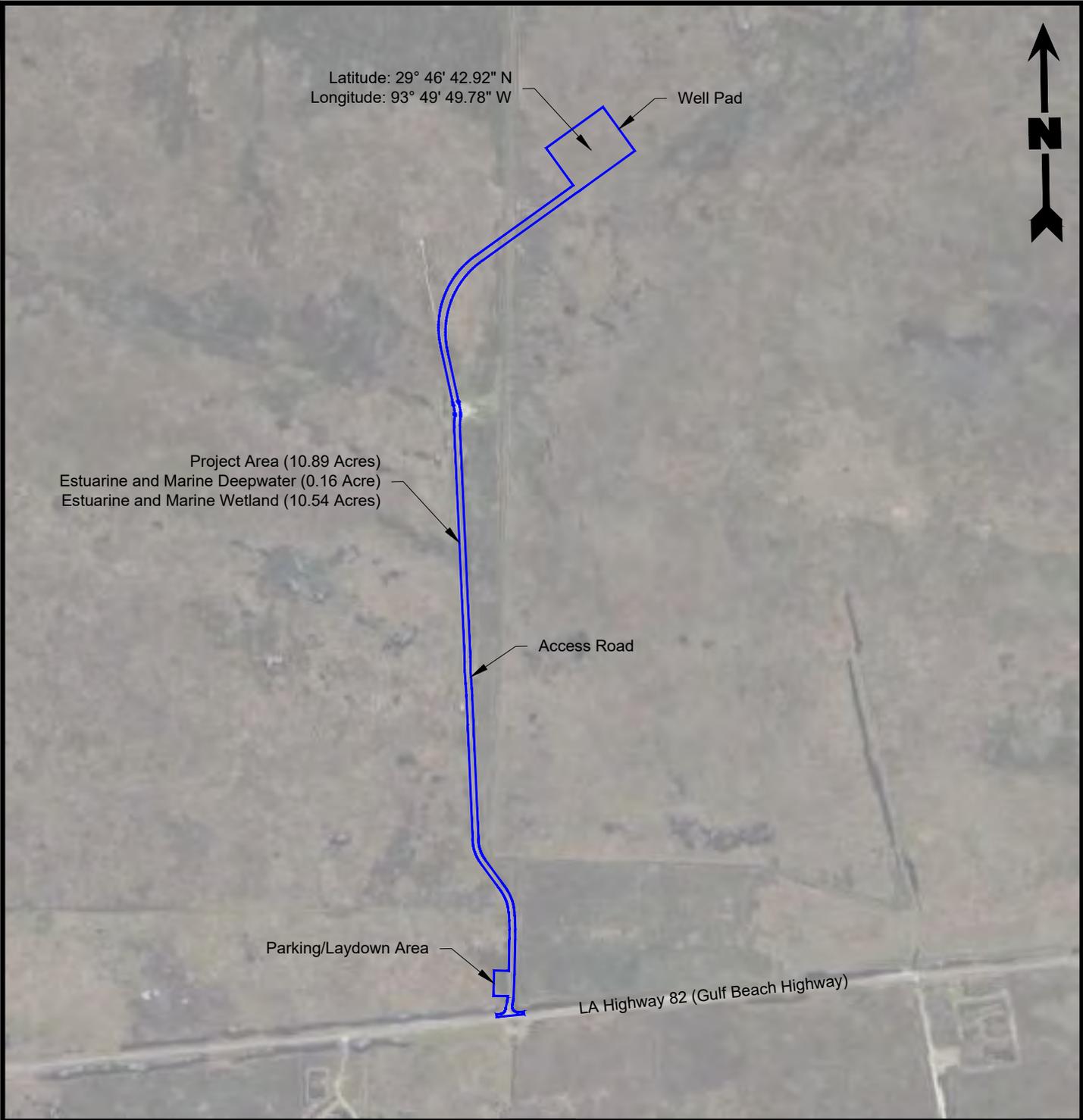
ConocoPhillips Company

Project Gumbo North



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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |

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| Project Number 1429-007 | 6 Figure |
| Drawing Number 1429-007-A046 | |



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

Alternative Site No. 4

Needs, Alternatives, and Justification Analyses
Habitat Assessment and Proposed Impacts
Johnson Bayou, Cameron Parish, Louisiana

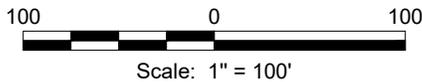
ConocoPhillips Company

Project Gumbo North



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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |

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| Project Number 1429-007 | 7 Figure |
| Drawing Number 1429-007-A082 | |



Notes

1. All coordinates shown are referenced to geographic coordinate system (NAD83).
2. Habitat acreages were based on National Wetland Inventory Data.

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers, exported 12/13/23.

Alternative Site No. 5

Needs, Alternatives, and Justification Analyses
 Habitat Assessment and Proposed Impacts
 Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company

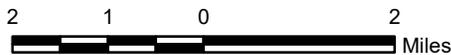
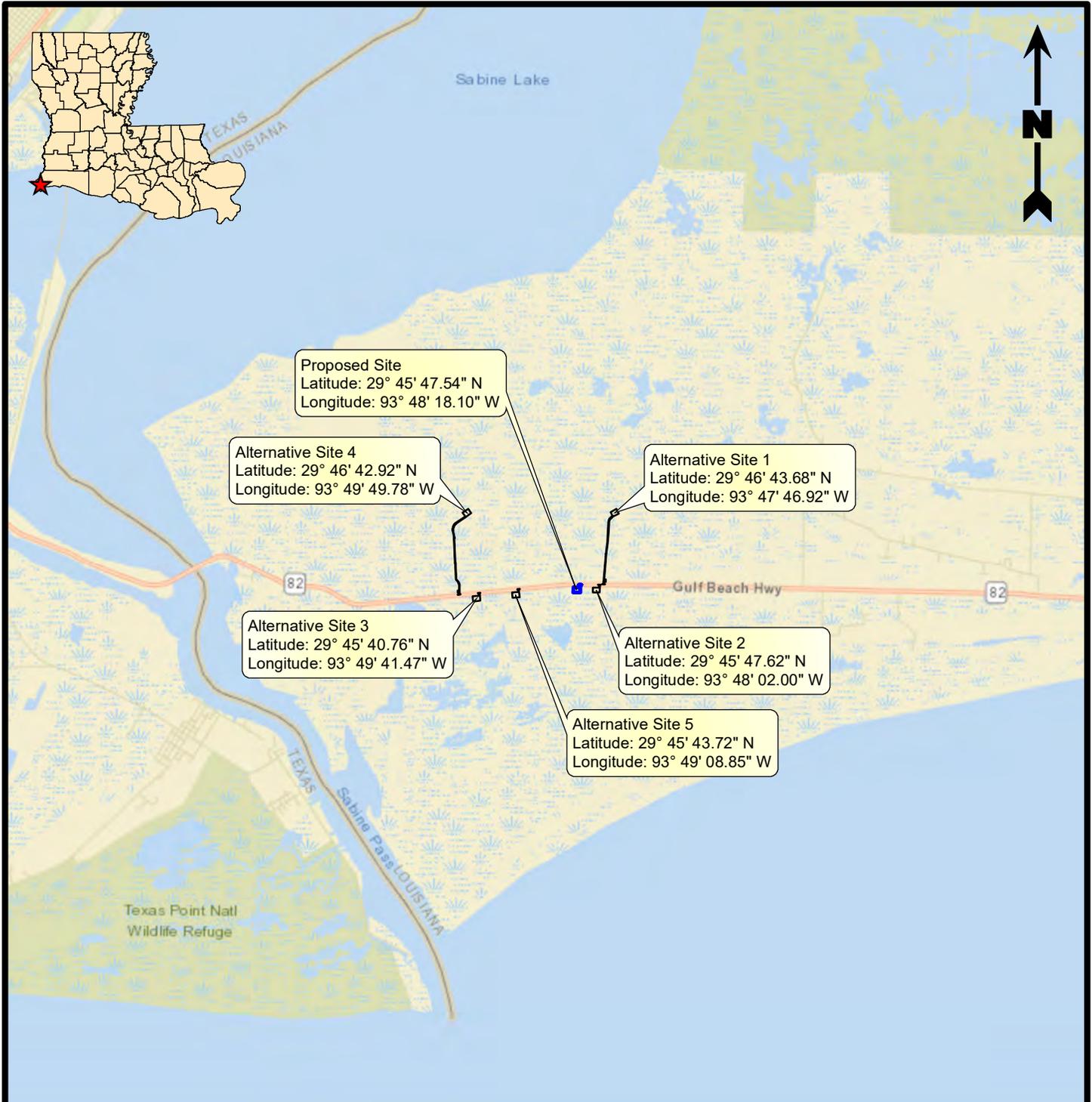
Project Gumbo North



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| Drawn By | LMM | 01/03/24 |
| Checked By | LMH | 01/03/24 |
| Approved By | TCK | 01/03/24 |

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| Project Number 1429-007 | 8 Figure |
| Drawing Number 1429-007-A083 | |

ATTACHMENT B
LAND USE / LAND COVER



Legend

Proposed Site Alternative Site

Note

All coordinates shown are referenced to geographic coordinate system (NAD83).

Reference

Base map comprised of ESRI StreetMap USA data.

Vicinity Map

Needs, Alternatives, and Justification Analyses
Land Use/Land Cover

Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company

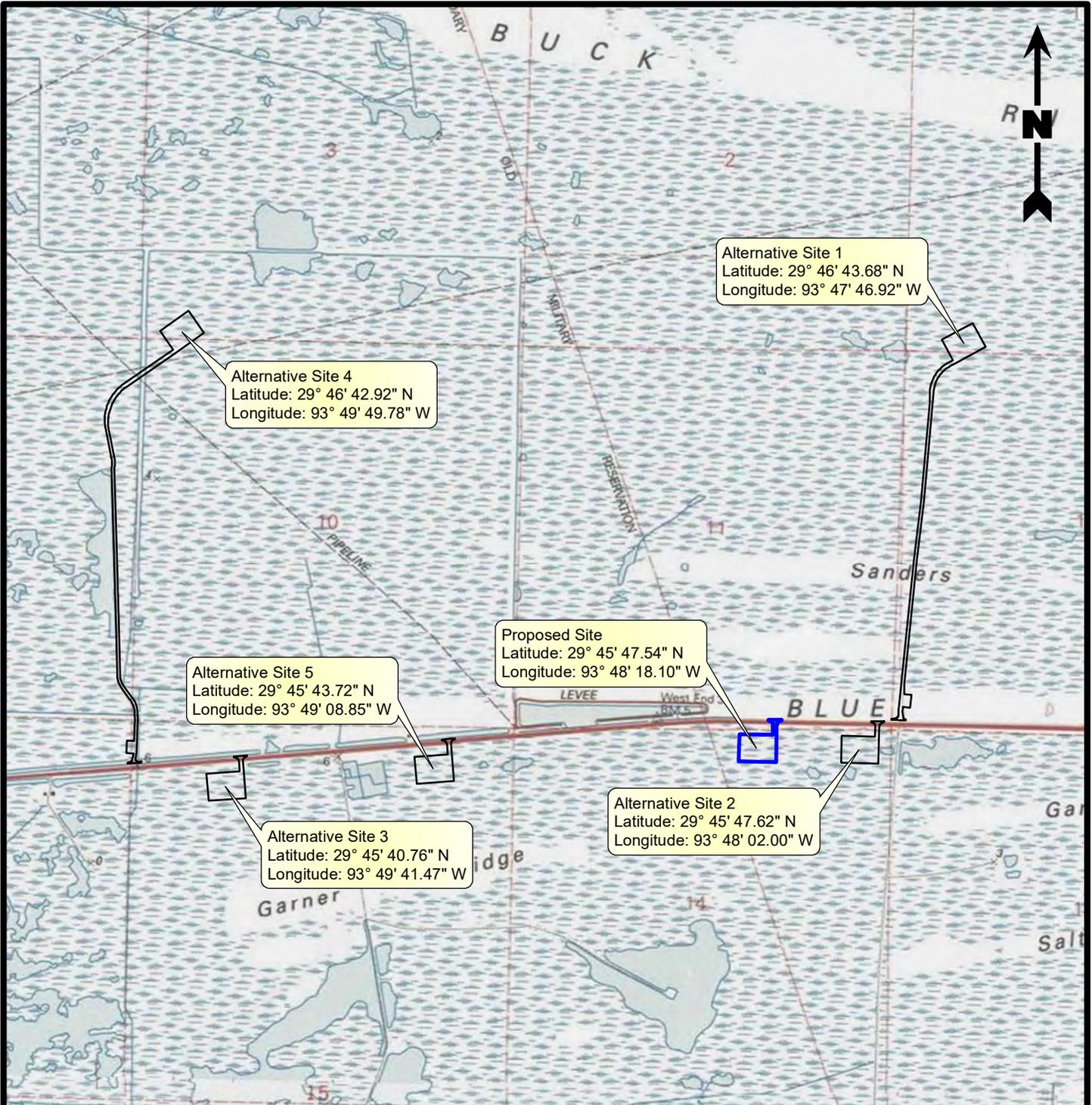
Project Gumbo North



PROVIDENCE

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| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |

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| Project Number 1429-007 | 1 Figure |
| Drawing Number 1429-007-A057 | |



Alternative Site 1
 Latitude: 29° 46' 43.68" N
 Longitude: 93° 47' 46.92" W

Alternative Site 4
 Latitude: 29° 46' 42.92" N
 Longitude: 93° 49' 49.78" W

Proposed Site
 Latitude: 29° 45' 47.54" N
 Longitude: 93° 48' 18.10" W

Alternative Site 5
 Latitude: 29° 45' 43.72" N
 Longitude: 93° 49' 08.85" W

Alternative Site 2
 Latitude: 29° 45' 47.62" N
 Longitude: 93° 48' 02.00" W

Alternative Site 3
 Latitude: 29° 45' 40.76" N
 Longitude: 93° 49' 41.47" W



Legend

Proposed Site Alternative Site

Note

All coordinates shown are referenced to geographic coordinate system (NAD83).

Reference

Base map comprised of U.S.G.S. 7.5-minute topographic maps, "West of Johnsons Bayou, LA" and "Texas Point, LA".

Site Location Map

Needs, Alternatives, and Justification Analyses
 Land Use/Land Cover
 Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company

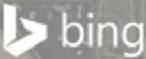
Project Gumbo North



PROVIDENCE

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| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |

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| Project Number 1429-007 | 2 Figure |
| Drawing Number 1429-007-A058 | |



Legend

Proposed Site Alternative Site

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2023 Microsoft Corporation and its data suppliers.

Index Map

Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
 Johnson Bayou, Cameron Parish, Louisiana

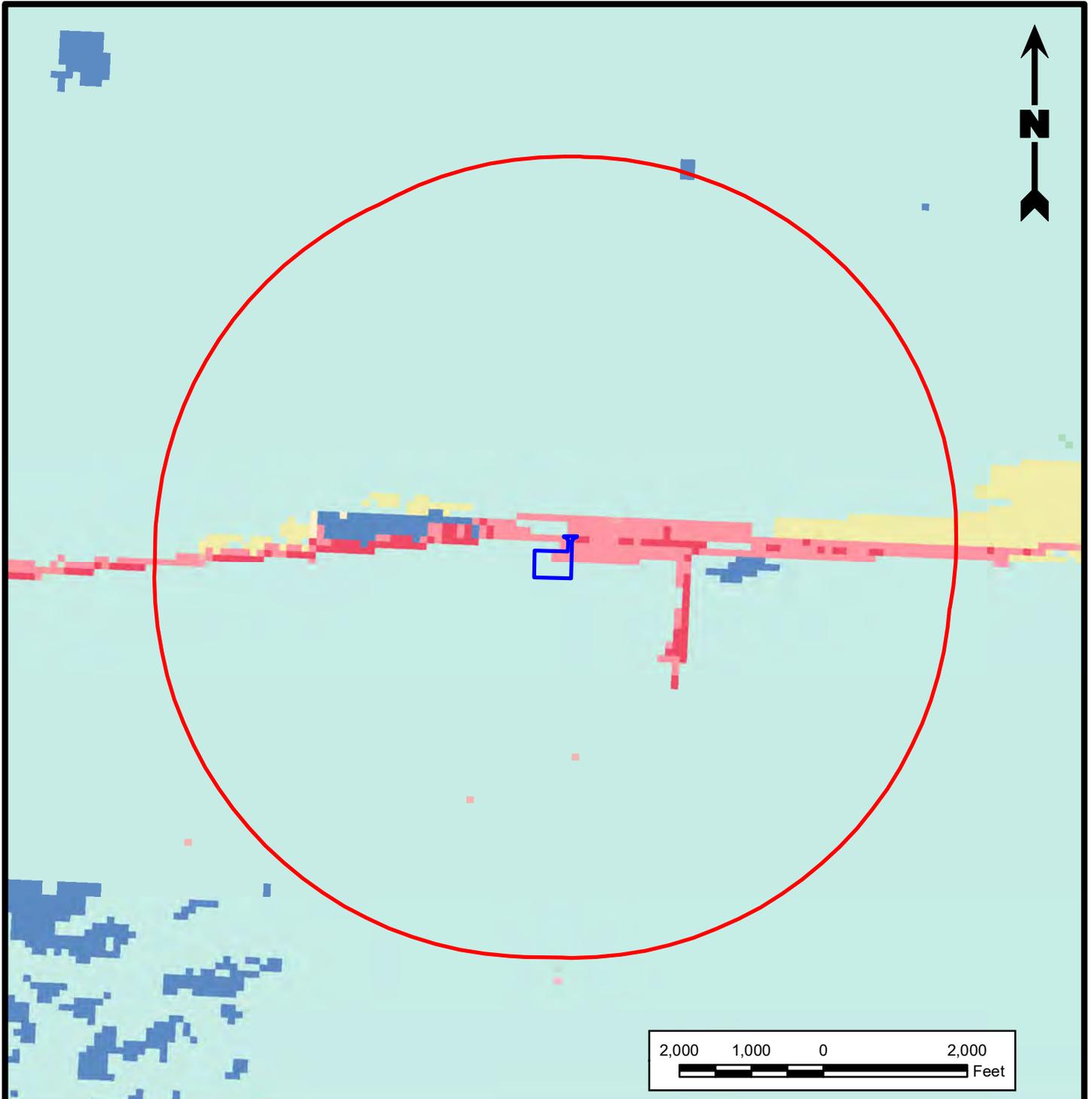
ConocoPhillips Company
 Project Gumbo North



PROVIDENCE

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| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |

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| Project Number 1429-007 | 3 Figure |
| Drawing Number 1429-007-A059 | |



Legend

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|--|--------------------------|--|------------------------------|--|------------------|
| | Proposed Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

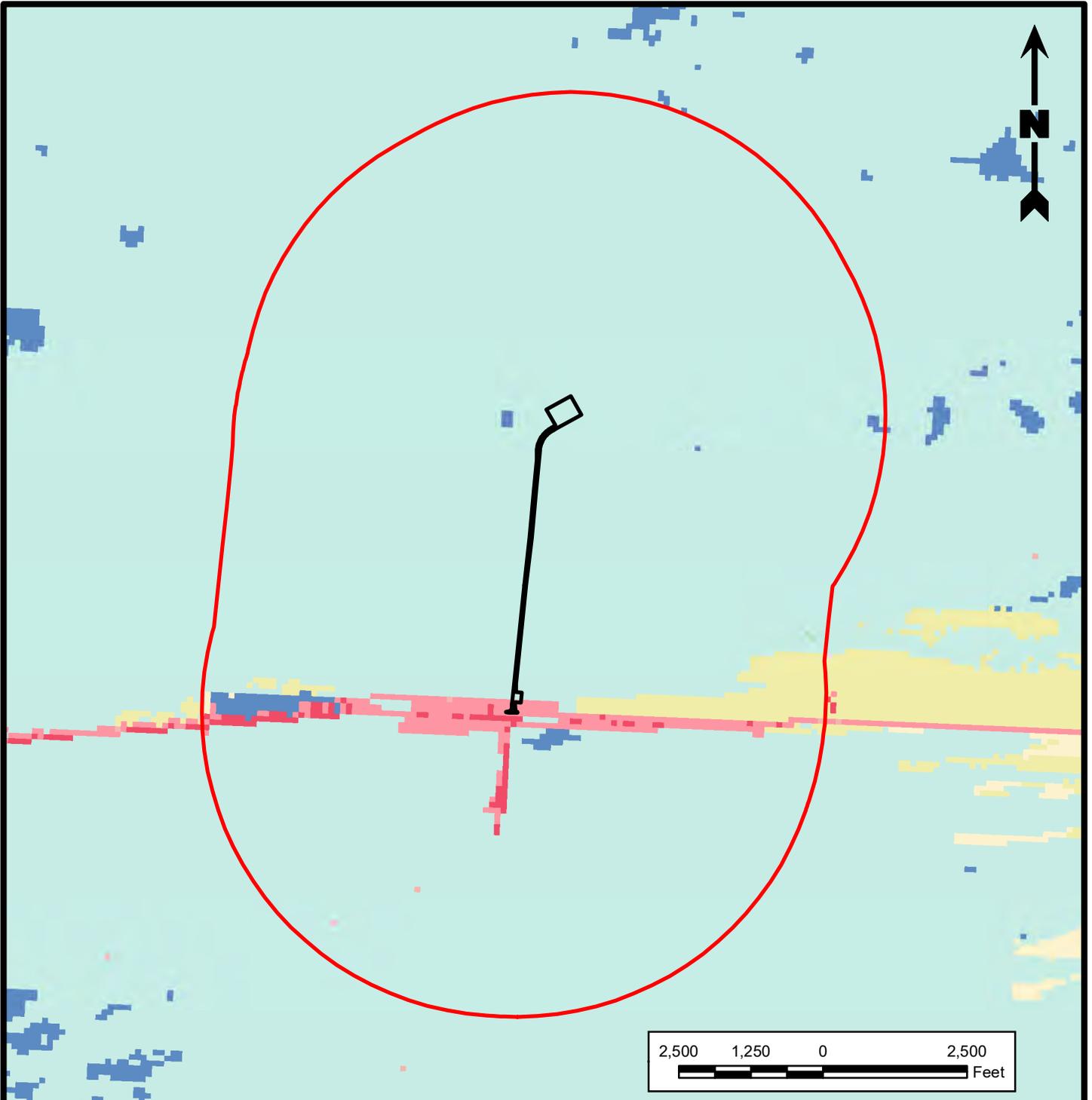
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**Land Use/Land Cover Map
(Proposed Site)**
Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company
Project Gumbo North



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|---------------------------------|-----|---------------------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | 4a Figure |
| Drawing Number 1429-007-A060 | | |



Legend

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|--|--------------------------|--|------------------------------|--|------------------|
| | Alternative Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

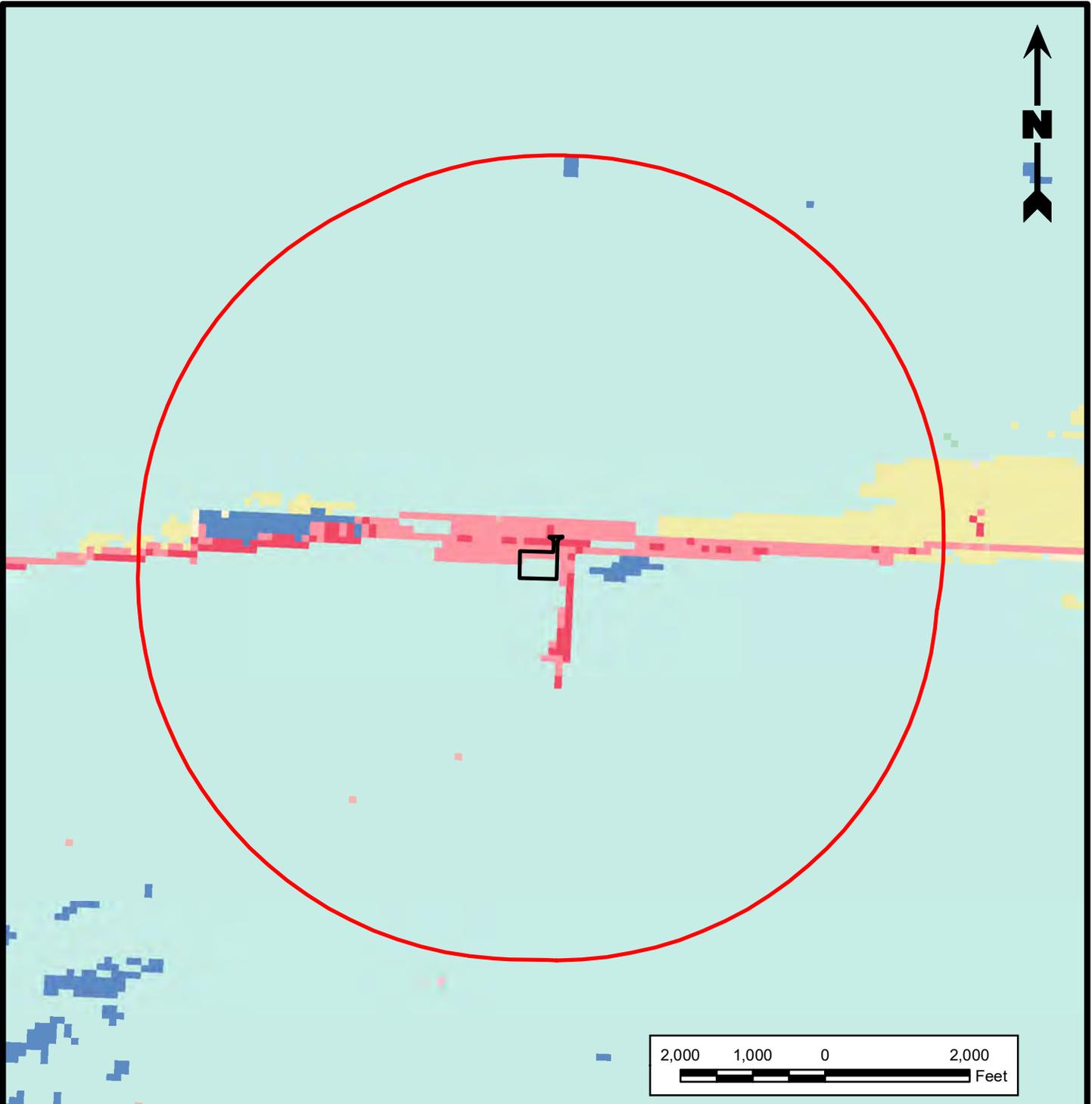
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**Land Use/Land Cover Map
(Alternative Site No. 1)**
Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company
Project Gumbo North



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|---------------------------------|-----|---------------------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | |
| Drawing Number 1429-007-A063 | | 4b Figure |



Legend

| | | | | | |
|--|--------------------------|--|------------------------------|--|------------------|
| | Alternative Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

Land Use/Land Cover data comprised of ESRI USA NLCD Land Cover, exported 12/13/23.

**Land Use/Land Cover Map
(Alternative Site No. 2)**
Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
Johnson Bayou, Cameron Parish, Louisiana

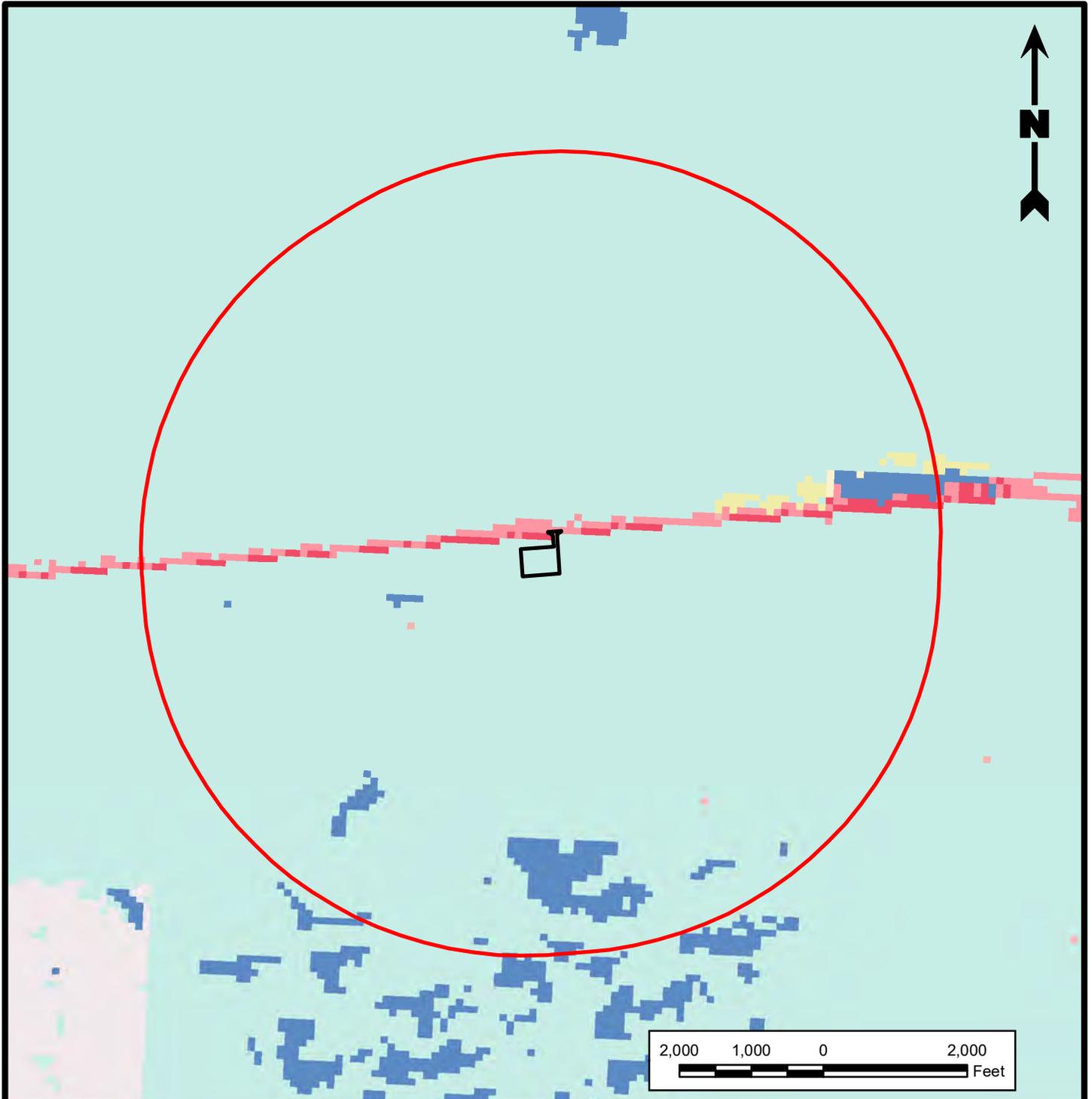
ConocoPhillips Company
Project Gumbo North



PROVIDENCE

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| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | |
| Drawing Number 1429-007-A062 | | 4c Figure |

Providence Engineering and Environmental Group LLC



Legend

| | | | | | |
|--|--------------------------|--|------------------------------|--|------------------|
| | Alternative Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

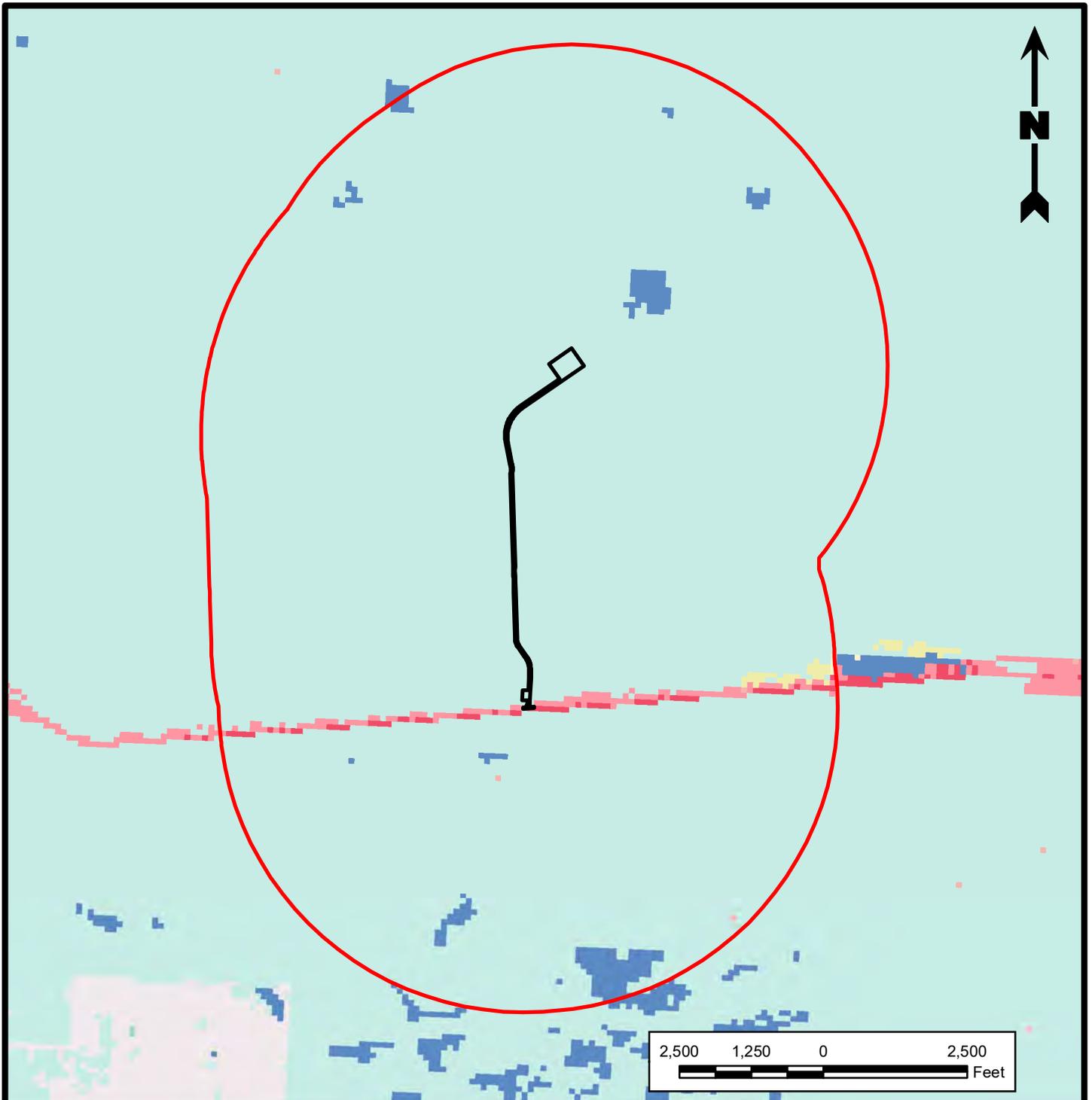
Land Use/Land Cover data comprised of ESRI USA NLCD Land Cover, exported 12/13/23.

**Land Use/Land Cover Map
(Alternative Site No. 3)
Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
Johnson Bayou, Cameron Parish, Louisiana**

ConocoPhillips Company
Project Gumbo North



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|---------------------------------|-----|---------------------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | 4d Figure |
| Drawing Number 1429-007-A061 | | |



Legend

| | | | | | |
|--|--------------------------|--|------------------------------|--|------------------|
| | Alternative Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

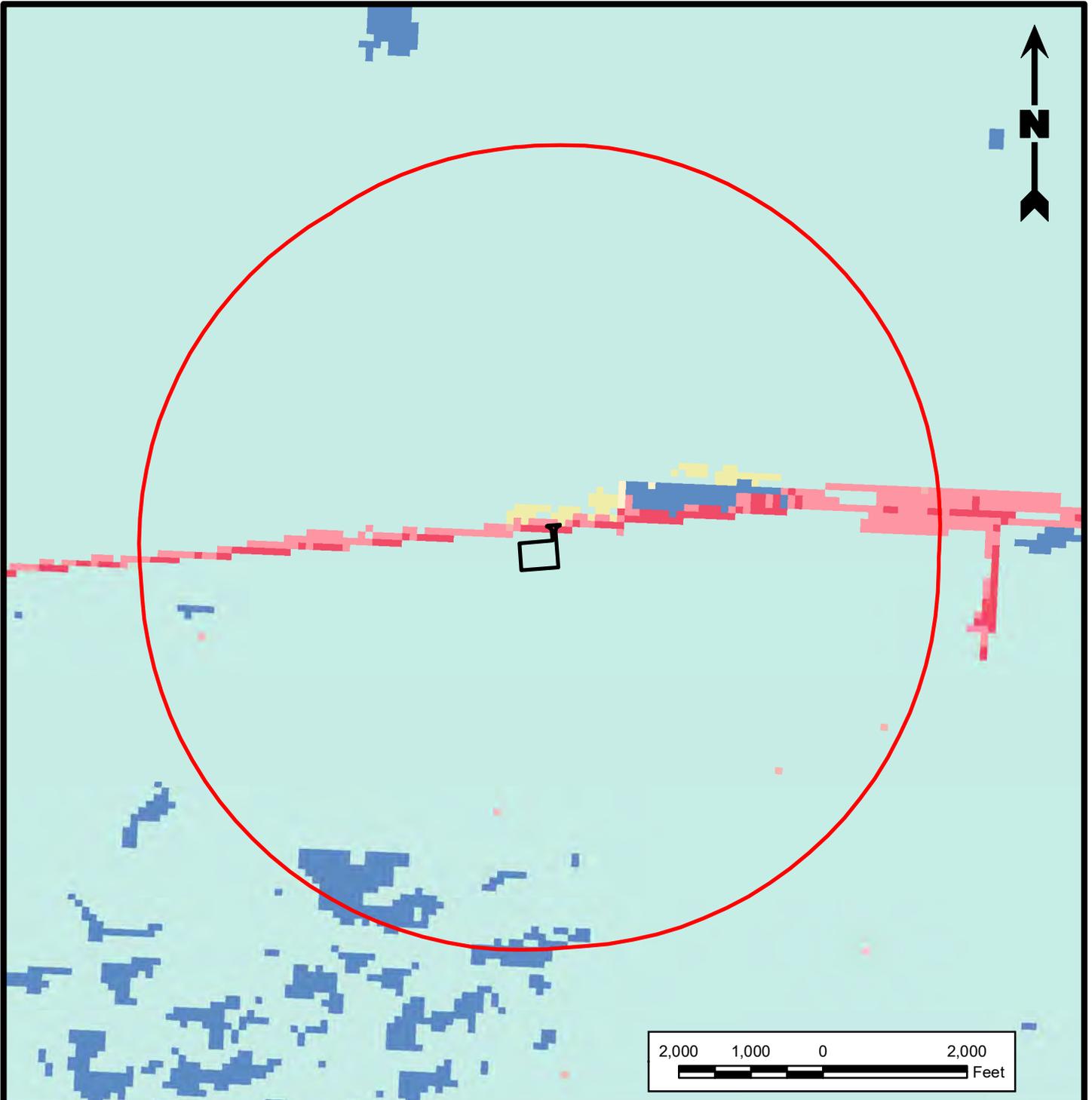
Land Use/Land Cover data comprised of ESRI USA NLCD Land Cover, exported 12/13/23.

Land Use/Land Cover Map (Alternative Site No. 4)
 Needs, Alternatives, and Justification Analyses
 Land Use/Land Cover
 Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company
 Project Gumbo North



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|---------------------------------|-----|---------------------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | |
| Drawing Number 1429-007-A080 | | 4e Figure |



Legend

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|--|--------------------------|--|------------------------------|--|------------------|
| | Alternative Site | | Developed Medium Intensity | | Mixed Forest |
| | One-Mile Buffer | | Developed Open Space | | Moss |
| | Barren Land | | Dwarf Scrub | | Open Water |
| | Cultivated Crops | | Emergent Herbaceous Wetlands | | Pasture/Hay |
| | Deciduous Forest | | Evergreen Forest | | Sedge/Herbaceous |
| | Developed High Intensity | | Grassland/Herbaceous | | Shrub/Scrub |
| | Developed Low Intensity | | Lichens | | Woody Wetlands |

Reference

Land Use/Land Cover data comprised of ESRI USA NLCD Land Cover, exported 12/13/23.

**Land Use/Land Cover Map
(Alternative Site No. 5)**
Needs, Alternatives, and Justification Analyses
Land Use/Land Cover
Johnson Bayou, Cameron Parish, Louisiana

ConocoPhillips Company
Project Gumbo North



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|---------------------------------|-----|---------------------|
| Drawn By | LMM | 01/03/23 |
| Checked By | LMH | 01/03/23 |
| Approved By | TCK | 01/03/23 |
| Project Number 1429-007 | | 4f Figure |
| Drawing Number 1429-007-A081 | | |

EXHIBIT A
REGIONAL SCREENING OF POTENTIAL CO₂ SEQUESTRATION SITES

Introduction

The potential for suitable reservoirs in which CO₂ can be sequestered in onshore and offshore regions of the Gulf Coast Basin is well documented by studies such as the National Assessment of Geologic Carbon Dioxide Storage Resources – Methodology and Implementation, and the Geologic Framework for the National Assessment of Carbon Dioxide Storage Resources – U.S. Gulf Coast. Both studies were completed by the United States Geological Survey and, although extensive in nature, had a primary focus on subsurface aspects of CO₂ sequestration without sufficient consideration for potential impacts on the **land's surface. To address this deficiency, ConocoPhillips applied an analysis method, known as Play Fairway Mapping (PFM), which takes into consideration surface and subsurface risk elements in the characterization of potential CO₂ sequestration sites.**

PFM is an industry-standard method that is widely used by oil and gas operators to identify potential hydrocarbon accumulations in petroleum-bearing basins. ConocoPhillips adopted the PFM method to develop a regional and holistic understanding of CO₂ sequestration site suitability along the Louisiana and Texas Gulf Coast region, which is the focus of this section of the study.

Regional Screening of Potential CO₂ Sequestration Sites

The scope of the regional PFM analysis was completed over the industrial emissions sources of southwest Louisiana and southeast Texas. It considered subsurface and surface risk elements, described further below.

Subsurface risk elements used in the regional PFM analysis:

1. Availability of subsurface data, such as 2D/3D seismic data, well logs, and core, with priority placed on regions containing seismic data coverage and well/core data available.
2. Presence, thickness, and quality of reservoir sands with priority placed on regions containing vertically stacked sands as potential CO₂ storage zones. Five potential reservoir sands were evaluated, including the Upper Eocene Yegua Formation, the Oligocene Frio Formation, Lower Miocene sands, Middle Miocene sands, and Upper Miocene sands. In the onshore Gulf Coast Basin, the Yegua and Frio formations are represented by channelized deepwater sands and are capped by the Anahuac formation, which is a thick marine shale representing a regional marine flooding event. The Lower Miocene formation represents basin-ward progression of shoreface systems followed by thick aggradation of the Middle Miocene formation.
3. Presence, thickness, and quality of shales with priority placed on intraformational seals and regional top seals with potential for adequate vertical CO₂ sealing capacity. All major formations evaluated in the Study Area have interbedded shales acting as potential intraformational seals, with punctuated geologic depositional periods of regional marine flooding events represented by thick marine shales that serve as potential regional seals.
4. Presence of seismically resolvable faults with priority placed on regions with few to no large-scale faults that may act as potential lateral and vertical CO₂ leakage pathways. The Gulf Coast Basin is pervasively faulted by two dominant faulting styles: extensional normal faults due to sediment-loading gravitational collapse and faults related to halokinesis. It is widely known that faults pose significant CO₂ containment and induced seismicity risks due to CO₂ injection-induced reservoir

pore pressure increase, which creates potential for CO₂ leakage pathways and/or releases seismic energy. Therefore, intensely faulted regions were deprioritized by the regional PFM analysis.

5. Presence of active/historic hydrocarbon exploration or production wells or saltwater disposal wells with priority placed on regions with few to no existing well penetrations near potential CO₂ sequestration sites.

Surface risk elements used in the regional PFM analysis:

1. Proximity to industrial emission sources.
2. Proximity to densely populated areas with priority placed on sites located away from population centers where large land parcels are not available for lease to perform CO₂ sequestration site appraisal/injection activities.
3. Availability of land to lease for drilling of appraisal and/or injection wells. Areas where land was already under contract by third parties were not considered as access rights are necessary for the appraisal and development of a CO₂ sequestration site.
4. Accessibility to existing highways and/or roads to minimize surface disturbance associated with the construction of new roads to appraisal/injection sites.

Each subsurface and surface risk element was mapped and divided into low-, medium-, and high-risk categories, which were represented in map format by green, yellow, and red, respectively. All maps were stacked into a composite risk map for the evaluated region (Figure 1). This was combined with CO₂ emissions intensity data along the Louisiana-Texas emissions corridor to facilitate the identification of potential regional CO₂ locations for further investigation, which are described in the next section of this study.

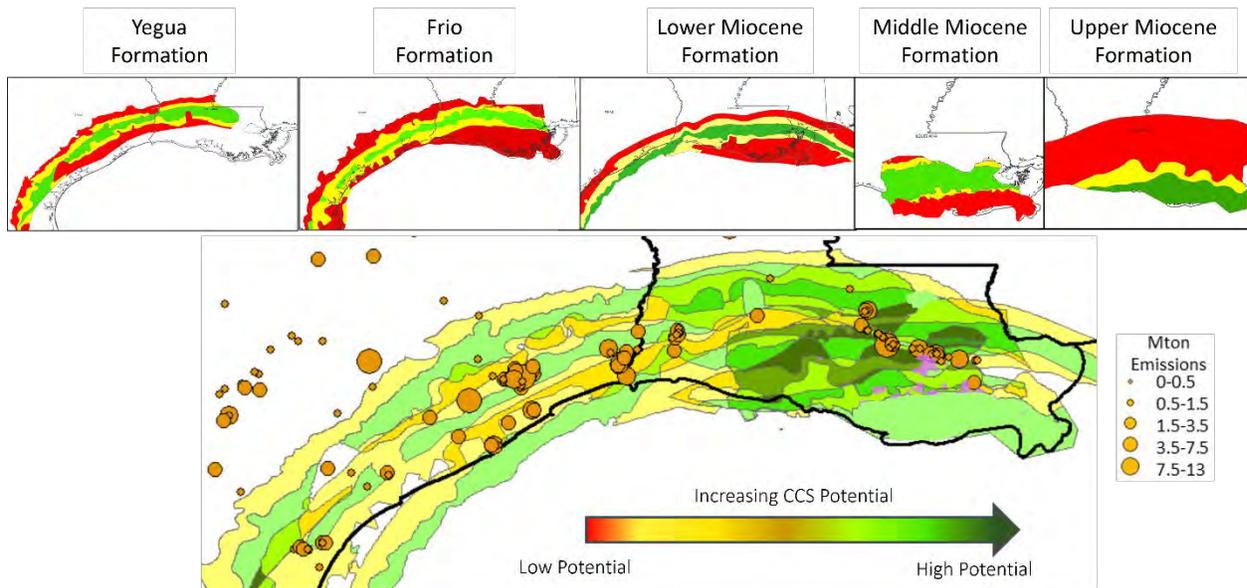


Figure 1. Play Fairway Map completed for the Louisiana and Texas Gulf Coast to identify regions suitable for CCS.

Description of Regional CO₂ Sequestration Sites

Based on the PFM analysis, six regions were deemed suitable for further investigation of potential CO₂ sequestration to serve the industrial emission sources near the Sabine Pass region. The sixth region represents ConocoPhillips' preferred region based on the above-mentioned subsurface/surface screening criteria and proximity to industrial emissions sources. Figure 2 shows the location of each region.

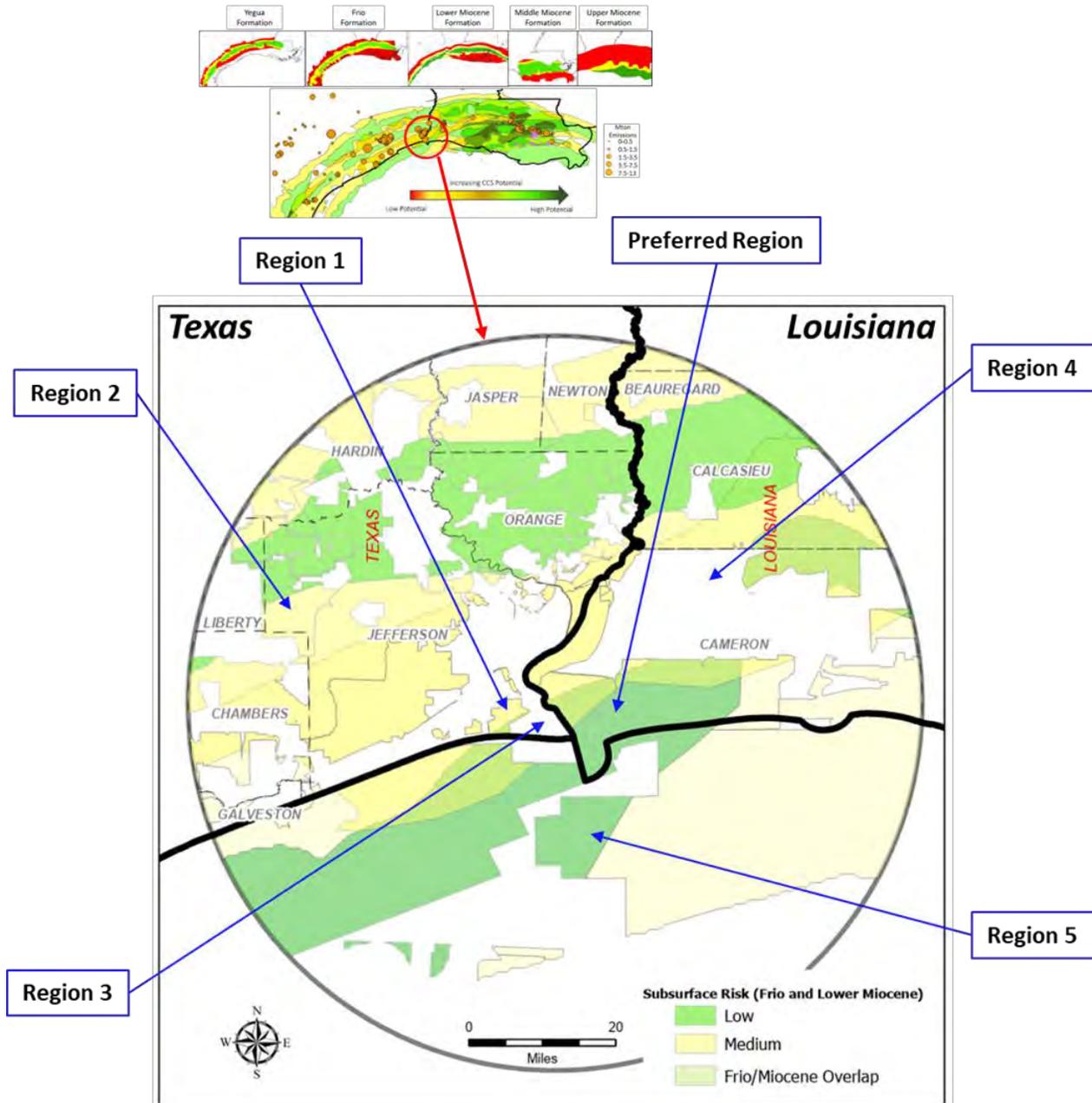


Figure 2. Regions evaluated in this study for CCS potential.

Region 1

Region 1 is in eastern Jefferson County, Texas, and includes the presence of excellent reservoir sands and interbedded shales in the Upper Frio and Lower Miocene formations. Few existing oil and gas wells exist, suggesting a low risk of CO₂ containment. Furthermore, this region is located near CO₂ emissions sources. ConocoPhillips actively pursued an access agreement for the subject acreage but was unsuccessful in acquiring the necessary access to create a viable CO₂ sequestration project. Therefore, this region was not selected for further evaluation.

Region 2

Region 2 is in western Jefferson County, Texas, and contains excellent reservoir sand properties and interbedded shales in the Frio Formation. However, this region is subject to two challenges that did not make it an optimal location for further investigation, the presence of existing oil and gas wells and the distance from industrial sources of CO₂ emissions. Therefore, this region was not selected for further evaluation.

Region 3

Region 3 is in eastern Jefferson County, Texas, and includes the presence of excellent Miocene reservoir sands and interbedded shales as seals with few faults and existing wells. However, this Region lies within protected lands of the Texas Point National Wildlife Refuge of the United States Fish and Wildlife Service. It is our understanding that the United States Fish and Wildlife Service is not granting carbon sequestration leases. Therefore, this region was not selected for further evaluation.

Region 4

Region 4 is in western Cameron Parish, Louisiana, and includes the presence of excellent Miocene reservoir sands and interbedded shales as seals with very few faults and existing wells. However, it lies within protected lands of the Sabine Fish and Wildlife Refuge of the United States Fish and Wildlife Service. It is our understanding that the United States Fish and Wildlife Service is not granting carbon sequestration leases. Therefore, this region was not selected for further evaluation.

Region 5

Region 5 is in United States Federal waters approximately 10 mi from the mouth of the Sabine River. It consists of Lower Miocene reservoir sands and interbedded shales with excellent geological properties for CO₂ sequestration. This region contains a significant number of existing oil and gas wells and is located further from industrial emissions sources than the preferred region. Therefore, this region was not selected for further evaluation.

Preferred Region for Proposed Appraisal Program

ConocoPhillips identified a Preferred Region for further evaluation of appraisal potential. The Preferred Region is in southwestern Cameron Parish, Louisiana, and balances favorable subsurface conditions, maximum land availability for lease, and proximity to industrial emissions sources.

The Preferred Region contains excellent Lower Miocene reservoir sands with interbedded intraformational shales and meets the screening criteria for Subsurface sequestration of CO₂. This region has sufficient data from existing and active wells along with 3D and 2D seismic data coverage. The existing data indicate high net thickness of porous saline aquifer which are confined with sealing formations to safely contain any injected CO₂ away from base of Underground Source of Drinking Water. Interpretation of 2D and 3D seismic data indicates faults with sealing capacity. The existing wells in the region are clustered around

local hydrocarbon structural closures and thus provide sufficient areal extent free from faults or existing wells for CO₂ sequestration.

The screening work draws on a broad body of subsurface data and literature available from the public domain via academic and government agencies. These data provide a regional view of the subsurface and indicates favorable subsurface condition for CO₂ Sequestration; however, key site-specific data such as modern log suites, core, pore pressure, and injectivity tests is required through an appraisal well for complete and thorough evaluation of the CO₂ sequestration potential of the Preferred Region.