REQUEST FOR INCIDENTAL HARASSMENT AUTHORIZATION

EAST LATERAL XPRESS PROJECT

St. Mary, Lafourche, Jefferson, and Plaquemines Parishes, Louisiana

Submitted by:

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ACRONYMS AND ABBREVIATIONS

BBES	Barataria Bay Estuarine System
CMR	capture-mark-recapture
Columbia Gulf	Columbia Gulf Transmission, LLC
dB	decibel
Dth/d	dekatherms per day
DOSITS	Discovery of Sound in the Sea
DWH	Deepwater Horizon
EL	East Lateral
ESA	Endangered Species Act
ERDC	USACE Engineering Research and Development Center
hp	horsepower
Hz	hertz
IHA	Incidental Harassment Authorization
kHz	kilohertz
km	kilometer
km^2	square kilometers
m	meters
MLV	mainline valve
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
POD	Point of Delivery

Project	East Lateral Xpress Project
PSO	Protected Species Observers
RMS	root mean square
ROW	right-of-way
SEL	sound exposure level
TC Energy	TC Energy Corporation
USACE	U.S. Army Corps of Engineers
Venture Global LNG	Venture Global Plaquemines LNG, LLC

1.0 DESCRIPTION OF ACTIVITY

1.1 Project Description

Columbia Gulf Transmission, LLC (Columbia Gulf), a wholly-owned subsidiary of TC Energy Corporation (TC Energy), proposes to construct two new compressor stations, a new meter station, approximately 8 miles of new 30-inch diameter natural gas pipeline lateral, two new mainline valves (MLVs), a tie-in facility, launcher and receiver facilities, and other auxiliary appurtenant facilities all located in St. Mary, Lafourche, Jefferson, and Plaquemines parishes, Louisiana (collectively referred to as "Project"). Upon completion, the Project, as proposed, will create 183,000 dekatherms per day (Dth/d) of incremental capacity. The incremental capacity created by the Project, in conjunction with the utilization of existing capacity, will allow for open access firm transportation service of approximately 725,000 Dth/d on Columbia Gulf's East Lateral from Columbia Gulf's Onshore Pool (CGT-Rayne) and Venice Meter Station to a greenfield primary point of delivery (hereinafter referred to as "Point of Delivery [POD] Meter Station") with Gator Express Pipeline in Plaquemines Parish, Louisiana. Columbia Gulf's proposed 30-inch pipeline lateral and POD Meter Station will interconnect with Venture Global Gator Express, LLC's Gator Express Pipeline, supplying feed gas to Venture Global Plaquemines LNG, LLC's (Venture Global LNG's) liquefied natural gas facility[1], all located in Plaquemines Parish, Louisiana.

The new Centerville and Golden Meadow compressor stations will each include the installation of a 23,470 horsepower (hp) (International Organization for Standardization) Solar Turbine Titan 130 gas-fired turbine compressor unit and related appurtenant facilities in St. Mary and Lafourche parishes, respectively. In addition to the proposed compressor stations, Columbia Gulf proposes to construct the new POD Meter Station on an existing platform[2] along with the new receiver at the terminus of the new 30-inch pipeline lateral in Plaquemines Parish. The new POD Meter Station will include the installation of three 16-inch meter runs and related appurtenant facilities, designed to deliver 725,000 Dth/d of natural gas per the customer's request. The new 30-inch pipeline lateral will originate at an interconnect with Columbia Gulf's existing East Lateral (EL)-300 pipeline where Columbia Gulf proposes to construct a new Tie-in Facility

[1] Venture Global Plaquemines LNG, LLC's and Venture Global Gator Express, LLC's Plaquemines LNG and Gator Express Pipeline Project is being constructed under Federal Energy Regulatory Commission Docket Number CP17-67-000 and CP17-66-000.

[2] The new POD Meter Station will be installed on a platform proposed in Venture Global Plaquemines LNG, LLC's and Venture Global Gator Express, LLC's Plaquemines LNG and Gator Express Pipeline Project under the Federal Energy Regulatory Commission Docket Number CP17-66. This platform will be installed prior to the start of construction of the proposed Project; therefore, it is hereinafter referred to as "existing."

platform in Jefferson Parish. The new Tie-in Facility platform in Jefferson Parish will also include a new MLV and launcher.

Table 1
Summary of the East Lateral XPress Project Facilities

Facility	Parish	Pipeline Milepost Location	Description
Pipeline Facilities			
30-inch Pipeline Lateral	Jefferson	0.00 – 2.47	Install approximately 8.14 miles of new 30-inch-diameter pipeline lateral.
	Plaquemines	2.47 – 8.14	
Aboveground Facilities			
Centerville Compressor Station	St. Mary	66.50 [a], 66.70 [b],67.00 [c]	Construct a new gas-fired compressor station with a 23,470 hp compressor unit, which will interconnect with Columbia Gulf's existing EL-100, EL-200, and EL-300 pipelines.
Golden Meadow Compressor Station	Lafourche	149.50 [c]	Construct a new gas-fired compressor station with a 23,470 hp compressor unit, which will interconnect with Columbia Gulf's existing EL-300 pipeline.
Point of Delivery Meter Station	Plaquemines	8.14	Construct one point of delivery meter station at the terminus of the new 30-inch pipeline lateral on an existing platform shared with Venture Global Gator Express, LLC. A 30-inch pig receiver will also be installed at the POD Meter Station.
Tie-in Facility	Jefferson	0.00	Install a new tie-in facility situated on a new platform at the intersection of the new 30-inch pipeline and Columbia Gulf's existing EL-300 pipeline. A 30-inch pig launcher will also be installed at the Tie-in Facility.
Valves and Other Ancillary Facilities	Jefferson	0.00, 1.71 [c]	Install one new 30-inch mainline valve assembly on the new 30-inch pipeline lateral and one new 24-inch mainline valve assembly Columbia Gulf's existing EL-300 pipeline. Both mainline valve assemblies will be situated on the new Tie-in Facility platform.

[a] Milepost is associated with Columbia Gulf's existing EL-100 pipeline.
[b] Milepost is associated with Columbia Gulf's existing EL-200 pipeline.
[c] Milepost is associated with Columbia Gulf's existing EL-300 pipeline.

Construction within Barataria Bay would occur in habitat that is utilized by the common bottlenose dolphin (*Tursiops truncatus*). Marine mammals are federally protected under the *Marine Mammal Protection Act* (MMPA). The MMPA established, with limited exceptions, a moratorium on the "take" of marine mammals in waters or on lands under U.S. jurisdiction. The MMPA further regulates, with certain exceptions, the "take" of marine mammals on the high seas by person, vessels, or other conveyances subject to the jurisdiction of the U.S. Section 101(a)(5)(A) and (D) of the MMPA stipulates that U.S. citizens may request for an incidental take by harassment of the specified marine mammals while executing construction activities. Pile driving associated with construction of the Tie-in Facility and Point of Delivery (POD) Meter Station may result in incidental Level B harassment to bottlenose dolphins, which are protected under

the MMPA, due to the impacts from increased noise levels during construction. Columbia Gulf is submitting an Incidental Harassment Authorization (IHA) requesting a conservative take estimate of approximately 42 individuals that may occur in the Project area throughout construction.

1.2 Purpose and Need

The purpose of the proposed Project is to provide 725,000 Dth/d of firm transportation capacity through a combination of incremental and existing capacity on Columbia Gulf's interstate natural gas pipeline system primarily from its Gulf Onshore Pool for delivery to the Gator Express Pipeline at a proposed new delivery point on Columbia Gulf's system in Plaquemines Parish, Louisiana to supply feed gas for Venture Global LNG's Plaquemines LNG facility in Plaquemines Parish. The Project is necessary to support the binding Precedent Agreement executed between Columbia Gulf and Venture Global LNG on July 29, 2019, as amended, in which Columbia Gulf has agreed to construct and operate the necessary facilities to provide the capacity for the Project.

1.3 Project Location

As discussed in **Section 1.1**, the Project would include the construction of two new compressor stations, a new meter station, approximately 8 miles of new 30-inch diameter natural gas pipeline lateral, two new mainline valves, a tie-in facility, launcher and receiver facilities, and other auxiliary appurtenant facilities all located in St. Mary, Lafourche, Jefferson, and Plaquemines parishes, Louisiana (see **Figure 1**). The in-water portions of the Project occur within Barataria Bay and involve construction of the new 30-inch pipeline lateral, the new MLVs, tie-in facility, and launcher and receiver facilities. Therefore, the remaining Project components are not discussed further.

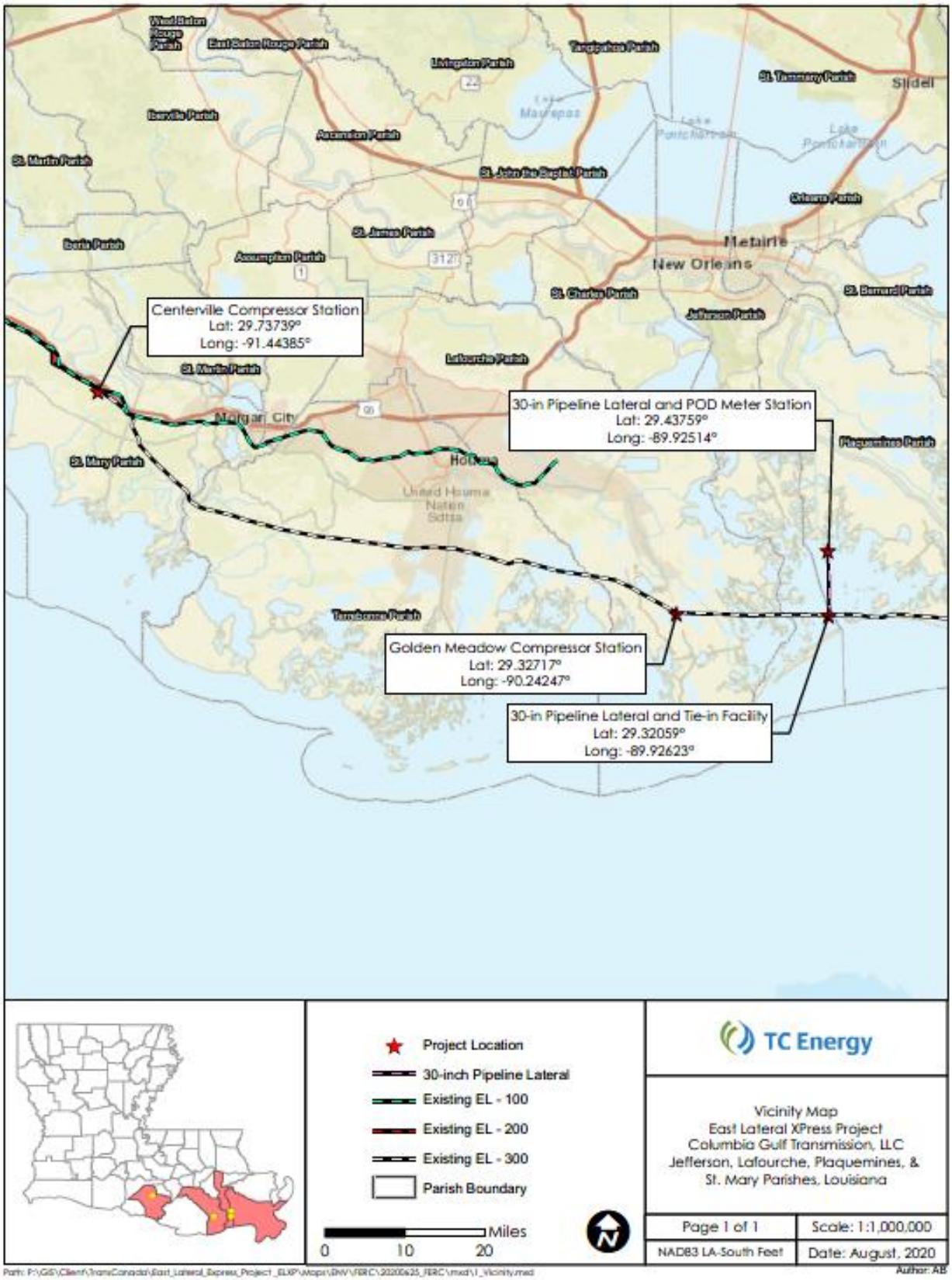

Figure 1. East Lateral Xpress Project Overview Map

1.4 Proposed In-Water Activity

The pipeline facilities associated with the Project will involve the construction and operation of 8.14 miles of new 30-inch-diameter pipeline lateral within Barataria Bay. The proposed pipeline lateral will commence at a new interconnect with Columbia Gulf's existing EL-300 pipeline in Jefferson Parish, Louisiana, and terminate at the new POD Meter Station in Plaquemines Parish, Louisiana. Although the proposed 30-inch pipeline lateral will not be co-located or parallel with existing utility rights-of-way (ROW), the pipeline lateral traverses multiple existing utility ROWs within Barataria Bay.

Columbia Gulf proposes to construct the new POD Meter Station on an existing platform along with the new receiver at the terminus of the new 30-inch pipeline lateral in Plaquemines Parish. The new POD Meter Station will include the installation of three 16-inch meter runs and related appurtenant facilities. Although the new POD Meter Station will be situated on the Venture Global Gator Express, LLC's existing platform, the Project will require the installation of four 18-inch square concrete piles to protect a 30-inch-diameter riser at the existing platform.

Columbia Gulf proposes to construct one new Tie-in Facility in Barataria Bay at the intersection of the new 30-inch pipeline lateral and Columbia Gulf's existing EL-300 pipeline. The new Tie-in Facility will consist of a 24-inch-diameter barred tee, 24-inch-diameter tap valve and 24-inch-diameter by 30-inch-diameter reducer to connect the 30-inch pipeline lateral to the existing EL-300 pipeline, 30-inch-diameter pig launcher to facilitate in-line inspections to ensure integrity of the pipeline, and other ancillary facilities. Approximately 240 feet of the existing EL-300 pipeline will be removed and replaced to accommodate the proposed tie-in with the new 30-inch pipeline lateral. Additionally, permanent bolt-on concrete weights will be installed below the mudline within Barataria Bay in the event the concrete coating of the existing EL-300 pipeline is damaged during installation of the new Tie-in Facility and additional buoyancy control is required. With the exception of a portion of two new 24-inch-diameter risers and one new 30-inch-diameter riser which will be underwater, the new Tie-in Facility will be situated on a new 180-foot-long by 80-foot-wide platform supported by 104 36-inch-diameter spun cast and 4 18-inch-diameter concrete piles. An additional 12 18-inch-diameter concrete piles will be installed to protect the two 24-inch-diameter and one 30-inch-diameter risers. The new platform will also be equipped with a boat landing, which will measure 10 feet-long by 10 feet-wide and used for maintenance activities during operation of the Project.

All materials necessary to construct the Project facilities in Barataria Bay will be transported by approximately eight support vessels from onshore in Jefferson Parish to the offshore construction workspace. Project access will be provided by boat via existing public barge channels and waterways, located southeast of Lafitte, Louisiana. Columbia Gulf has identified a total of four barge access routes for

construction and operation of the 30-inch pipeline lateral and aboveground facilities located in Barataria Bay. These routes were designed to avoid the need for dredging or prop washing; therefore, no water bottom disturbance is anticipated.

The new Tie-in Facility in Jefferson Parish will also include the new MLVs and launcher. See **Figure 2** for an overview of Project activities within Barataria Bay with additional Project Mapping presented in **Attachment 1**.

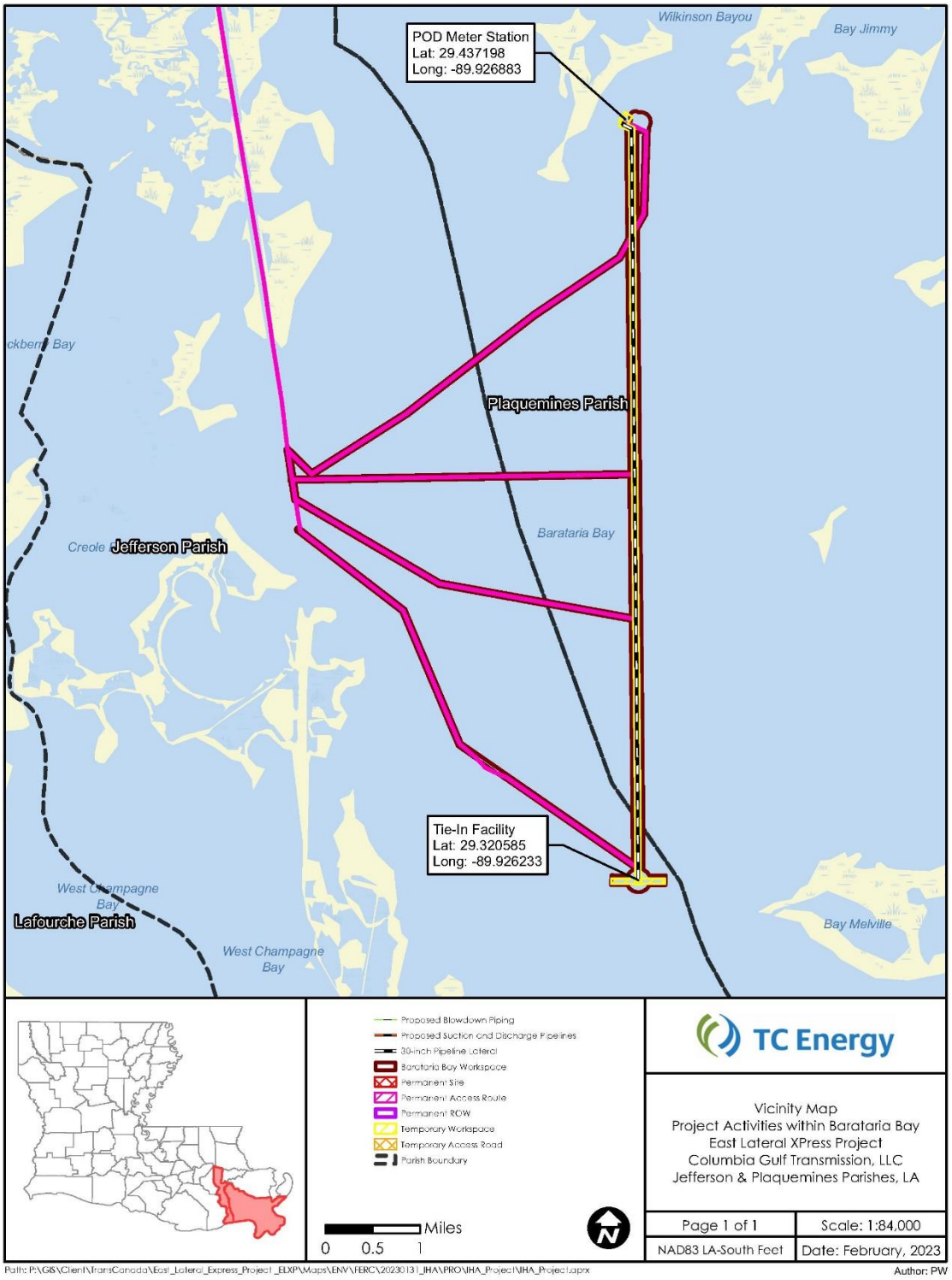

Figure 2. . Overview of Project Activities Within Barataria Bay

1.4.1 In-Water Construction Procedures

The barge lay method will be used for installation of the 30-inch pipeline lateral in Barataria Bay. Placement of the 30-inch pipeline lateral below the mud line in Barataria Bay will be accomplished via a combination of two methods: jetting and dredging. Jetting involves the use of highly pressurized water and air to "jet out" and displace the soils below the laid pipe so that the pipe is allowed to settle below the mudline to the required depth. Spoil displaced via jetting will be dispersed into the water column and allowed to settle naturally on the seafloor.

In areas where dredging is utilized, the pipeline trench will be excavated using a barge-mounted clam bucket and/or excavator. Trench spoil will be deposited adjacent to the trench within the construction work areas in 500-foot-long segments with 50 feet between each spoil pile to allow for the passage of local watercraft. Trench spoil will remain below the surface of the water, where feasible, to minimize wave-generated turbidity. The trench will be excavated to a sufficient depth to allow for a minimum 3 feet of cover between the top of the pipe and the final land surface after backfilling

Steel pipe used for the 30-inch pipeline lateral will be protected with an epoxy coating applied at the factory (the beveled ends will be left uncoated for welding), and shipped directly to the supply barge for transport to the Project workspaces in Barataria Bay. In addition to the epoxy coating, the 30-inch pipeline lateral will have a 3-inch-thick concrete coating, which will also be applied offsite, to counter the negative buoyancy of the water. The 30-inch pipeline lateral will be fabricated onsite, onboard a string of shallow-draft spud barges, which will be connected together in a line to form the lay barge. The pipe will be offloaded from tugboat-towed cargo barges and each pipe joint would then be aligned end-to-end with the previous joint. The pipe joints would be assembled into one continuous pipeline by passing through multiple welding, inspection, repair and coating stations. Prior to lowering the pipe off the spud barge, the open end of the first joint of pipeline will be installed with a cap to prevent water from getting into the pipeline. The fabricated pipeline will then be lifted off of the spud barge and either laid in the dredged trench or lowered to the seafloor and allowed to settle below the mudline, after which the trench is jetted. The concrete coating on the pipe will counter the negative buoyancy as the pipeline is lowered into the water, bringing the laid pipe to the seafloor and below the mudline, and a dead man anchor will be utilized to keep the laid pipeline in position. Following installation of the pipeline, the trench will be backfilled with the previously excavated material or backfilled naturally by allowing the seabed to settle.

Construction of the Project will also require the installation of concrete piles to support the new Tie-in Facility and to protect the two 30-inch-diameter and one 24-inch-diamter risers proposed at the new Tie-in Facility and to protect the one 30-inch-diameter riser proposed at the existing POD Meter Station platform.

In total, 20, 18-inch-diameter concrete piles and 104, 36-inch-diameter spun cast concrete piles would be installed within Barataria Bay for construction of the Project. Construction of the new platform for the Tie-in Facility and the protection for the risers will begin with the installation of concrete piles using prefabricated pile templates. Once the pile templates are in place, each pile will be lifted off the tug-boat-towed cargo barge with the crane onboard the spud barge and positioned inside its allotted space in the pile template driven by impact pile drivers. Once the concrete piles are in place, caps will be installed, and the platform will be placed on top of the support piles.

In addition to trenching and jetting activities for installation of the 30-inch pipeline lateral, dredging and jetting will also be utilized at localized sites at the new and existing platforms to expose the existing facilities and to facilitate the necessary tie-ins and connections with the proposed Project components.

1.5 Noise Producing In-Water Actions

Various construction activities are proposed within Barataria Bay that would result in a temporary increase in underwater noise (see **Section 1.4.1**). Common sources of ambient noise include not only marine vessels, but industrial activities such as pile driving, seismic exploration, sonar, and various recreation activities. Much of this noise has been shown to overlap and interfere with the frequency range of cetacean communication signals (Van Ginkel et al., 2017). Project-specific construction activities that would increase underwater noise generally include pile driving, construction vessel traffic, and pipeline installation.

1.5.1 Pile Driving

Construction of the Project aboveground facilities in Barataria Bay will require the installation of piles to support the proposed structures, including the new platform associated with the Tie-in Facility. Construction of the new platform will begin with the installation of concrete piles using pre-fabricated pile templates. Columbia Gulf would use impact pile driving during construction, which is considered an impulsive sound source. The underwater noise generated by impact pile driving would depend on the size and type of the pile. A total of 20, 18-inch-diameter concrete piles and 104, 36-inch-diameter spun cast concrete piles will be installed via impact hammer within Barataria Bay for construction of the Tie-in Facility and POD Meter Station. Pile driving for the Tie-in Facility is expected to occur for 24 days with an anticipated installation of 5 piles per day, while the proposed pile driving at the POD Meter Station platform is anticipated to occur within 1 day.

The engineering plans for the Tie-In Facility and POD Meter Station, including the number of piles, diameter, total length, and depth below ground, are shown in **Figures 3 and 4**, respectively.

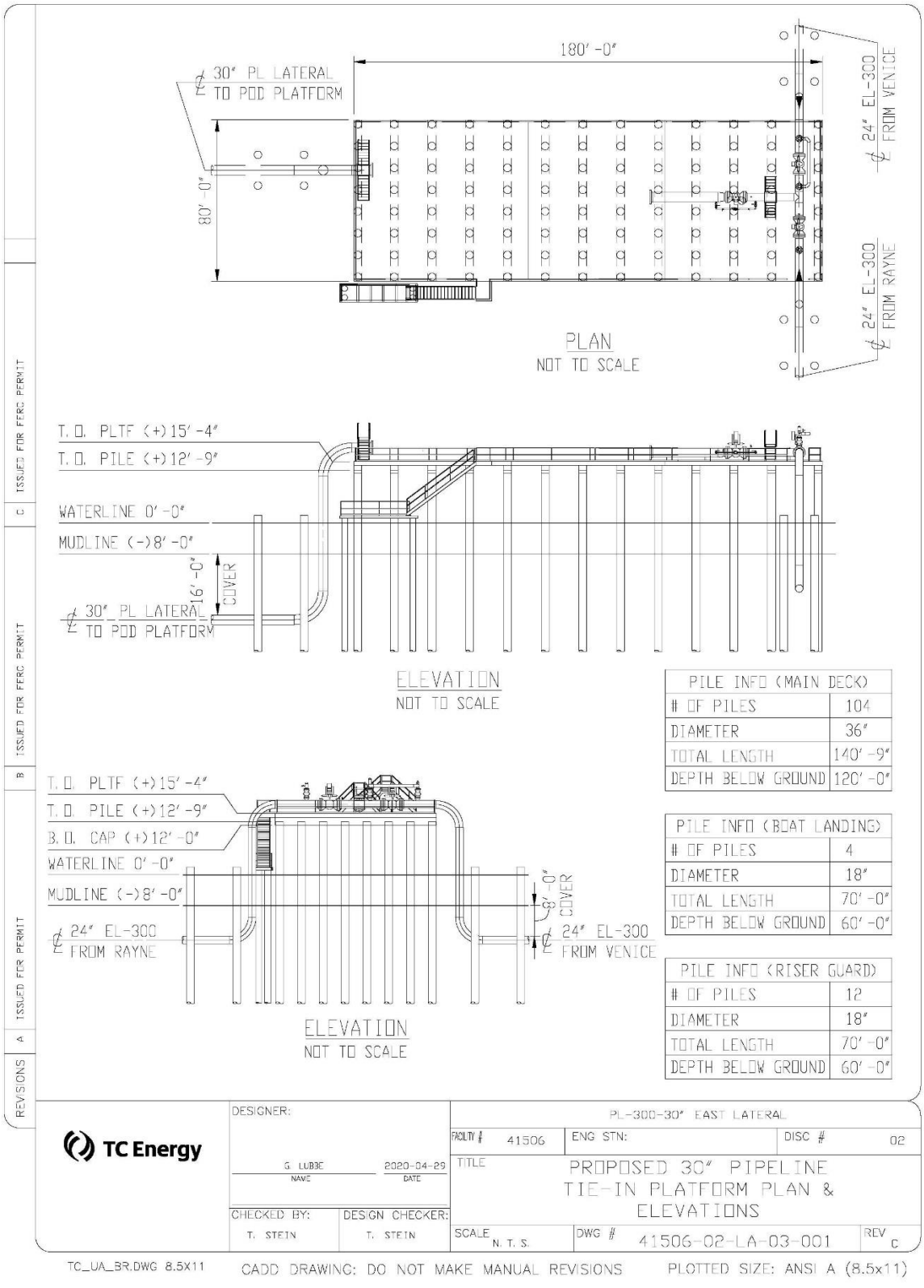

Figure 3. Tie-In Facility Plan

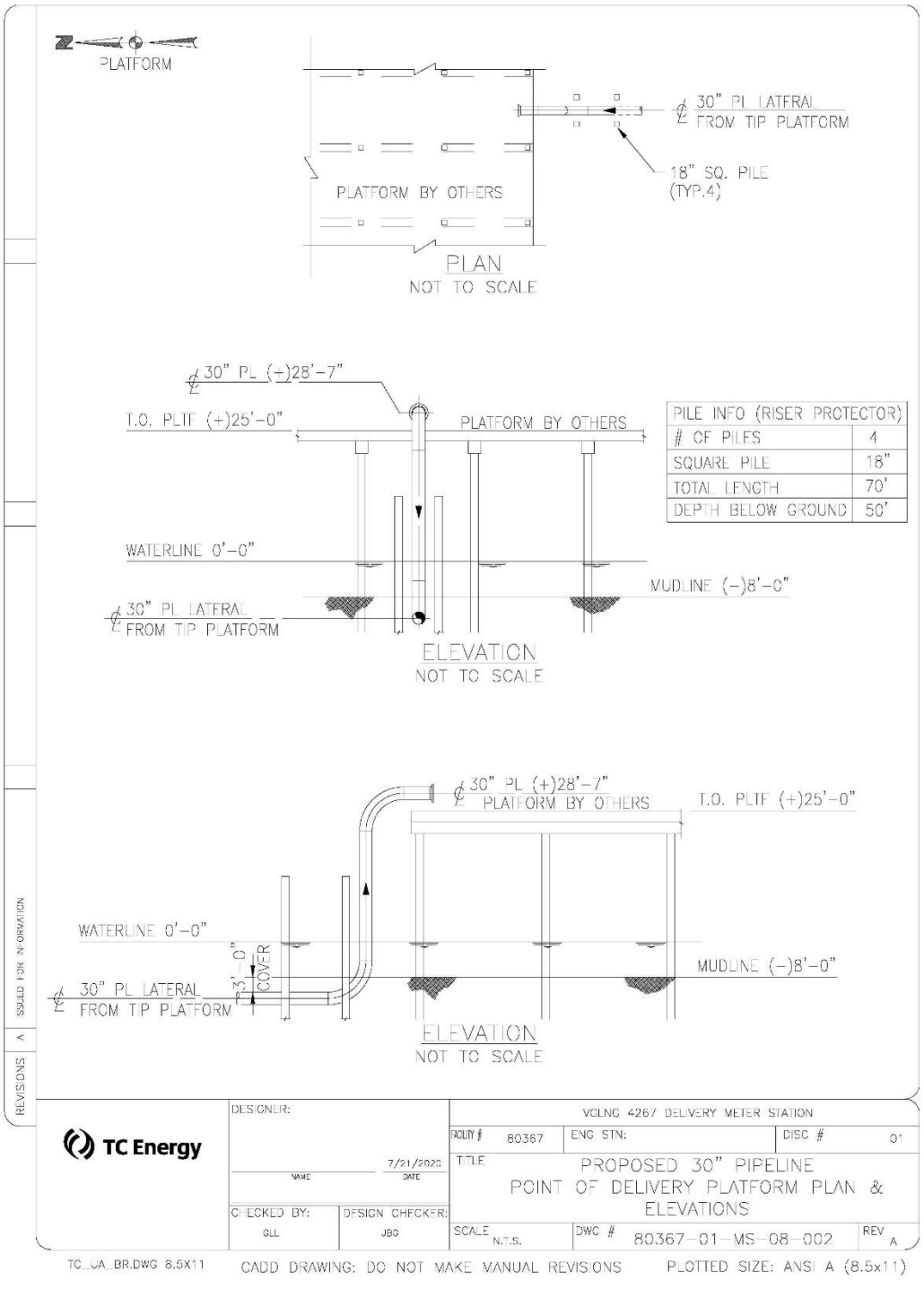

Figure 4. POD Meter Station Plan

Of the noise-producing in-water actions, impact pile installation throughout the Project may create noise levels of concern for marine mammals within Barataria Bay. These actions are further discussed in **Section 1.6**.

1.5.2 Vessel Traffic

During construction in Barataria Bay, barges will deliver large equipment and materials to the Project site. Tugboats will be used to transport barges through the Barataria Waterway to the Project area within Barataria Bay. Columbia Gulf anticipates a total of 704 barge trips (average of approximately 16 trips per week) to the Project area in Barataria Bay during construction. Columbia Gulf has selected barge access routes that have sufficient water depth such that dredging is not required for access. Additionally, Columbia Gulf is taking all reasonable measures to limit vessel traffic to the maximum extent possible. These measures include housing construction personnel on barges that will be staged in Barataria Bay, when feasible, so that personnel will not have to be repeatedly chartered to and from the Project area.

Large watercrafts, such as ferries and container ships, have been reported to generate sound levels of up to 200 decibels (dB) re 1 µ Pa m (Erbe et al., 2019). For many vessels, the most prominent source of noise disturbance is typically from the propeller as it forms low-pressure vibrating bubbles which then collapse. This mechanism produces noise over a wide audible range (i.e., a few Hertz (Hz) to over 100 kilohertz (kHz)) (Erbe et al., 2019). Vessel traffic is responsible for a rise in low frequency ambient noise (10 to 100 Hz) within the marine environment; however, vessels have also been recorded emitting higher frequencies (i.e., tens of kHz) (Erbe et al., 2019). Odontocetes (i.e., toothed whales, dolphins, and porpoises), utilize more high-frequency sounds and can, therefore, be impacted when exposed to the vessel traffic (Erbe et al., 2019). The reported effects of vessel traffic and the associated noise that is generated includes several non-lethal effects. Signal masking occurs when acoustic signals are either not received or not understood due to increased background ambient noise levels that occur in the same auditory frequency (Van Ginkel et al., 2017). This may force animals, such as dolphins, to manipulate their acoustic communication to counteract the masking effects. Oceans are affected by a considerable amount of anthropogenic noise sources, with levels constantly increasing, which are generally higher in amplitude (Van Ginkel et al., 2017). Overall, ships have multiple sources that produce noise at different frequencies and into various directions, which can potentially disrupt the welfare of marine mammals (Erbe et al., 2019).

Barataria Bay is linked to the intracoastal waterway system by a navigable channel and is one of the two main navigable waterways in the Barataria Basin. As such, use of the bay for Project construction would be consistent with the existing use of the bay and traffic is not expected to be significantly impacted. Additionally, the use of the bay for Project construction would be temporary and consistent with its existing

use, and noise impacts from construction vessels are not anticipated to constitute as a major contributing noise source. Therefore, noise impacts due to vessel traffic will not be discussed further.

Vessel strikes may occur when a marine mammal and a vessel collide. Strikes may result in the injury or death of a marine mammal and could potentially go unnoticed depending on the size of the vessel. To avoid vessel strikes, National Marine Fisheries Service (NMFS) coordinates with the United States Army Corps of Engineers (USACE) and shipping industry officials to offer marine outreach or collect data/coordinate marine research (National Oceanic Atmospheric Administration [NOAA], 2023d). Columbia Gulf will adhere to the NMFS recommendations to minimize impacts on marine mammals and would implement measures in the *Wildlife and Vessel Strike Avoidance Plan*. Based on the implementation of these measures, vessel impacts on marine mammals due to the Project are not anticipated. Therefore, impacts due to vessel traffic will not be discussed further.

1.5.3 Pipeline Installation

As presented in **Section 1.4.1**, placement of the 30-inch pipeline lateral below the mud line in Barataria Bay will be accomplished via a combination of jetting and dredging. Impacts due to jetting and dredging include localized turbidity and sedimentation, which are anticipated to be minor and temporary. Following installation, the pipeline would be hydrostatically tested. However, underwater noise is not anticipated to be a concern for hydrostatic testing and is not discussed further.

The USACE Engineering Research and Development Center (ERDC) has conducted studies to characterize dredge-produced sound (USACE, 2015). The type of dredging equipment used during construction governs the variability in sound that is produced and typically is recorded at lower frequencies (<500 Hz) (USACE, 2015; Reine et al., 2014). In areas where dredging is to be utilized, the pipeline trench will be excavated using a barge-mounted clam bucket and/or excavator. According to the ERDC, bucket dredging produces repetitive sounds generated by winches, bucket impact with the substrate, and bucket closing and emptying (USACE, 2015). The maximum spike in noise during bucket dredging activities occurs when the bucket hits the substrate and has been found to travel up to 7 kilometers (km) from the dredging site (Clarke et al., 2002). The peak amplitude for a dredge bucket hitting rocky, gravel substrate, is about 120 decibels (dB), while the peak amplitude of a dredge bucket hitting soft mud substrate would be significantly less than 120 dB (USACE, 2015). The substrate found within Barataria Bay is predominantly a soft, muddy material; therefore, dredging is anticipated to produce sound at a peak amplitude of below 120 dB (Quigley, 2022; USACE 2015).

Underwater sound produced due to dredging could possibly cause physical injury to aquatic species, including bottlenose dolphins (Popper et al., 2006; Southall et al., 2007). Some temporary impacts to hearing might occur if any animals remain in the immediate area of the dredge for long periods; however, the risk of this is low and any animals in the area would likely respond to dredging noise by avoiding the area (Central Dredging Association, 2011; Southall et al., 2007; Popper et al., 2006). Frequencies generated from a vessel that is dredging can overlap with the hearing ranges of bottlenose dolphins (as further described in Section 4.3). Further, the frequencies produced while dredging have been recorded to be similar to the frequencies generated from other vessel traffic (e.g., shipping, tourist, and recreational vessels) (Naval Facilities Engineering Command, 2008). As previously stated, Barataria Bay is one of the two main navigable waterways in the Barataria Basin. Therefore, the potential frequencies due to dredging for construction of the Project would be consistent with the current use of Barataria Bay.

Underwater noise related to pipeline installation is not anticipated to result in harassment of marine mammals as these activities will be highly localized and temporary. Additionally, the frequencies generated from dredging are anticipated to be consistent with the background noise found in Barataria Bay. Therefore, noise impacts due to dredging or jetting will not be discussed further.

1.6 Sound Levels

1.6.1 Reference Impact and Vibratory Pile Driving Sound Source Levels

The intensity of the sound pressure levels produced during pile driving depends on a variety of factors such as the type and size of the pile, the substrate into which the pile is being driven, the depth of water, and the type of pile driving equipment that is being used. In discussing the impacts of sound on aquatic resources, it is important to note the difference in sound intensity in air versus water. Sound in water and sound in air are both waves that move similarly and can be characterized the same way; however, the differences in density and speeds at which the sound wave travels through the medium (i.e., air or water) result in a different reference pressure. Noise impacts for the Project was calculated using the NMFS Multi-Species Pile Driving Calculator for the impact pile driving of the 20 x 18-inch and 104 x 36-inch-diameter concrete piles. Columbia Gulf utilized source levels for the installation of the larger pile size (36-inches) for all 124 piles and utilized proxy sound levels that most closely resembled the Project materials as presented in **Attachment 2**.

Barataria Bay is a relatively marshy waterbody with small islands throughout and is also physically separated from the Gulf of Mexico by a chain of barrier islands (Britannica, 2023a). When met with a hard surface, sound waves tend to reflect off and go in the opposite direction. Additionally, the natural marsh

vegetation of Barataria Bay will allow for greater attenuation of underwater noise, while the presence of barrier islands would prevent noise from entering the Gulf of Mexico.

Attenuation to NOAA Fisheries Service Thresholds

Two levels of harassment are defined by the MMPA. Level A harassment refers to any activity that could injure marine mammals or marine mammal stock in the wild. Level B harassment refers to activities that could disturb, but not injure, marine mammals or marine mammal stock in the wild. Level B "disruption" of marine mammals involves activities that would alter behavioral patterns (NOAA, 2023e).

NOAA Fisheries Service guidance was reviewed to determine potential impacts to marine mammals and subsequently possible harassment due to Project construction within Barataria Bay (NOAA, 2016a; National Marine Fisheries Service [NMFS], 2018). Based on NOAA Fisheries guidance, Columbia Gulf calculated the radii of areas in which thresholds are expected to be reached or exceeded by the proposed pile driving activities. These calculations and expected level of harassment are further discussed in **Sections 5.0 and 6.0**.

Pile driving produces high sound pressure levels in the surrounding air and underwater environments. These sound levels can vary and are dependent on the size of the hammer, diameter of the pile, and the properties of the seafloor (Discovery of Sound in the Sea [DOSITS], 2021a; Reyff, 2012). During impact pile driving, a heavy weight is lifted and dropped against the top of a pile (a wood, steel, or reinforced concrete pole), driving it into the substrate. Each impact is delivered at approximately one second intervals and may take several hours to drive one pile, depending on the size of the hammer, sediment properties, and required penetration depth (DOSITS, 2021a; Reyff, 2012). Sound from the hammer strike generates a pulse that transmits down the pile and into the substrate and surrounding water (DOSITS, 2021a; Reyff, 2012). These pulses emit into the surrounding aquatic environment at frequencies of approximately 500 Hz. Within 10 meters (m) of the pile, peak sound pressure levels range from 220 underwater dB and higher. Sound pressure levels generated by the process of impact pile driving can be harmful to marine animals (DOSITS, 2021a). The documented effects to marine animals from exposure to such noise include behavioral and acoustic responses, auditory masking, and stress (Erbe et al., 2019).

2.0 DATES, DURATION, AND GEOGRAPHIC REGION

2.1 Dates

Columbia Gulf proposes to begin construction of the Project January 2024 to meet a planned in-service date of April 2025. As discussed in **Section 1.5** above, pile driving activities within Barataria Bay are expected to be the only potential cause of marine mammal harassment. Pile driving within Barataria Bay is anticipated to occur within January to March 2025; however, pile driving activities will not occur continuously within the 3-month period. As bottlenose dolphins are present throughout Barataria Bay year-round, no additional assumptions were made regarding potential abundance, density, or distribution in relation to the period of pile driving activities.

2.2 Duration

Possible harassment of bottlenose dolphins could occur due to pile driving activities (see **Section 1.5**). A total of 16, 18-inch-diameter concrete piles and 104, 36-inch-diameter spun cast concrete piles would be installed via impact hammer within Barataria Bay for construction of the Tie-in Facility. While 4, 18-inch-diameter concrete piles would be installed via impact hammer at the POD Meter Station. Pile driving activities would take place from 7 a.m. to 7 p.m. (adjusted as appropriate to conduct work during daylight hours), 7 days per week for about 25 days (5 piles per day) in Barataria Bay.

2.3 Region of Activity

The overall Project is in St. Mary, Lafourche, Jefferson, and Plaquemines parishes, Louisiana (see **Figure 1 and Attachment 1**). The in-water portions of the Project will occur in Barataria Bay in Jefferson and Plaquemines parishes, Louisiana (see **Figure 2 and Attachment 1**).

Barataria Bay, a shallow estuarine system, is categorized as an open bay habitat with a mean depth of 2.0 meters (U.S. Environmental Protection Agency, 1999; Conner and Day, 1987). Average tidal current as assessed by NOAA between 1986 and 2001 was 0.97 feet, while present day tidal current averages range from -0.60 to 0.77 feet (NOAA, 2023a). The bay has two barrier islands (Grand Isle and Grand Terre) that separate it from the rest of the Gulf of Mexico and that also prevent underwater sound dissipation out to the Gulf from machinery and ambient sounds within the bay. Sound waves can travel through air and water; however, when met with a hard surface, they tend to reflect in the opposite direction of travel. The same applies to sound waves underwater, except sound travels approximately four to five times faster through water (Dartmouth, 2012). It can be inferred that when sound reaches these underwater barriers (the islands), it will be reflected towards the source. General activity within Barataria Bay includes petroleum, mechanical, and fishery operations (NOAA, 2023b).

Barataria Bay is bordered by tidal salt marshes and is connected to a series of passes (i.e., Caminada Pass, Barataria Pass, Pass Abel, and Quatre Bayou Pass) which are connected to the Gulf of Mexico (NMFS, 2023a; Conner and Day, 1987). To the east, Barataria Bay is bordered by levees surrounding the Mississippi River and to the west it is bordered by Bayou Lafourche (Birdsong, 2004). The waters of Barataria Bay are turbid with a higher salinity in the southern portion of the bay due to tidal influence and a decreased salinity (including the presence of freshwater lakes) to the north (NMFS, 2023a). Salinity concentrations in Barataria Bay range from 6 to 22 parts per trillion depending on the location. Due to the closure of Bayou Lafourche in Donaldsonville and the construction of protection levees along the Mississippi River, the only freshwater input to Barataria Bay is through rainfall (*Coastal Wetlands Planning, Protection and Restoration Act*, 2023). Barataria Bay is part of the Barataria Bay Estuarine System Stock (specifically, Barataria Bay east to Bastian Bay), which is managed by NOAA Fisheries. The Barataria Bay Estuarine System Stock also includes Caminada Bay, Bay Coquette, and Gulf coastal waters extending 1 kilometer (km) from the shoreline (NMFS, 2023a).

No critical habitat is designated within Barataria Bay (NOAA, 2023b).

3.0 SPECIES AND NUMBERS OF MARINE MAMMALS

3.1 Species Present

According to NMFS's list of threatened and endangered species in Louisiana, there are two federally listed marine mammal species with the potential to occur in marine waters off of Louisiana, including the sperm whale (*Physeter macrocephalus*) and Rice's whale (*Balaenoptera ricei;* formerly Bryde's whale [*Balaenoptera edeni*]) as occurring. Additionally, the bottlenose dolphin, protected under the MMPA, has potential to occur in marine waters of Louisiana. However, the Project area does not contain suitable habitat for or is outside the range of the sperm whale and Rice's whale; therefore, these species are not discussed further.

3.2 Bottlenose Dolphin

The bottlenose dolphin is a marine mammal of the Delphinidae family and inhabits the Gulf of Mexico, predominantly within nearshore waters and estuaries, but are also present in offshore waters (NOAA, 2023c). Additional information regarding the life history, behaviors, and vulnerabilities of the bottlenose dolphin within Barataria Bay is discussed in **Section 4.2**.

3.2.1 Abundance

The most recent and best available estimate of bottlenose dolphins within the Barataria Bay Estuarine System Stock is 2,071 individuals (Coefficient of Variation=0.06) (Garrison et al. 2020; NMFS, 2023a). This estimate was derived from vessel-based capture-recapture photo-ID surveys conducting in March and April 2019 (Garrison et al. 2020; NMFS, 2023a). The minimum bottlenose dolphin population estimate for the Barataria Bay Estuarine System Stock is 1,971 individuals (NMFS, 2023a).

4.0 BOTTLENOSE DOLPHIN STATUS AND DISTRIBUTION

As discussed in **Section 3.0**, one marine mammal species, the bottlenose dolphin, is anticipated to be potentially affected by pile driving activities during construction of the Project.

4.1 Status

Although protected by the MMPA throughout its range, common bottlenose dolphins are not listed as threatened or endangered under the Endangered Species Act of 1973 (ESA). The Barataria Bay Estuarine System (BBES) Stock of common bottlenose dolphin is considered a strategic stock under the MMPA (NMFS, 2023a). This stock is regularly monitored for fluctuations in the number of individuals. The current and best available abundance estimate for the BBES Stock is 2,071, a value obtained during March and April 2019 vessel-based capture-recapture photo-ID surveys (NMFS, 2023a). The results of the 2019 assessment demonstrate a decline in population when compared to the results of the population estimate in 2014 from McDonald et al. (2017). In this older study, McDonald et al. (2017) conducted vessel-based capture-mark-recapture (CMR) photo-ID surveys from June 2010 to May 2014 during and after the events of the Deepwater Horizon oil spill (NMFS, 2023a). Abundances measured in the study ranged from 1,303 dolphins in June 2010 to 3,150 dolphins in April 2014 (NMFS, 2023a).

4.2 Life History, Behaviors, and Vulnerabilities

The common bottlenose dolphin can be found in temperate and tropical offshore and coastal environments, but they can also be found in harbors, bays, and estuaries (NOAA, 2023c; NMFS, 2023a). Bottlenose dolphins are generally 6 to 13 feet in length, weigh 300 to 1,400 pounds, and have a lifespan of 40 years (NOAA, 2023c). Bottlenose dolphins are named after their short, thick snout and are typically light gray to almost black in color. The highly social bottlenose dolphin lives in groups that range from just a few individuals to more than 100 (Animalia, 2023). Individuals can live at least 40 years, with some females outliving their male counterparts at 60 or more years (NOAA, 2023c). The common bottlenose dolphin is a polygamous species (does not form pair bonds) that can breed at any time of the year. However, the species primarily breeds in the spring with a smaller peak in the fall. Reproduction begins when individuals reach between 5 and 15 years old, and females will gestate for approximately 12 months (Animalia, 2023). Births may occur throughout the year; however, females will typically give birth during spring, early summer and throughout the fall (SeaWorld Parks, 2023).

Common bottlenose dolphin traveling behavior is classified based on constant movement in a single direction, while resting behavior is classified using the presence of a close group formation with limited movement, and rhythmic breathing (NOAA, 2023c). Common bottlenose dolphin social behaviors include behaviors such as breeding, play, aggressive interactions, and gentle body contact. The common bottlenose

dolphin is a carnivore (piscivore) and usually feeds on a variety of prey such as fish, squid, eels, shrimp, and crabs. The hunt for food is accomplished both individually and cooperatively using varying techniques (i.e., passive listening, and/or high frequency echolocation) (NOAA, 2023c).

The common bottlenose dolphin is exposed to a variety of natural and anthropogenic threats and stressors, including disease, vessel strikes, energy exploration activities and associated spills, and other types of human driven disturbance, such as noise. Specifically, the fact that the species lives in coastal and estuarine waters close to shore puts them at an increased risk of human-related injuries and death (NOAA, 2023c). One of the main threats to the bottlenose dolphin is when the animal becomes entangled in or ingests fishing gear used by recreational fishermen or commercial fishing vessels. This is exacerbated by the fact that dolphins may take bait and catch directly from fishing lines, consuming discarded fish, or being fed fish illegally by humans. This behavior forms an association of anglers with sources of food (NOAA, 2023c). Additionally, common bottlenose dolphins living near shore are susceptible to habitat degradation and destruction due to the presence of contaminates and spilled oil. For example, on April 20, 2010, an explosion on the Deepwater Horizon (DWH) oil rig, located 41 miles (66 km) off the coast of Louisiana, in the Gulf of Mexico, generated the largest marine oil spill in history (Britannica, 2023b). Two days later, on April 22, 2010, the entire rig capsized and sank, rupturing a riser through which drilling mud had been injected to counteract the upward pressure of oil and natural gas. Without this opposing force, oil began to discharge into the gulf at an estimated 1,000 barrels per day (Britannica, 2023b).

Marine life, including the common bottlenose dolphin, suffered effects from exposure to the DWH oil spill (NOAA, 2016b). Studies conducted on impacted wildlife revealed that coastal bottlenose dolphins suffered from adrenal gland disease and dysfunction because of the spill. Impaired adrenal glands create dysfunction of the endocrine system which otherwise enables the dolphins to respond adequately to changes in their environment (NOAA, 2016b; Schwacke et al., 2013). Overall, findings from research conducted in the aftermath of the spill demonstrated that the dolphins, along with many other marine species, suffered a wide range of toxic effects, including death, impaired reproduction, disease, and other physiological malfunctions that reduce the ability of organisms to thrive and survive. In Barataria Bay alone, it is estimated that 45 percent of the common bottlenose dolphin population was lost following the spill (NOAA, 2016b; Schwacke et al., 2021).

One additional threat to the common bottlenose dolphin is offshore energy infrastructure and the generation of noise that results from pile-driving activities (David, J.A., 2006). Exposure to anthropogenic noise has been documented to have negative implications for a variety of wildlife species, including the common bottlenose dolphin (Paiva et al., 2015). The area over which anthropogenic noise may adversely impact the

bottlenose dolphin depends upon how well the sound propagates underwater, the frequency of the sound, and its duration. Pile driving-generated noise can be detected by dolphin populations up to 24.9 miles (40 km) from the source. Furthermore, at 9 kHz, the noise generated by pile-driving activities can mask strong vocalizations within 6.2 to 9.3 miles (10 to 15 km) and weak vocalizations up to 24.9 miles (40 km). In the presence of such noise, behavioral modifications, such as total avoidance of an area in aquatic species such as bottlenose dolphins have been observed (Paiva et al., 2015; David, J.A., 2006). Pulsed sound sources, such as pile-driving, also possess the capacity to induce behavioral responses which may suggest discomfort being experienced by the affected animal (NOAA, 2017). Pulsed sounds are generally brief signals and occur over a wide range of frequencies. These sounds are characterized as rapid increases in sound from ambient noise that may dissipate quickly. As such, pulsed sounds are more likely to physically harm species compared to non-pulsed sounds. While vibrations from the activity are typically less harmful, the sound itself presents the greatest threat, especially when done for longer durations. Hearing, which is a highly valuable sense for the bottlenose dolphin, can be damaged to a point of loss when exposed to high and low-intensity sound for prolonged periods (NOAA, 2017). Following exposure, the mammals can experience temporary or permanent damage to the auditory tissues and structures, which can then lead to shifts in the threshold for hearing ability (i.e., changes may occur to the ability to hear at specific frequencies within an individual's range of hearing). In these instances, extreme behavioral and neurological effects may be observed (NOAA, 2017).

4.3 Acoustics

Bottlenose dolphins utilize high-frequency sounds to communicate, forage, navigate, and gather information about their surroundings (Dolphin Research Center, 2023). These sounds are produced under water in one of two ways. Dolphins may produce sound utilizing air sacs that are found under the blowhole (Dolphin Research Center, 2023). Once air sacs are inflated, sounds are created by forcing the air out of the sacs and over a plug (Dolphin Research Center, 2023). The second hypothesized method of sound production also involves use of these air sacs. However, this hypothesis theorizes that sounds are produced by fatty tissue deposits that create pulses found beneath the blowhole, and the air sacs are utilized to focus the sound (Dolphin Research Center, 2023).

Bottlenose dolphins produce sound that can fall into one of three categories (i.e., burst-pulse sounds, whistles, or clicks) and will alter these vocalizations according to function and behavior (Nuuttila et al., 2013). Once sound is emitted into the water, the dolphins can then detect and interpret the echoes (sonar) that bounce back off other creatures and objects, allowing them to generate a picture of their surroundings (Nuuttila et al., 2013). Fat-filled cavities in the lower jaw of the dolphins receive the sounds, and auditory nerves conduct them to the middle ear and brain, where the information is then interpreted (Public

Broadcasting Service, 2008). Common bottlenose dolphins produce sound from 0.2 to 150 kHz (SeaWorld Parks, 2023). Lower frequency vocalizations range from approximately 0.2 to 50 kHz and are largely believed to be used primarily in social communication. Higher frequency clicks range from 40 to 150 kHz and are believed to be utilized for echolocation (SeaWorld Parks, 2023). Signature whistles, which the dolphins use to identify themselves, are a highly unique sound that communicates identity, location, and even the emotional state of individuals. These are emitted at ranges of 7 to 15 kHz (SeaWorld Parks, 2023).

The hearing range for bottlenose dolphins reportedly falls between 150 Hz to 160,000 Hz (NOAA, 2023c). However, Lima et al. (2018) have found that hearing sensitivity of the common bottlenose dolphin can range from 75 Hz and up. In general, due to their short wavelengths, high frequency sounds produced by the dolphins cannot be expected to travel far in water. Low frequency sounds, however, possess longer wavelengths and greater energy and can therefore travel farther (SeaWorld Parks, 2023). Echolocation, for example, is most effective at close to intermediate range, about 5 to 200 m (16 to 656 ft.). In shallow-water areas, low frequency whistles could be detected by dolphins at 487 meters (Quintana-Rizzo et al., 2006). In shallow areas containing a mud bottom, these same low frequency sounds could be detected up to 2 kilometers away. In channels, high-frequency sounds could be detected at distances greater than 20 kilometers (Quintana-Rizzo et al., 2006).

4.4 Distribution

Bottlenose dolphins are found globally in temperate and tropical waters (NOAA, 2023c). The bottlenose dolphin inhabits the Gulf of Mexico, predominantly within nearshore waters and estuaries, but are also present in offshore waters. Bottlenose dolphins can be found year-round within Barataria Bay (NOAA, 2023a).

5.0 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

As discussed in **Sections 3.0** and **4.0**, bottlenose dolphins commonly occur throughout the inshore and nearshore waters of the Gulf of Mexico (Louisiana Gulf Coast). Due to their presence within Barataria Bay, Project construction could potentially impact bottlenose dolphins by the noise generated underwater due to pile driving activities. According to the *Marine Mammal Protection Act Acoustic Thresholds*, harassment occurs when marine mammals are exposed to sound levels, which could lead to mortality, hearing impairment (temporary and permanent), non-auditory physical or physiological effects, and/or behavioral alterations (NMFS, 2023b). NMFS characterizes sound as impulsive/non-impulsive and intermittent/continuous. The impulsive sound sources are responsible for transient, brief, broadband, and high peak sound pressure with a rapid rise time and rapid decay of sound. Sound incurred from pile driving would produce impulsive sounds that occur in repetition. Pile driving would also be categorized as an intermittent sound source as it produces bursts of sound that is followed by periods of low or no sound (NMFS, 2023b). Level B harassment per NMFS guidelines is predicted to occur if sound levels are measured above the root-mean-square (RMS) received levels of 160 dB re 1 µPa for non-explosive, impulsive or intermittent sources (NMFS, 2023b).

Level A harassment is not anticipated to occur and authorization for this take is not requested. In-water construction activities will be completed within one to two months (a total of 25 to 42 days) and are not expected to result in serious injury or mortality to marine mammals within Barataria Bay. Based on calculated threshold distances in **Table 2** of **Section 6.2** for mid-frequency cetaceans, an individual would need to remain within 142.0 feet of the piles being driven throughout the entire day of pile driving activities for cumulative exposure injury to occur. Given the mobility of bottlenose dolphins and the expected behavior of the species to avoid noise disturbance (i.e., pile driving), such a scenario is extremely unlikely to occur.

Columbia Gulf will utilize biological monitors to ensure that dolphins and other marine mammals do not come within the behavioral disturbance underwater threshold (i.e., 1,407.0 feet; see **Section 6.2**) of pile driving activities and are not present within that radius when pile driving activities begin. In the event dolphins are observed entering the area, pile driving will continue until dolphins are observed entering the area in which the permanent injury threshold will be exceeded (i.e., 142.0 feet; see **Section 6.2**), and pile driving will cease until the dolphins leave the area of their own accord. Further, Columbia Gulf will utilize soft starts at the beginning of each pile driving session and bubble curtains will be used. Bubble curtains release air through closely spaced release points around the pile via tubing laid on the water bottom. Because there is a density difference between air and water, the bubble curtain reflects the sound from the

pile driving, while the bubbles themselves absorb some of the sound energy (DOSITS, 2021b). Through the implementation of these measures, Columbia Gulf will ensure that dolphins and other marine mammals are not present within areas where Level A harassment could occur.

Although bottlenose dolphins would be expected to largely avoid the Project area during pile driving activities, the potential exists for bottlenose dolphins to be present when pile driving begins. Based on review of the MMPA, impacts from pile driving (as discussed in **Section 1.0**) may result in a behavioral disturbance of bottlenose dolphins; therefore, Columbia Gulf is requesting takes resulting from Level B acoustical harassment in this IHA application.

6.0 TAKE ESTIMATES FOR MARINE MAMMALS

Detailed descriptions of in-water construction activities proposed in Barataria Bay are discussed above in **Section 1.4**. Specifically, impact pile driving within Barataria Bay may result in Level B acoustical behavioral harassment of bottlenose dolphins in Barataria Bay. This section describes the pile driving locations, the extent of harassment due to pile driving, density, and abundance of bottlenose dolphins in the Project area, and applicable acoustic thresholds.

6.1 Representative Pile Driving Location

A total of 20, 18-inch-diameter concrete piles and 104, 36-inch-diameter spun cast concrete piles will be installed via impact hammer within Barataria Bay for construction of the Tie-in Facility and a POD Meter Station (Project locations are shown in **Figure 2 and Attachment 1**). Since there are numerous piles within close proximity at this location, the potential areas of threshold exceedance would be nearly identical. Therefore, one representative location in the center of the Tie-in Facility and one representative location in the center of the POD Meter Station was chosen to represent the installation of all piles within the respective station.

6.2 Threshold Criteria for Behavioral (Level B) Disturbance

Columbia Gulf is requesting Level B take of the bottlenose dolphin, as stated in **Section 5.0**. NMFS developed the *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (NMFS, 2018). The bottlenose dolphin is classified by NMFS as a mid-frequency cetacean. The NMFS-accepted underwater noise thresholds for permanent injury (Level A) and behavioral disturbance (Level B) are shown in **Table 2** below. Additionally, the maximum anticipated distances to behavioral and injury thresholds for mid-frequency cetaceans (i.e., bottlenose dolphin) during in-water pile driving are presented in **Table 3**.

Table 2
Underwater Sound Thresholds for Bottlenose Dolphins

Functional Hearing Group	Underwater Sound Thresholds [b]		Radius of 24-Hour Cumulative Effects Injury Threshold Area	Radius of Behavioral Effects Threshold Area
	Impact Pile Driving – Behavioral Disturbance [a]	Impact Pile Driving - Injury		
Marine Mammals (mid-frequency cetaceans) Permanent Threshold Shift [d]	160 dB RMS	185 dB SEL_{cum} 230 dB Peak [c]	142.0 feet	1,407.0 feet

dB = decibel; Peak = peak sound pressure; RMS = root mean-square sound pressure; SEL_{cum} = cumulative sound exposure level

[a] The root mean square exposure level is the square root of the average sound pressures over the duration of a pulse and represents the effective pressure and intensity produced by a sound source.

Table 2 Underwater Sound Thresholds for Bottlenose Dolphins				
Functional Hearing Group	**Underwater Sound Thresholds [b]**		**Radius of 24-Hour Cumulative Effects Injury Threshold Area**	**Radius of Behavioral Effects Threshold Area**
	Impact Pile Driving – Behavioral Disturbance [a]	**Impact Pile Driving - Injury**		
[b] The cumulative sound exposure level is the energy accumulated over multiple strikes or continuous vibration over a period of time. [c] Peak sound pressure level is the largest absolute value of instantaneous sound pressure. [d] The injury threshold is the general level for permanent threshold shift onset for mid-frequency cetaceans as identified by NMFS (2018). Threshold shifts are influenced by the frequency of noise received and a cumulative sound exposure exceeding this level may not cause a threshold shift if outside the range of hearing.				

Table 3 Calculated Distances to Underwater Noise Thresholds for Marine Mammals from Mitigated In-water Pile Driving		
Activity	**Distance from Source in which Threshold would be Exceeded**	
	Permanent Injury	**Behavioral Disturbance**
Impact pile driving in Barataria Bay [a]	142.0 feet	1,407.0 feet
[a] Impacts were calculated based on the use of an impact hammer on 36-inch-diameter concrete piles with use of bubble curtains (estimated 5 dB reduction, per consultations with NMFS) (MacGillivray et al., 2007).		

The calculated distance to underwater noise thresholds presented in **Table 3** are conservatively based on the installation of 36-inch diameter concrete piles, as these would produce the highest sound levels and result in the largest area of potential effects on bottlenose dolphins. Additionally, these calculations consider the use of bubble curtains, which Columbia Gulf has committed to implementing during pile driving activities. Based on previous correspondence with NMFS, the use of bubble curtains should provide at least 5 dB reduction in the noise generated by impact hammer installation of the piles.

Based on the calculations in **Table 3**, behavioral effects for the bottlenose dolphin would have a radius of approximately 1,407.0 feet from the source pile, or an approximate area of 0.58 square kilometers (km^2). The Level A "shutdown zone"[3] would have a radius of approximately 142.0 feet, or an approximate area of 63,347 square feet (0.006 km^2). The harassment zones in which the underwater noise thresholds are exceeded for mid-frequency cetaceans during pile driving in the Tie-In Facility and PO Meter Station area are shown in **Figures 5 and 6**, respectively.

[3] Although Level A take is not anticipated or requested in this IHA, Columbia Gulf has committed to cease pile driving if bottlenose dolphins are observed within the Level A "shutdown zone" and until the dolphins leave the area of their own accord.

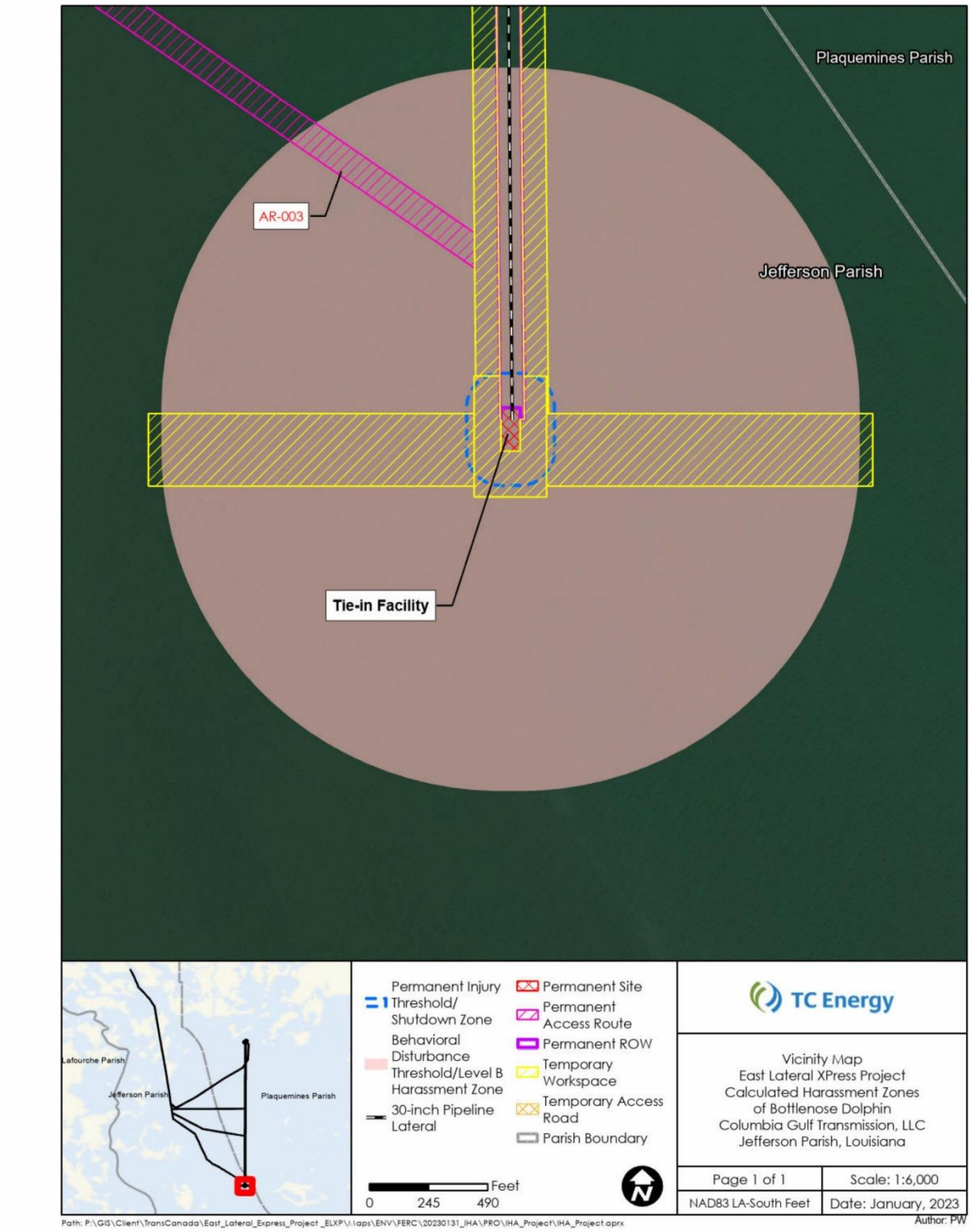

Figure 5. Calculated Harassment Zones for the Project

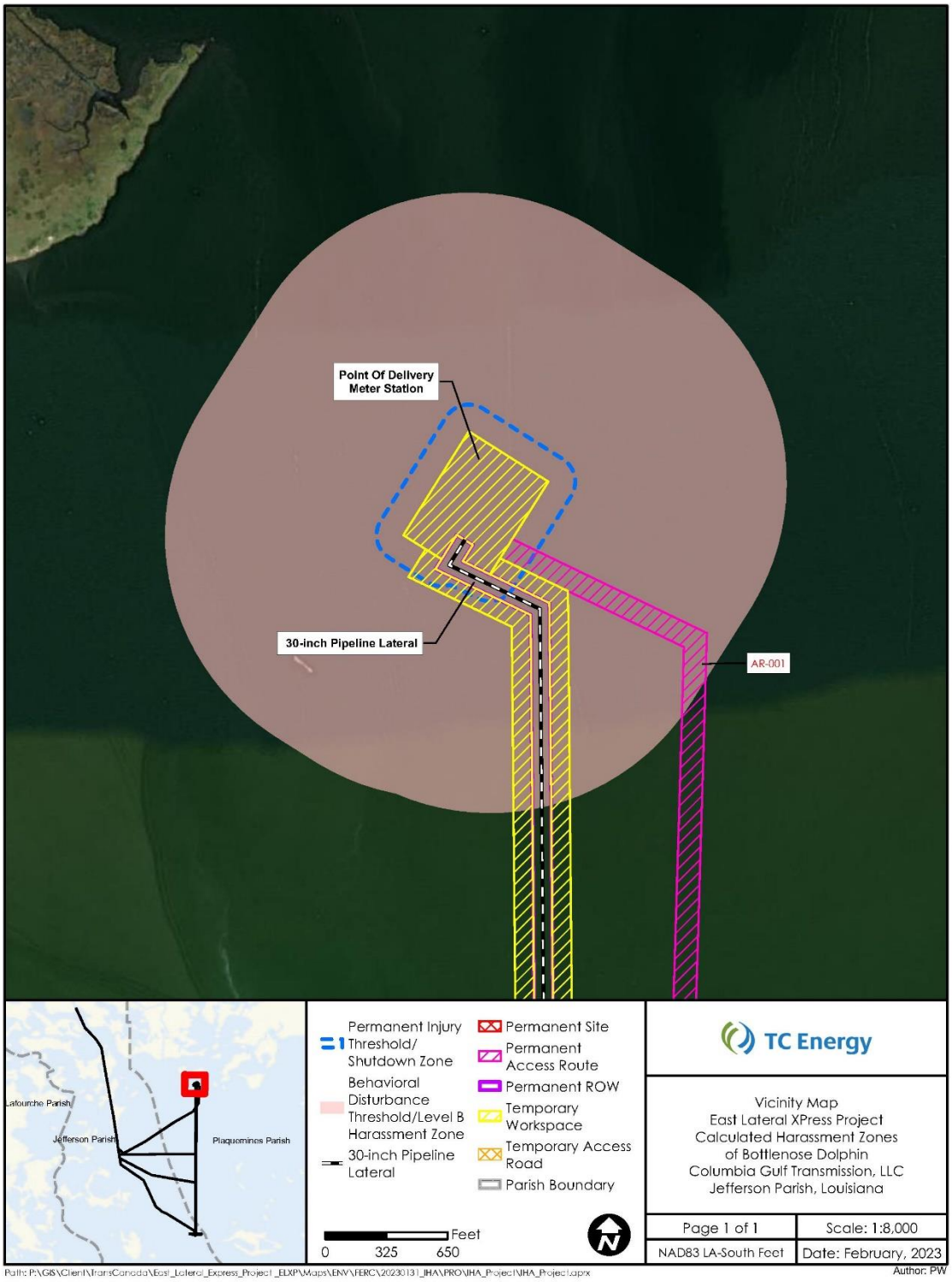

Figure 6. Calculated Harassment Zones for the POD Meter Station

6.3 Species Density

Density estimates for bottlenose dolphins within Barataria Bay were derived from estimates calculated through vessel-based capture-mark-recapture photo-ID surveys conducted during ten survey sessions from June 2010 to May 2014 (McDonald et.al., 2017). Because the surveys were conducted during the DWH oil spill, the abundance and resulting density estimate does not account for mortality following the spill.

The study area for these surveys included Barataria Bay and Pass, Bayou Rigaud, Caminada Bay and Pass, Barataria Waterway, and Bay des Ilettes. The study area was further divided into East, West, and Island habitat regions (see **Figure 7**).

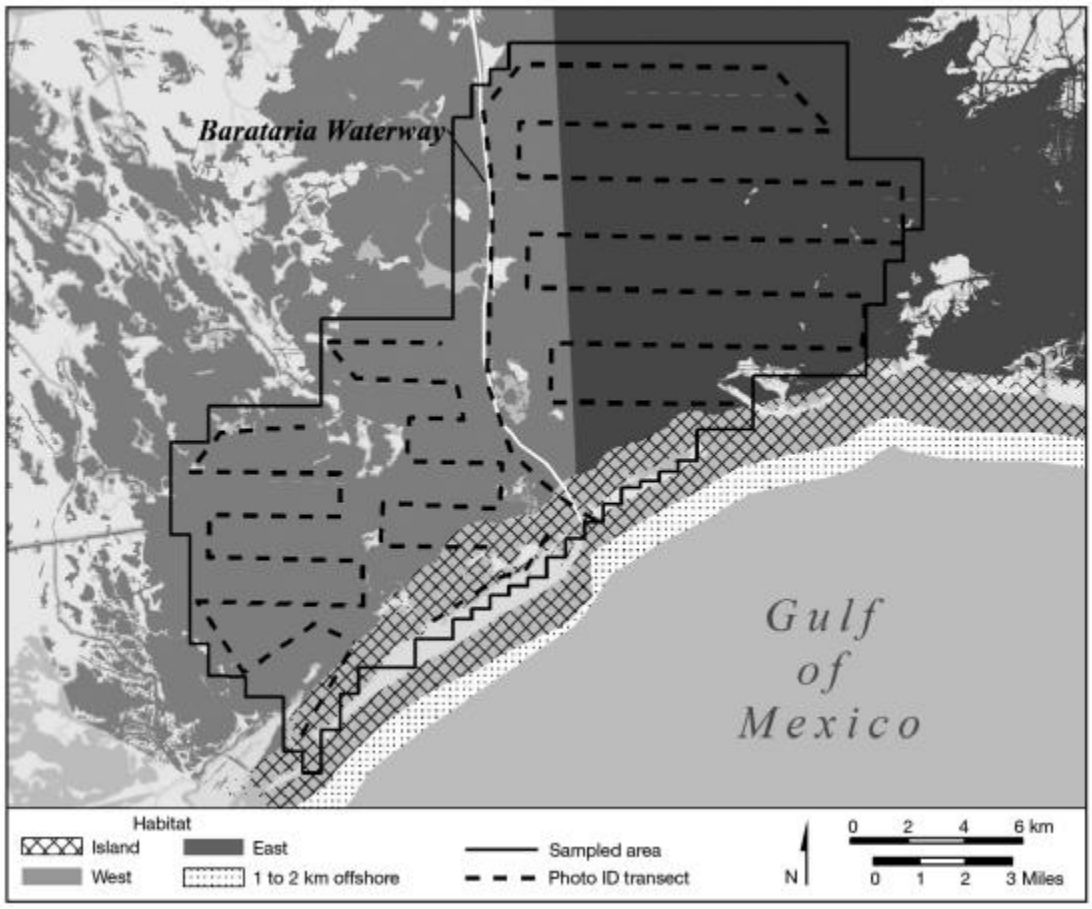

Figure 7. Study Area from McDonald et.al., 2017

Densities from the study were calculated for each habitat region of the study area. For our analysis, the average densities of each habitat region analyzed in the study were averaged. Based on this calculation, the average bottlenose dolphin density for the Project was calculated to be 2.83 individuals per km^2.

6.4 Take Estimates

Based on the population density estimates, potential take estimates of the bottlenose dolphin were calculated for Level B harassment. The take by Level B harassment assumes the threshold distances and resulting potential area of effect for 36-inch concrete piles (including use of bubble curtains) and an even distribution of population density throughout the calculated harassment zones.

At the Tie-in Facility and POD Meter Station where piles would be installed within the range of bottlenose dolphins of Barataria Bay, an initial Level B take estimate was calculated using the area of behavioral harassment (0.58 km^2) multiplied by the assumed density (2.83 individuals per km^2). This assumed an initial take estimate of 1.64 individuals for pile driving at the Tie-in Facility and the POD Meter Station. The initial Level B take estimate (1.64 individuals) was then multiplied by the duration of pile driving (24 days at the Tie-in Facility and 1 day at the POD Meter Station) to calculate the number of requested Level B take for the Project.

6.5 Number of Requested Takes

The total calculated number of bottlenose dolphin individuals requested for Level B takes during pile driving is 42 individuals. **Table 4** below presents the calculations and number of requested take as a percentage of the species' stock within the Barataria Bay Estuarine System.

Table 4
Level B Harassment Takes Requested and Percentage of Stock Potentially Affected

Pile Driving Location	Species	Estimated Density	Level B Harassment Area	Level B Takes Requested (individuals) [a]	Stock Abundance (individuals)	Percentage (%) of Stock Potentially Affected by Level B Take
Tie-In Facility	Bottlenose Dolphin	2.83 individuals per km^2	0.58 km^2	40	2,071	1.93
POD Meter Station				2		0.10
Project Totals				**42**	**--**	**2.03**

7.0 ANTICIPATED IMPACT OF THE ACTIVITY ON SPECIES AND STOCKS

The Barataria Bay Estuarine System Stock of common bottlenose dolphin is considered a strategic stock under the MMPA (NMFS, 2023a). The current and best available abundance estimate for the BBES Stock is 2,071, which, when compared to the McDonald et al. (2017) assessment, demonstrates some decline (NMFS, 2023a). Along with impacts from the DWH oil spill in which approximately 51 percent of the stock was eliminated, the BBSE has experienced additional stock-wide impacts because of human presence and activity (NMFS, 2023a). As assessed from 2015 to 2019, the number of dolphins injured or killed due to various human-caused sources (i.e., fishery research, at-sea entanglements, and gunshot wounds) was 41 individuals. Additionally, from 2015 to 2019, it was documented that 138 dolphins were found stranded within the BBES area with evidence of human interaction in 10 of those strandings (NMFS, 2023a). Human interaction in these incidents were from sources such as entanglements with hook and line gear, one incidental take in a research gillnet, one mortality with evidence of a gunshot wound, and one animal with evidence of a vessel strike (NMFS, 2023a).

The BBSE stock has been affected by three separate unusual mortality events. The first was from January through May of 1990 (in which 344 individuals became stranded), from March 2010 to July 2014 (which included stranding before, during, and after the DWH oil spill), and from February to November of 2019 as a result of extreme freshwater discharge from rivers (NMFS, 2023a).

Areas within the Barataria Basin were directly impacted by the DWH oil spill and response activities in the Gulf of Mexico (see **Section 4.2**). Findings from research conducted in the aftermath of the spill demonstrated that the dolphins, along with many other marine species, suffered a wide range of toxic effects, including death, impaired reproduction, disease, and other physiological malfunctions that reduce the ability of organisms to thrive and survive. In Barataria Bay alone, it is estimated that 45 percent of the common bottlenose dolphin population was lost following the spill (Schwacke et al., 2021). There is a potential for Project activities to remobilize residual oil on shoreline locations along the coast of Louisiana. Columbia Gulf will take all appropriate precautions to prevent the resuspension of contaminated media and will notify all appropriate authorities if weathered oil is encountered during construction activities (see **Section 11.0**).

Serious injuries or mortalities to the common bottlenose dolphins are not anticipated due to Project activities in Barataria Bay. Behavioral impacts could occur due to the increase in underwater noise resulting from pile driving activities. Hearing, which is a highly valuable sense for marine mammals like the bottlenose dolphin, can be significantly damaged when exposed to high and low-intensity sound for prolonged periods (NOAA, 2017). The underwater noise generated could interfere with the ability of the bottlenose dolphin

to communicate using auditory cues for mating, social relationships, and pod recognition (Bransetter, 2012; King, et al., 2021). Physiological impacts brought on by noise-induced stress could occur. The physiology of a stress response in cetaceans is similar to that of terrestrial mammals (Yang et al., 2021). Acute stress responses can increase heart rate and blood pressure and impair function in the endocrine system. Long-term impacts include reduced reproductive capacity, reduced immune response, and hampering of foraging ability or evasion from predators (Yang et al., 2021). Further, this impediment of communication could negatively impact cooperative tasks, such as hunting, and a significant decrease in transit events have been documented during pile driving activities (King, e. al., 2021; Paiva, et al, 2015).

Potential acoustic disturbance to bottlenose dolphins would be temporary and limited to the period of pile driving. Pile driving activities would take place from 7 a.m. to 7 p.m. (adjusted as appropriate to conduct work during daylight hours), 7 days per week for about 25 days (5 piles per day) in Barataria Bay. Although bottlenose dolphins would be expected to largely avoid the Project area during pile driving activities, the potential exists for bottlenose dolphins to be present when pile driving begins. The noise generated during pile driving activities could be audible to bottlenose dolphins potentially present within the Project area; however, Columbia Gulf proposes to implement measures recommended by NMFS to avoid adverse impacts on dolphins during pile driving. For example, NMFS has identified the use of bubble curtains as the best way to minimize underwater noise impacts. Additionally, Columbia Gulf will ensure that all Project personnel are trained in the identification of protected marine mammals like the bottlenose dolphin, that may potentially occur in the Project area. Columbia Gulf will utilize biological monitors to ensure that dolphins are not present within 1,407.0 feet of the pile driving area when pile driving activities begin. In the event dolphins are observed entering the area in which the injury threshold will be exceeded (i.e., Level A, calculated to be 142.0 feet), pile driving will cease until the dolphins leave the area of their own accord. Further, all construction related vessels will adhere to NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners.* Through the implementation of these measures, Columbia Gulf will ensure that dolphins and other marine mammals are not present within areas where Level A harassment is likely to occur.

Potential effects on bottlenose dolphins from temporary avoidance of the construction areas would be insignificant, as this is an open-water area, adjacent to broad areas of open water (Barataria Bay) which provide high quality habitats that would remain accessible to these species throughout the construction process. Based on the percentage of stock potentially affected by pile driving activities (up to 2.03 percent), Columbia Gulf expects a negligible impact on the bottlenose dolphin stocks within the Project area. Further, by implementing the measures described in **Section 11.0**, developed in coordination with NMFS, Level B harassment would be minimized and negligible.

As discussed above in **Sections 5.0 and 6.0**, Columbia Gulf is requesting authorization for Level B harassment of the bottlenose dolphin; specifically, Level B take of 42 bottlenose dolphins. No Level A take is anticipated to occur (and is not requested in this IHA); therefore, the Project would not exceed the Potential Biological Removal of the stock. Based on the Level B take estimates calculated for this IHA, comparison to the bottlenose dolphin stock within the Barataria Bay Estuarine System Stock, and the measures that Columbia Gulf would implement to minimize impacts to bottlenose dolphins, pile driving activities area anticipated to have a negligible impact.

8.0 ANTICIPATED IMPACTS ON SUBSISTENCE USE

This issue is not applicable to the proposed Project activity. As described above, in-water Project activities will occur in southern Louisiana within Barataria Bay, which is not in or near a traditional Alaskan subsistence hunting area. Therefore, there are no relevant subsistence uses of marine mammals implicated by this action.

9.0 ANTICIPATED IMPACTS ON HABITAT

All in-water construction activities, including excavation and operation, jetting, dredging, refueling of heavy machinery, pipeline installation, pile installation, placement of fill material, and construction-related impacts due to marine traffic could result in impacts on Barataria Bay. The primary impact on Barataria Bay discussed in this IHA is acoustic disturbance resulting from pile driving activities during construction. Other potential impacts on Barataria Bay include modification of aquatic habitat, increased sedimentation and turbidity, decreased dissolved oxygen concentrations, inadvertent release of chemical and nutrient pollutants from sediments, introduction of chemical contaminants such as fuels or lubricants, and changes in prey distribution. To minimize the potential impacts to marine mammal habitat within Barataria Bay, Columbia Gulf would implement the measures described in **Section 11.0**.

Impacts on Barataria Bay Habitat

Construction of the Tie-in Facility related to pile driving activities will temporarily impact 2.79 acres within Barataria Bay, of which 0.02 acres would be permanent due to the installation of piles. Construction of the POD Meter Station piles would require a minimal area due to the installation of the piles.

The Tie-in Facility and POD Meter Station will be constructed on open, raised platforms; therefore, they will not alter the flow patterns in Barataria Bay. Temporary increases in sedimentation and turbidity may occur; however, these increases are short-term and mostly localized. Further, construction barge access will only occur on pre-approved access routes that were selected due to sufficient water depths to accommodate the barges.

Impacts on Prey Species

Prey of the bottlenose dolphin consists of mobile species which are also assumed to avoid the Project area during construction. Impacts on fish due to increased underwater noise include physical injury and behavioral disturbance. Based on thresholds recommended by the California Department of Transportation, potential physical injury and behavioral disturbance thresholds are presented in **Table 5** below.

Table 5 Underwater Sound Thresholds for Fish		
Functional Hearing Group	**Underwater Sound Thresholds [b]**	
	Injury Threshold	**Behavior Disturbance Threshold**
Fish ≥ 2 grams [a]	150 dB RMS	187 dB SEL_{cum}
Fish < 2 grams [a]	150 dB RMS	183 dB SEL_{cum}
Fish All sizes [a]	150 dB RMS	206 dB Peak
[a] From Caltrans, 2015 [b] dB = decibel; Peak = peak sound pressure; RMS = root mean-square sound pressure; SEL_{cum} = cumulative sound exposure level		

Underwater sound pressures associated with the Project were estimated using the NMFS *Southeast Regional Office Pile Driving Noise Calculator* (2017) for calculating the effects of pile driving noise on fish. The maximum anticipated distances to behavioral and injury thresholds for fish during in-water pile driving are presented in **Table 6**.

Table 6 Calculated Distances to Underwater Noise Thresholds from In-water Pile Driving in Barataria Bay			
Marine Fauna	**Distance from Source in which Threshold would be Exceeded [a]**		
	Injury due to Peak Pressure	**Injury due to Accumulated Sound Exposure (SEL_{cum})**	**Behavior Disturbance (RMS)**
Fish ≥ 2 grams	7.6 feet	761.4 feet	6,530.6 feet
Fish < 2 grams		761.4 feet	
Peak = peak sound pressure; RMS = root mean-square sound pressure; SEL_{cum} = cumulative sound exposure level [a] Sound levels were based on those presented for 36-inch concrete piles in MacGillivray et al. (2007). [b] Impacts were calculated based on the use of an impact hammer on 36-inch-diameter concrete piles with use of bubble curtains (estimated 5 decibel reduction, per consultations with NMFS). [c] Impacts were calculated based on the use of an impact hammer on 18-inch concrete piles without the use of noise abatement measures.			

Although Columbia Gulf will implement mitigation measures outlined in **Section 11.0**, permanent injury and behavioral disturbance of some fish could occur. However, this is not anticipated to affect the overall abundance of prey species in the region. As Project activities within Barataria Bay are highly localized and would be in short duration, impacts on bottlenose dolphins as a result of prey abundance are not likely to occur.

10.0 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The primary impact on bottlenose dolphins within Barataria Bay as previously discussed will be the production of pile-driving noise, which can cause acoustic disturbance. Potential impacts to the Barataria Bay habitat include modification of aquatic habitat, increased sedimentation and turbidity, decreased dissolved oxygen concentrations, inadvertent release of chemical and nutrient pollutants from sediments, introduction of chemical contaminants such as fuels or lubricants, and changes in prey distribution.

During the course of the Project, various activities can cause benthic disturbance. These activities include dredging, pile installation, laying the pipe on the seafloor, backfilling, and vessel anchoring. These activities would not result in the significant permanent loss or modification of habitat for bottlenose dolphins or their prey, as any habitat impacts would be short term and localized, quickly returning to pre-existing conditions following completion of the Project. Minor permanent impacts will result from installation of piles in Barataria Bay; however, these impacts would result in permanent loss of 0.02 acre, which is negligible when compared to the overall size of the bay and the abundance of similar habitat nearby.

Fish that are prey for the bottlenose dolphin can be injured or behaviorally disturbed as a result of the noise that is generated from pile driving activities, and although Columbia Gulf will implement mitigation measures, permanent injury and behavioral disturbance to prey sources could occur. However, this is not anticipated to impact the total abundance of prey in the region, and any impacts are expected to be temporary and highly localized. In the short term, dolphins seeking prey in the area could face increased energy expenditures as they travel to find prey that is otherwise avoiding the area where Project activities are taking place. Due to the availability of similar suitable habitat surrounding the Project area and the ability of both prey species and marine mammals to avoid the areas of disturbance, the Project is not expected to have significant effects on the habitat or prey of marine mammal species in the Project area.

As described above, adverse impacts on bottlenose dolphin and prey habitat are not anticipated; therefore, no effects on the fitness of marine mammal species or stocks are anticipated because of impacts on habitat.

11.0 MITIGATION MEASURES TO PROTECT MARINE MAMMALS AND THEIR HABITAT

11.1 Measures to Protect Marine Mammals

Columbia Gulf proposes to implement measures recommended by NMFS in previous Project correspondence to avoid adverse impacts on marine mammals during pile driving activities in Barataria Bay. NMFS identified the use of bubble curtains as the best way to minimize underwater noise impacts. Bubble curtains release air through closely spaced release points around the pile via tubing laid on the water bottom. Because there is a density difference between air and water, the bubble curtain reflects the sound from the pile driving, while the bubbles themselves absorb some of the sound energy (DOSIT, 2020). NMFS stated that a reduction of approximately 5 dB could be achieved through the use of bubble curtains.

Columbia Gulf will ensure that all Project personnel are trained in the identification of protected marine mammals potentially occurring in the Project area. Additionally, Columbia Gulf will utilize biological monitors to ensure that dolphins are not present within that 1,407.0 feet radius when pile driving activities begin. In the event dolphins are observed entering the area in which the injury threshold will be exceeded (i.e., Level A, calculated to be 142.0 feet), pile driving will cease until the dolphins leave the area of their own accord. Further, all construction related vessels will adhere to NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners.* Through the implementation of these measures, Columbia Gulf will ensure that dolphins and other marine mammals are not present within areas where Level A harassment is likely to occur.

Potential effects on bottlenose dolphins from temporary avoidance of the construction areas would be insignificant, as this is an open-water area, adjacent to broad areas of open water (Barataria Bay) which provide high quality habitats that would remain accessible to these species throughout the construction process.

11.2 Measures to Protect Habitat

A majority of impacts on habitat will be short-term and localized, quickly returning to pre-existing conditions following the completion of Project activities. Minor, permanent impacts will result from installation of piles in Barataria Bay. However, these impacts would result in permanent loss of 0.02 acres, which is negligible compared to the size of Barataria Bay and the abundance of similar habitat nearby.

12.0 MITIGATION MEASURES TO PROTECT SUBSISTENCE USES

As stated above in **Section 8.0**, there are no relevant subsistence uses of marine mammals impacted by the proposed Project and this issue is not applicable. In-water Project activities will occur in southern Louisiana in Barataria Bay, which is not in or near a traditional Alaskan subsistence hunting area.

13.0 MONITORING AND REPORTING

In accordance with the MMPA, Columbia Gulf has identified measures to comply with the necessary monitoring and reporting of bottlenose dolphins potentially present in the Project area. Columbia Gulf intends to employ trained biological observers to observe presence of marine mammals (including the common bottlenose dolphin), conduct counts, and record behaviors (including behavioral reactions to stimuli) before, during, and after Project activities. The goal of monitoring will be to document the number and type of marine mammals (i.e., species, sex, age), the location of the observation, behavior, reaction to Project activities, and effectiveness of mitigation efforts (see **Section 11.0**). Additional information to be collected includes weather conditions, open-water state, visibility, and glare to understand overall observer effort and the effectiveness of the effort.

13.1 Monitoring

Columbia Gulf proposes the following in order to monitor disturbance from pile installation activities associated with the Project:

- At least one NOAA Fisheries-approved observers (i.e., Protected Species Observers [PSOs]) will be on watch from the highest possible vantage points and will have a 360-degree view of the Project area.
    - The 100-meter (0.062-statute-mile) pre-clearance zone for non-ESA-listed species and the 1,000-meter (0.62-statute-mile) pre-clearance zone for ESA-listed species will be established by the observers using a range finder.
    - Observers will make note of the state of Barataria Bay using the Beaufort scale and weather conditions during observations.
    - Observers will monitor the NOAA-approved pre-clearance zone and will ensure the zone is clear prior to the start of any pile installation activities.
    - During pile installation, observers will use binoculars and/or naked eye observations to continuously search for marine mammals.
    - If marine mammals are observed in the Project area, the sighting will be fully documented, including the following, when possible:
        - Bearing to animal relative to observer position;
        - Number of individuals observed;
        - Estimated location within the Project area;
        - Type of construction activity (i.e., impact pile driving); and

- Behavioral state, possible reaction of the animal(s) to the pile driving, and any behaviors of the animal/s while in the Project area.

13.2 Reporting

Columbia Gulf would provide the NOAA Fisheries Service with a draft comprehensive monitoring report within 90 days of the conclusion of monitoring. This report would include the following:

- A summary of the Project activity (e.g., Project actions, dates, times, durations, and locations)
- A summary of mitigation implementation
- Monitoring results and a summary that addresses the goals of the monitoring plan, including (but not limited to):
    - Environmental conditions when observations were made (e.g., water conditions and weather);
    - Date and time of observations (initiation and termination);
    - Date, time, number, species, and any other relevant data regarding marine mammals observed;
    - Description of the observed behaviors; and
    - Assessment of implementation and effectiveness of prescribed mitigation and monitoring measures.

In addition to the information included in the draft comprehensive monitoring plan, Columbia Gulf would report the following as necessary:

- If any type of take not permitted by the IHA is believed to have occurred, activities would immediately cease and the incident would be reported to NOAA Fisheries as soon as practicable and within 24 hours.
- In the event that an injured or dead marine mammal is discovered, cause of death or injury is unclear, and death is relatively recent (i.e., the animal is in less than a moderate state of decomposition), the observation would immediately be reported to the Region Stranding Coordinator.
- In the event that an injured or dead marine mammal is discovered in which the cause of death is clear and unrelated to the Project or the death is not recent, the observation would be reported to the Regional Stranding Coordinator within 24 hours.

If comments are received from the NOAA Fisheries Service on the draft report, a final report would be submitted to the NOAA Fisheries Service within 30 days after all comments are received. If no comments are received from the NOAA Fisheries Service, the report submitted would be considered the final report.

14.0 SUGGESTED MEANS OF COORDINATION

Columbia Gulf would continue to coordinate with NMFS and all other applicable agencies throughout construction of the Project. Any data collected by Columbia Gulf related to ESA-listed species under NMFS jurisdiction or marine mammals would be shared with NOAA Fisheries Services.

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