Freeport LNG
Liquefaction Project

Resource Report 2

Water Use and Quality

August 2012

Docket No.
CP12-

Prepared by

Resource Report 2 – Water Use and Quality FERC Environmental Checklist		
	Part 380-Appendix A Minimum Filing Requirements for Environmental Reports	**Company Compliance or Inapplicability of Requirement**
☐	Identify all perennial surface waterbodies crossed by the Project and their water quality classification. (§380.12(d)(1))	Sections 2.3.2, 2.3.3, and 2.3.4
☐	Identify all waterbody crossings that may have contaminated waters or sediments. (§380.12(d)(1)).	Sections 2.3.1 and 2.3.3
☐	Identify watershed areas, designated surface water protection areas, and sensitive waterbodies crossed by the Project. (§380.12(d)(1)).	Sections 2.3.1 and 2.3.3
☐	Provide a table (based on National Wetlands Inventory (NWI) maps if delineations have not been done) identifying all wetlands, by milepost and length, crossed by the Project (including abandoned pipeline), and the total acreage and acreage of each wetland type that would be affected by construction. (§380.12(d) (1 & 4)).	Tables 2.4-1, 2.4-2, and 2.4-3
☐	Discuss construction and restoration methods proposed for crossing wetlands, and compare them to staff's Wetland and Waterbody Construction and Mitigation Procedures. (§380.12(d)(2)).	Sections 2.4.1.2, 2.4.2.2, and 2.4.3.2 See also Section 1.5.2.4.4 (Resource Report 1)
☐	Describe the proposed waterbody construction, impact mitigation, and restoration methods to be used to cross surface waters and compare to the staff's Wetland and Waterbody Construction and Mitigation Procedures. (§380.12(d)(2)).	Sections 2.3.4.1, 2.3.4.2, 2.3.4.3, and 2.3.5.1 See also Section 1.5.2.4.4 (Resource Report 1)
☐	Provide original NWI maps or the appropriate state wetland maps, if NWI maps are not available, that show all proposed facilities and include milepost locations for proposed pipeline routes. (§ 380.12(d)(4)).	Figures 2.4-1, 2.4-2, 2.4-3
☐	Identify all U.S. Environmental Protection Agency (EPA)- or state-designated aquifers crossed. (§ 380.12(d)(9)).	Section 2.2.3
☐	Identify proposed mitigation for impacts on groundwater resources.	Section 2.2.6
☐	Discuss the potential for blasting to affect water wells, springs, and wetlands, and associated mitigation.	Not Applicable
☐	Identify all sources of hydrostatic test water, the quantity of water required, methods for withdrawal, and treatment of discharge, and any waste products generated.	Sections 2.3.6.1
☐	If underground storage of natural gas is proposed, identify how water produced from the storage field will be disposed.	Not Applicable
☐	If salt caverns are proposed for storage of natural gas, identify the source locations, the quantity required, the method and rate of water withdrawal, and disposal methods.	Not Applicable
☐	For each waterbody greater than 100 feet wide, provide site-specific construction mitigation and restoration plans.	Appendix 2-B
☐	Indicate mitigation measures to be undertaken to ensure that public or private water supplies are returned to their former capacity in the event of damage resulting from construction.	Section 2.2.6.1
☐	Describe typical staging area requirements at waterbody and wetland crossings.	Not Applicable
☐	If wetlands would be filled or permanently lost, describe proposed measures to compensate for permanent wetland losses.	Sections 2.4.1.2, 2.4.2.2, and 2.4.3.2
☐	If forested wetlands would be affected, describe proposed measures to restore forested wetlands following construction.	Not Applicable
☐	Describe techniques to be used to minimize turbidity and sedimentation impacts associated with offshore trenching, if any.	Section 2.3.5.1

LIQUEFACTION PROJECT

RESOURCE REPORT 2 – WATER USE AND QUALITY

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
BCGCD	Brazoria County Groundwater Conservation District
bgs	below ground surface
Blue Dolphin	Blue Dolphin Pipe Line Company
BMP	best management practice
BOG	boil-off gas
CFR	Code of Federal Regulations
CO_2	carbon dioxide
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CR	County Road
CWA	Clean Water Act
DA	Department of the Army
DMPA	dredged material placement area
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ºF	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHC	Freeport Harbor Channel
Freeport LNG Development	Freeport LNG Development, L.P.
Freeport LNG	Freeport LNG Development, L.P., Freeport LNG Expansion, L.P., and FLNG Liquefaction, LLC
FOC	Freeport Oil Company
gpd	gallons per day
gpm	gallons per minute
H_2S	hydrogen sulfide
HDD	horizontal directional drill *or* horizontal directional drilling
ICW	Intracoastal Waterway
INEOS	INEOS Group Limited
LNG	liquefied natural gas
mgd	million gallons per day
mg/l	milligrams per liter
MLV	mainline valve
MP	milepost
msl	mean sea level
NAVD 88	North American Vertical Datum 1988
NG	natural gas

NGL	natural gas liquids
NWI	National Wetlands Inventory
NPDES	National Pollutant Discharge Elimination System
PCL	protective concentration level
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
ppbv	parts per billion by volume
ppm	parts per million
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
PTP	Pretreatment Plant
Quintana Island Terminal	existing LNG terminal on Quintana Island near Freeport, Texas
RHA	Rivers and Harbors Act of 1899
RRC	Railroad Commission of Texas
SH	State Highway
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
Terminal	existing LNG terminal on Quintana Island near Freeport, Texas
TPDES	Texas Pollutant Discharge Elimination System
TRRP	Texas Risk Reduction Program
TWC	Texas Water Commission
TWDB	Texas Water Development Board
UGS	underground storage
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
yds^3	cubic yards

2.0 RESOURCE REPORT 2 – WATER USE AND QUALITY

2.1 Introduction

As described in Resource Report 1, the Liquefaction Project (or "Project") is composed of multiple components, including liquefaction facilities ("Liquefaction Plant") at and adjacent to the Quintana Island Terminal ("Terminal"), a natural gas pretreatment plant ("Pretreatment Plant") located about 2.5 miles north of the Terminal, an interconnecting system of pipelines and utility lines ("Pipeline/Utility Line System"), and appurtenant structures. The Liquefaction Plant, Pretreatment Plant, and parts of the Pipeline/Utility Line System (boil-off gas ["BOG"] pipeline and natural gas interconnect pipelines) are considered jurisdictional by the Federal Energy Regulatory Commission ("FERC" or "Commission"), whereas other parts of the Pipeline/Utility Line System (natural gas liquids ["NGL"] and nitrogen pipelines, and electric, fiber optic, and water lines) are considered FERC non-jurisdictional. However, to provide a comprehensive overview of the entire Project and to assist environmental review, Freeport LNG's Environmental Report ("ER") provides the same level of environmental analysis for all facilities, irrespective of their jurisdictional status.

Resource Report 2 describes the existing groundwater, surface water, and wetland resources that may be directly or indirectly affected by construction or operation of the proposed Liquefaction Project facilities. It also identifies the mitigation measures that Freeport LNG will implement to avoid or minimize potential impacts on these resources. The information contained in Resource Report 2 is derived from various sources, including: review of publicly available maps, technical documents, and databases; consultation with federal, state, and local regulatory authorities; and field surveys.

All facilities associated with the Liquefaction Project, both jurisdictional and non-jurisdictional, will be located within a 7-mile radius of the City of Freeport in Brazoria County, Texas. The non-jurisdictional components will generally be located along or close to Freeport LNG's existing send-out pipeline between the Quintana Island Terminal and the Stratton Ridge meter station. The Pretreatment Plant will be located in an outlying area of Freeport, near the City of Oyster Creek. Figures 1.1-1 and 1.1-2 in Resource Report 1 illustrate the Project's regional location and the proposed layout of the facilities on topographic and aerial maps, respectively.

2.2 Groundwater Resources

2.2.1 Gulf Coast Hydrogeology

The Liquefaction Project is located in the coastal lowlands aquifer system in southeastern Texas, which underlies about 35,000 square miles of the low-lying coastal plain in the state, and extends eastward into parts of the Coastal Plain of Louisiana, Mississippi, Alabama, and the western edge of the Florida panhandle. The coastal lowlands aquifer system consists mostly of Miocene and younger unconsolidated sediment deposits that lie above and coastward of the Vicksburg-Jackson confining unit. These coastward dipping sediments extend to the land surface and reach thicknesses of thousands of feet. They contain water that ranges in salinity from freshwater to brine and recharge occurs through infiltration of rainfall in outcrop areas. The system yields large amounts of water for public, agricultural, and industrial needs.

The sand, silt, and clay lithology of the coastal lowlands aquifer system reflects three depositional environments: continental (alluvial plain); transitional (delta, lagoon, and beach);

and marine (continental shelf). The sediment deposits thicken as they dip towards the Gulf of Mexico, resulting in a wedge-shaped configuration of the hydrologic units. Coarser-grained, non-marine deposits updip and grade laterally into finer-grained material that was originally deposited in marine environments. Numerous oscillations of ancient shorelines have resulted in a complex, overlapping mixture of sand, silt, and clay. These complex deposits have been divided into five permeable zones and two confining units based on permeability differences, water depths, and vertical differences in hydraulic head. (Ryder, 1996)

In Texas, the coastal lowlands aquifer system is commonly referred to as the Gulf Coast aquifer (see Figure 2.2-1). The landward boundary, or updip limit of the aquifer system, is in outcrop areas where the aquifer system feathers out at the point of contact with the underlying Vicksburg-Jackson confining unit. The Gulf-ward boundary is near the coastline where the groundwater becomes increasingly saline; the upper boundary is the land surface. The base of the aquifer system is defined as either its contact with the top of the Vicksburg-Jackson confining unit or the approximate depth at which the water in the system has a dissolved-solids concentration of more than 10,000 milligrams per liter ("mg/l"). The altitude of the base ranges from a few hundred feet above sea level near the updip limit to as much as 6,000 feet below sea level about midway between the updip limit and the coastline. (Ryder, 1996)

"Chicot aquifer" and "Evangeline aquifer" are commonly used hydrogeologic unit designations for subdivisions of the upper, mostly sandy part of the Gulf Coast aquifer deposits, while the underlying "Jasper aquifer" is the most deep-seated aquifer of the system (Ryder, 1996). These three aquifers are discussed in greater detail below and their geological profile is illustrated in Figure 2.2-2.

Chicot Aquifer - The Chicot is the uppermost aquifer in the Gulf Coast aquifer system. The Chicot-Evangeline boundary runs approximately parallel to the coast and crops out about 90 miles inland from the City of Freeport. For practical purposes, the delineation of the base of the Chicot in southeast Texas has been based on the presence of a higher sand-clay ratio in the Chicot rather than in the underlying Evangeline. In some places, a predominant clay layer is used to define the boundary. Differences in hydraulic conductivity or water levels in some areas also serve to differentiate the Chicot from the Evangeline. The high percentage of sand in the Chicot in southeast Texas, where the aquifer is noted for its abundance of water, diminishes to the southwest. Here, the higher clay content of the Chicot and the absence of fresh to slightly saline water in the unit are sharply contrasted with the underlying Evangeline aquifer, which still retains relatively large amounts of sand and good quality water. (Baker, 1979)

Evangeline Aquifer - The Evangeline aquifer has been delineated essentially as a rock-stratigraphic unit. The aquifer is composed primarily of the Goliad sand, although the lower boundary transgresses time lines to include sections of sand in the Fleming Formation. The Evangeline aquifer is typically wedge-shaped and has a high sand-clay ratio. Individual sand beds are characteristically tens of feet thick. Near the coastline, where the top of the aquifer is about 1,000 feet deep, its thickness averages 2,000 feet. The Evangeline is noted for its abundance of good quality ground water and is considered one of the most prolific aquifers in the Texas Coastal Plain. (Baker, 1979)

Jasper Aquifer - The Jasper Aquifer is separated from the Evangeline aquifer by the overlying Burkeville confining system and is underlain by the Catahoula confining system (restricted). It ranges in thickness from 200 feet to approximately 3,200 feet. The maximum thickness occurs in the region of highly saline water; where the water is fresh to slightly saline, the thickness ranges from about 600 feet to 1,000 feet. The Jasper contains a higher

percentage of sand in the eastern part of the Coastal Plain of Texas than in the southern part. (Baker, 1979)

2.2.2 Regional and Local Groundwater Withdrawals and Supplies

Between 1984 and 2003, groundwater use in Brazoria County averaged 29.7 million gallons per day ("mgd"), whereas surface water use averaged 266.6 mgd. In 2003, groundwater use in Brazoria County totaled 10.4 billion gallons, an average of 28.6 mgd. Of this average, 23.7 mgd (83 percent) was used for municipal supply, 2.4 mgd (8 percent) for irrigation, 1.1 mgd (4 percent) for manufacturing, 1.1 mgd (4 percent) for livestock, and 0.3 mgd (1 percent) for mining. Since 2003, the amount of groundwater use has continued to show a decreasing annual trend whereas surface water use has risen. In 2008, groundwater use in Brazoria County totaled 10.4 billion gallons, an average of 28.6 mgd. In the year 2020, the potential groundwater and surface water supplies for Brazoria County are projected to be 39.2 mgd and 279.6 mgd, respectively. (Brazoria County Groundwater Conservation District ["BCGCD"], 2008)

In the 1940s and 1950s, significant changes in groundwater elevations occurred in the Freeport area, which experienced the most dramatic fluctuations in water levels in southern Brazoria County at that time. Water levels dropped nearly 100 feet, but started to recover as the rate of groundwater pumping leveled off during the late 1950s (Texas Water Commission ["TWC"], 1963). In most of southern Brazoria County beyond the Freeport area, water levels in the Chicot aquifer remained relatively constant at 30 feet to 50 feet below ground surface ("bgs") between the late 1970s and 2001 (Coplin and Lanning-Rush, 2002); in comparison, during the 1980s, water levels within most of the Freeport area remained greater than 70 feet bgs. However, water levels in wells located approximately 0.5 mile from the Terminal, across the Intracoastal Waterway ("ICW"), were as shallow as 21 feet in the late 1960s (Texas Water Development Board ["TWDB"], 2012a). Recent data indicate that water well levels in the Chicot aquifer in southern Brazoria County rose by as much as 10 feet from January 2009 to January 2010, illustrating a contemporary regional decline in groundwater usage (Fort Bend Subsidence District, 2010).

All public and private water supply wells (see Section 2.2.4) in the Freeport area draw from the Chicot aquifer (TWDB, 2012b). In the vicinity of the Terminal, the Upper Chicot aquifer extends from ground surface to about 300 feet bgs and the Lower Chicot aquifer extends from 300 feet bgs to at least 1,200 feet bgs. The principal water producing sands of the Upper Chicot aquifer occur in the depth interval between 230 feet bgs and 270 feet bgs; those of the Lower Chicot aquifer occur between about 520 feet bgs and 650 feet bgs. The underlying Evangeline aquifer is not developed as a local supply source because its water contains a high level of total dissolved solids ("TDS"), estimated to be greater than 8,000 mg/l. (LBG-Guyton Associates, 2010)

In the Stratton Ridge area, about 3.2 miles north northwest of the proposed Pretreatment Plant site, the top of the Upper Chicot aquifer is at 10 feet bgs, the top of the Lower Chicot aquifer is at 300 feet bgs, and the top of the Evangeline aquifer is at 1,100 feet bgs. The degree of water salinity is characterized as "fresh water to slightly saline" in the Upper Chicot aquifer, slightly saline to saline in the Lower Chicot aquifer, and saline to brine in the Evangeline aquifer. (U.S. Department of Energy ["DOE"], 2006)

Based on agency data, eight water supply wells are located within 0.5 mile of the Pretreatment Plant site (see Figure 2.2-3) and local groundwater supplies are drawn from the

Upper Chicot aquifer at depths of between 204 feet and 279 feet. Three of the eight wells were drilled before 2002; the other five wells were drilled between 2002 and 2011. The limited data available for the latter wells indicate water levels of between 40 feet bgs and 70 feet bgs at the time of completion. (TWDB, 2012a)

2.2.3 Designated and/or Sensitive Groundwater Resources

Sole or principal source aquifers are designated by the U.S. Environmental Protection Agency ("EPA") as aquifers that supply 50 percent or more of the drinking water for an area, and for which there are no other reasonably available alternative sources should the aquifer become contaminated. The EPA (2011) has not designated any sole source aquifers within the Liquefaction Project area.

No protected watersheds, specially designated aquifer withdrawal areas, wellhead protection areas, or springs occur within 150 feet of the construction workspace for the proposed Liquefaction Project facilities.

2.2.4 Public and Private Water Supply Wells

Based on TWDB (2012a) groundwater data, the locations of water wells within one mile of the Liquefaction Project's construction footprint are shown in Figures 2.2-3 through 2.2-5. Figure 2.3-3 provides an overview of the whole project area; Figures 2.2-4 and 2.2-5 show well locations, type (industrial, domestic, government, public), and operational status (active, unused, plugged or destroyed) within one mile of the Terminal site and the Pretreatment Plant site, respectively. The following descriptions are derived from this same data source.

There are four operating water wells located within 150 feet of the proposed construction workspace for the Liquefaction Project on Quintana Island, two of which are located within the Terminal fenceline and two of which are located in the Town of Quintana close to the Terminal. These wells are discussed in more detail below.

As part of the Phase I Project, two 8-inch-diameter wells were installed on the Terminal site to provide water for operational needs, including process water, service water, and potable water. These wells draw water from the Upper Chicot aquifer and are drilled to a depth of approximately 200 feet. Each well is capable of producing approximately 1,300 gallons per minute ("gpm"). Both wells are located in the Phase I process area: one in the northwest corner of the proposed site for the West Central Temporary Workspace and Phase II LNG storage tank; the other at the southern end of the liquefied natural gas ("LNG") vaporization tower unit.

The Town of Quintana operates two municipal water wells, located on the north side of Lamar Street approximately 125 feet south[1] of the temporary workspace for the nitrogen pipeline, BOG pipeline, and fiber optic utility line at milepost ("MP") 0.20(A). This 100-foot-wide workspace runs along the outer toe of the Velasco Levee, which forms the southeast perimeter of the Terminal site. Each well is drilled to 265 feet and total send-out into the municipal system is 500 gpm.

No known active water wells are located within 150 feet of the construction workspace for the Pretreatment Plant; the two closest water wells to the site are located approximately 610

[1] Compass directions provided in Resource Report 2 for Quintana Island and the Terminal correspond with "Plant North", etc., where the Terminal site boundary along the ICW is considered the northern site boundary.

feet south at Blue Dolphin Pipeline Company's ("Blue Dolphin's") oil and gas storage facility and approximately 1,345 feet west at a residential property on CR 230 (Jeffers Road). The Blue Dolphin well was drilled in 1965 to a depth of 274 feet to draw water for industrial use. In 1967, the reported yield was 128 gpm; however, the current operating status of the well is not known and no post-1967 sampling data appear in the agency database. The well on Jeffers Road was drilled in 2010 to a depth of 245 feet to draw water for domestic use; given its relatively recent installation, Freeport LNG assumes that this well is active.

No known active water wells are located within 150 feet of the construction workspace for the Pipeline/Utility Line System beyond Quintana Island. One inactive water well is located adjacent to the proposed construction workspace near MP 0.77(A); two inactive water wells are located approximately 140 feet east of the proposed workspace boundary at MP 2.65(A) near the Bridge Harbor Yacht Club.

The Liquefaction Project construction area lies within the BCGCD. The BCGCD cannot tax, impose fees, or meter withdrawals from private water wells used for agricultural or personal purposes; however, it can impose fees on municipal, industrial, and commercial users who obtain groundwater from public water systems and can collect additional fees on groundwater exported from the county (BCGCD, 2011).

2.2.5 Groundwater Quality

Based on data from wells in the general vicinity of the Quintana Island Terminal, it is estimated that local groundwater contains between 1,000 mg/l and 1,100 mg/l TDS from 230 feet to 270 feet bgs (Upper Chicot aquifer), between 1,700 mg/l and 2,000 mg/l TDS from 520 feet to 650 feet (Lower Chicot aquifer), and between 6,000 mg/l and 8,000 mg/l TDS below 9,000 feet (Lower Chicot Aquifer). The principal TDS constituents in the upper two intervals are sodium, bicarbonate, and chloride; the principal TDS constituents in the deepest interval are sodium and chloride. (LBG-Guyton Associates, 2010)

An environmental due diligence study of the Terminal site was conducted by Entrix, Inc. ("Entrix") on behalf of Conoco-Phillips during facility planning for the Phase I and Phase II Projects. This involved field and analytical investigations of groundwater conditions and any potential contamination on the site, including the centrally located property formerly owned by Freeport Oil Company ("FOC"). Originally, the FOC property was the intended location for the Phase II Project's northeast vaporization facility but instead is now one of four designated temporary workspaces for the proposed Liquefaction Plant and Pipeline/Utility Line System at the Terminal.

Entrix's study (2004) indicated two metals (arsenic and manganese) and one volatile compound (benzene) existing in some areas on the FOC property at groundwater concentrations above Texas Risk Reduction Program ("TRRP") Tier I protective concentration levels ("PCLs"). However, the study concluded that, based on the limited number of samples collected, constituent concentrations did not appear to be indicative of significant contamination. The FOC property was cleared of abandoned and aboveground industrial infrastructure (primarily piping and storage tanks) and closure obtained through the TRRP in 2008 ahead of the anticipated construction of Phase II facilities.

Based on BCGCD data provided from 665 locations in 2005, approximately 93 percent of the groundwater wells in Brazoria County met the Federal primary drinking water standards, indicating satisfactory groundwater quality overall in the region (BCGCD, 2011). Analysis of

data from the Texas Groundwater Protection Committee (2010) indicates that, of the 77 listed agency cases involving industrial contamination of groundwater in Brazoria County since 1989 or earlier, 8 have been in the Freeport area although none appear to have been in the proximity of the proposed project facilities.

2.2.6 Groundwater Impacts and Mitigation

2.2.6.1 Construction-Related Impacts and Mitigation

2.2.6.1.1 General Issues

Existing conditions indicate that a high groundwater table, structurally soft and weak sediments, and shallow ground faulting and subsidence associated with the sedimentary environment are potential concerns for construction of the Liquefaction Plant in the former dredged material placement area ("DMPA") at and adjacent to the Quintana Island Terminal. A high groundwater table is also a potential concern for the Pretreatment Plant where approximately 77 percent of the site is mapped as Surfside clay, a hydric soil (see Resource Report 7, Figure 7.2-2). According to the U.S. Department of Agriculture (2000), surfside soils are "poorly drained" with a water table that fluctuates from the soil surface to a depth of about 50 inches; the soil is saturated at or near the surface for periods of 4 months to 6 months during the year.

Given the soil profiles and the potential for shallow groundwater at the sites for both the Liquefaction Plant and the Pretreatment Plant, foundation integrity and flooding prevention are important considerations during facility design. Two elements of the current design address these issues: an increase in base ground elevation and the use of foundation piles for major equipment infrastructure. The Liquefaction Plant equipment in the former DMPA will be installed on foundations set at 29.6 feet above mean sea level ("msl"), requiring a maximum ground elevation of 28.0 feet above msl compared to the currently variable elevation averaging 25 feet to 31 feet above msl; the Pretreatment Plant equipment will be installed on foundations set at 9.6 feet above msl, requiring a uniform ground elevation of 8.0 feet compared to the current average of 3.0 feet above msl. The elevation increases at both locations will be achieved through the placement of fill material derived from on-site and/or off-site sources.

The elevation increases described above reduce the risk of flooding, which is already low given the fact that both sites are afforded levee protection - in the case of the Liquefaction Plant by the DMPA levee and in the case of the Pretreatment Plant by the Velasco Levee to the east. The use of deep-seated piles reduces the risk that above-ground structures could shift due to associated soil strength reduction or buoyancy effects caused by groundwater table fluctuations.

A general area of concern for construction projects relates to the use of concrete piles. Concrete piles will be needed to provide a firm base for the pads and the heavy equipment components of the liquefaction trains and pretreatment units. Deep seated piles can potentially function as conduits for cross-zone groundwater migration and contamination. However, when installed, the piles for the liquefaction and pretreatment facilities will not extend beyond the Upper Chicot aquifer, precluding the potential for such impacts. In fact, rather than increasing the risk of cross-zone contamination, pile driving activity would be expected to result in decreased permeability at the soil/pile interface, thereby restricting the vertical transport of surface constituents.

In areas of shallow groundwater, which often reflects seasonal and tidal influences, pipeline and utility trench dewatering may be necessary, resulting in a temporary lowering of the groundwater in the trench. Because of the relatively small volume of water removed, the short duration of the activity, and the local discharge of the water, the water level will recover quickly when dewatering pumps are inactivated. Groundwater effects from trench dewatering will be localized and insignificant.

The greatest potential for groundwater impacts during construction of the Liquefaction Project facilities would be through the accidental release of hazardous substances, such as lubricants or fuel. To counteract this potential, Freeport LNG will continue to follow the *Spill Prevention, Control, and Countermeasure Plan* ("SPCC Plan") that was developed for Phase I project construction, with any project-specific changes made as necessary. A draft SPCC Plan for the Liquefaction Project is contained in Appendix 2-C. The SPCC Plan addresses personnel training, secondary containment design, hazardous substance storage and disposal procedures, refueling areas, spill response procedures, mitigation measures, and other Best Management Practices ("BMPs") designed to reduce or eliminate potential adverse impacts on groundwater resources. Other appropriate mitigation measures will be implemented during construction in accordance with Freeport LNG's project-specific *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") and *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures"), along with applicable permit requirements.

Groundwater withdrawals from the two existing wells on the Terminal site may be required as a source of water for mixing concrete during construction. However, these withdrawals would be at a rate low enough to avoid short- and long-term groundwater depletion. Groundwater withdrawal could also be necessary for fire protection during construction, but this would occur only during an emergency. Firewater tank capacity would be maintained with water from the Town of Quintana's two existing water supply wells, the two existing on-site water wells, and/or condensate water from air tower operation.

Given that the Liquefaction Project's design concepts, construction procedures, and mitigation measures are very similar to those used for the successful development of the Phase I Terminal facilities and send-out pipeline, no significant construction-related groundwater impacts are anticipated during construction.

2.2.6.1.2 Off-Site Water Well Issues

The Town of Quintana's two water supply wells, located approximately 125 feet from the closest construction workspace at or adjacent to the Terminal site (see Section 2.2.4), were a primary focus for groundwater protection during construction of the Phase I Project and will continue to be so for the Liquefaction Project. For the Phase I Project, the most significant public concerns related to any impacts on well water quality associated with the potential infiltration of stormwater runoff from construction zones and the effects of pile-driving on local groundwater flow and constituents.

While the Town of Quintana's two wells are in relatively close proximity to the construction workspace for the collocated pipeline/utility lines that will run along the toe of the Velasco Levee, they are separated from on-site construction zones by the perimeter levee system, which precludes the potential for stormwater infiltration from these zones. Moreover, the Liquefaction Plant workspace, where the most extensive ground disturbance and pile-driving activity will take place, is located at least 0.6 mile from the wells.

Freeport LNG will implement the erosion and sedimentation control measures set forth in its project-specific Plan, SPCC Plan, *Stormwater Pollution Prevention Plan* ("SWPPP"), and BMPs to avoid or minimize stormwater runoff from the Pipeline/Utility Line System construction area north of the Town of Quintana's water wells. Other pollution prevention measures that will be applied here and throughout the Project area include a restriction of refueling and storage of hazardous substances within a 200-foot radius of private wells and a 400-foot radius of community and public supply wells.

For the Town of Quintana, Freeport LNG anticipates that pre- and post-construction well water monitoring would be undertaken under the municipality's existing analytical program; if monitoring results indicate possible construction-related impacts, Freeport LNG will work directly with the appropriate authorities to rectify the issue.

Given the apparent lack of active water wells in close proximity to the Liquefaction Project workspace beyond Quintana Island, Freeport LNG does not expect that any construction-related well water concerns would exist beyond those described already for the Town of Quintana. If necessary, however, groundwater quality and yield for other private and public supply wells will be monitored by Freeport LNG on a case-by-case basis before and after construction to determine impacts. Although every reasonable attempt will be made to protect local water supplies, in the event of damage directly attributable to construction, temporary water sources will be provided and the damage rectified as necessary. Any repair will depend greatly on the type and extent of damage incurred and the existing condition of each well. Freeport LNG will contract with a certified well drilling contractor familiar with the wells in southern Brazoria County to evaluate the cause(s) of the damage, to recommend remedial measures, and to implement such measures as necessary. Remedial measures may range from simple flushing of well screens to completion of a new well.

Within 30 days of construction completion for the Liquefaction Project, Freeport LNG will file a report with the FERC describing any complaints received regarding well quality and yield and how these complaints were resolved.

2.2.6.2 Groundwater Usage for Facility Operations

As described in Resource Report 1, Section 1.3.8, natural gas will be cooled with air rather than water during the liquefaction process. As such, only potable and service water will be required for the new Liquefaction Plant. The supply systems for these new facilities will be integrated with and will represent an expansion of the existing supply systems for the Phase I facilities. Except for the fire water system, the same sources (i.e., the Town of Quintana's two existing water supply wells[2] and the two existing on-site water wells that provide water for the Phase I supply systems) will be used for the Liquefaction Plant. During operation of the fire water system, water will be drawn from the ICW, as described in Section 2.3.6.2. Assuming 106 new full-time employees will work at the Liquefaction Plant, Freeport LNG estimates that an additional 243.8 gallons per day ("gpd") (0.17 gpm) of potable water will be required at the Terminal. The proposed supply sources should have more than enough capacity to accommodate this increase.

[2] The Town of Quintana has recently upgraded its water wells and supply system to provide customers with a more consistent supply of high quality water than before. Thus, these wells currently represent a more reliable water source for activities at the Terminal than was the case during Phase I construction.

Operation of the Pretreatment Plant will require process water, in addition to potable and service water. Freeport LNG has not yet determined a water source definitively, but is currently evaluating both installation of an on-site well for potential groundwater withdrawals and construction of a water line from Freeport LNG's Stratton Ridge underground storage site to the Pretreatment Plant (see Resource Report 1, Section 1.3.6). The new line will connect with an existing water line that originates at Dow Chemical Company's brine mining and production facility, located about 0.9 mile north of the storage site, and was used previously to supply water for solution mining of Freeport LNG's underground cavern. If well water is used, the withdrawals would be at a rate low enough to avoid short- and long-term groundwater depletion. The well would be permitted through the BCGCD and appropriate monthly user fees would apply during construction and operation. Approximately 28,800 gpd (20.0 gpm) of de-ionized water will be needed for process use. In addition, assuming 57 new full-time employees will work at the Pretreatment Plant, Freeport LNG estimates that 131.1 gpd (0.09 gpm) of potable water will be required. The final determination of water supply sources for the Pretreatment Plant will include consideration of these water rate requirements.

2.3 Surface Water Resources

2.3.1 Regional Characteristics

The Liquefaction Project area is located within the Austin-Oyster Creek watershed (U.S. Geological Survey ["USGS"] catalogue no. 12040205). This watershed is located in the Texas-Gulf Region, Galveston Bay-San Jacinto Subregion, and Galveston Bay-Sabine Lake Accounting Unit. The major waterbodies in this watershed include Austin Bayou, Bastrop Bayou, Oyster Creek, the ICW, and the Old Brazos River Channel, in addition to numerous meandering streams, oxbow lakes, and drainages. All major waterways within the Liquefaction Project area are considered tidally influenced because of their close relation to the Gulf of Mexico. The relatively low relief of the watershed promotes slow water movement, which is typical of coastal areas.

State water quality assessments by the Texas Commission on Environmental Quality ("TCEQ") are based on classified stream segments within named drainage basins; several drainage basins make up the Austin-Oyster Creek watershed referenced above. The Liquefaction Project area is located within the San Jacinto-Brazos Coastal Basin (Basin 11) and falls within the boundaries of two classified stream segments: Old Brazos River Channel Tidal (Segment 1111) and Oyster Creek Tidal (Segment 1109). The Old Brazos River Channel Tidal segment includes the eastern section of the Terminal site together with the adjoining Pipeline/Utility Line System in the area of the LNG berthing docks and the Freeport Harbor Channel ("FHC")/ICW confluence; the Oyster Creek Tidal segment includes most of the Pretreatment Plant site and an approximately 4.3-mile-long section of the Pipeline/Utility Line System between MP 3.2(A) and MP 7.5(A).

According to the 2010 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) (TCEQ, 2011), the Oyster Creek Tidal segment has no impairments or concerns. However, the Old Brazos River Channel Tidal segment is listed as having elevated levels of chlorophyll-a and iron, sufficient in the case of chlorophyll-a to constitute an "impairment" - the levels of both parameters are considered water quality concerns. The TCEQ report indicates that high levels of chlorophyll-a are associated with fertilizer runoff from surrounding watersheds, nutrient loading from wastewater treatment plants, sanitary sewer overflows, and malfunctioning septic systems; high levels of iron are associated with dissolution from natural deposits, discharges of build-up from water supply equipment (heaters, softeners, pipelines,

etc.), and particle deposition and resuspension resulting from dredging or tidal movements. Additional details are provided in Section 2.3.3.

Neither of the two segments described above appears on the most recent (Final 2008 and Draft 2010) Clean Water Act ("CWA") Section 303(d) lists of impaired waters (TCEQ, 2008a, 2011). However, within the Austin-Oyster Creek watershed, four waterbodies do appear on these lists: Upper Oyster Creek, Oyster Creek above tidal, West Bay, and the Gulf of Mexico. Since 1998, the Gulf of Mexico in the Freeport area has been listed for "mercury in edible tissue". Of the other three waterbodies, the closest (Oyster Creek above tidal) lies about 12 miles north northwest of the Terminal and about 10 miles northwest of the proposed Pretreatment Plant site; it is listed for elevated levels of bacteria and depressed dissolved oxygen. The separation distance between all four waterbodies and the location of the Liquefaction Project facilities alone precludes any project-related concern regarding their 303(d) listing status.

2.3.2 Local Characteristics

2.3.2.1 Quintana Island Terminal Site

As shown in Figure 2.3-1, the Terminal site lies adjacent to and southwest of the intersection of the tidally influenced FHC (which is part of the Old Brazos River Channel) and the ICW. Both waterways are major shipping routes through this highly industrialized area and are used by pleasure craft and commercial/recreational fishing boats as well as cargo ships and barges. The FHC provides direct access from Freeport LNG's berthing area to the Gulf of Mexico.

As shown in Figure 2.3-1, five waterbodies are located on the Terminal site: two perennial manmade ponds (1 and 2) and three intermittent drainage channels (A, B, and C). Stormwater runoff from the maintained areas around the existing facilities is directed through a system of shallowly sloped peripheral troughs, which is connected to the drainage channel system by a series of culverts.

Pond 1 is located south of the existing LNG storage tanks and was created by Freeport LNG Development as part of the wetland mitigation program for the Phase I facilities. It consists of two open water areas connected by a short channel through an upland divide. Pond 2 is located just west of the LNG carrier berthing area and was created as a bermed impoundment during a dredging operation prior to Freeport LNG Development's involvement at the site. It was reduced in size through construction of the Phase I LNG berthing dock and associated shoreline reconfiguration.

Drainage Channel A runs south to north across the western section of the Terminal site and connects the above-described wetland mitigation pond (Pond 1) to the ICW. During periods of high water in the pond, it allows overflow drainage into the ICW; conversely, during periods of low water in the pond and high tidal flows in the ICW, the drainage flow in Channel A can be reversed by opening a tidal gate to allow water from the ICW to reach the pond. Channel A also carries surface runoff from the Town of Quintana and from the adjacent Phase I terminal facilities.

Drainage Channel B runs south to north from within Exxon Mobil's property to the ICW. It provides an outlet for stormwater runoff to the ICW from the maintained areas surrounding Exxon Mobil's facilities.

Drainage Channel C is located in the eastern section of the Terminal site and trends west to east across the estuarine wetland area between the former FOC property to the west and the LNG carrier berthing area to the east. It carries surface runoff from the former FOC property to a shoreline outlet in the berthing area; its lower reach was reconfigured during Phase I facility development to accommodate the newly constructed shoreline near the LNG berthing dock.

Recent aerial imagery (Google Earth, 2011) and field observations in late spring and summer 2012 indicate extensive pooled water in the former DMPA on the west side of the Terminal site. However, the same extensive pooling was not seen during a field reconnaissance in September 2011. About 40 percent of the construction workspace for the Liquefaction Plant shows this intermittent inundation which is likely a manifestation of the direct and indirect collection of precipitation in topographic depressions and/or temporal variation in the height of the groundwater table.

2.3.2.2 Pretreatment Plant Site

As shown in Figure 2.3-2 and Table 2.3-2, seven waterbodies (A through G) are wholly or partially located on the Pretreatment Plant site. One named waterbody, Horseshoe Lake (Waterbody A), is partially located within the Pretreatment Plant site. Horseshoe Lake is characterized by open water areas and peripheral emergent wetland (see Section 2.4.2.1). It extends across the site from the southwest to beyond the eastern property boundary, where it confluences with the drainage ditch that lies adjacent to and west of the Velasco Levee. This drainage ditch, known as the western Velasco Ditch (Waterbody G), was created during construction of County Road ("CR") 690 and represents a continuation of the oxbow feature, which diagonals back across the northeast corner of the site, constituting Waterbody B, and continues northwest beyond the site's northern property boundary. Another aberrant oxbow loop of Oyster Creek fringes the northwest sector of the Pretreatment Plant site, the connection with the main channel to the north having been severed through construction of the Velasco Levee.

As shown in Figure 2.3-2, four unnamed waterbodies (C through F) that are not associated with wetlands are located on the Pretreatment Plant site. Two of these features (Waterbodies C and D) are associated with the two large pits that have been excavated since 2004-2005 for the commercial extraction of sand and clay (see Resource Report 1, Section 1.5.2.3.1). One pit is centrally located on the site; the other is located in the northwest corner. Open water at the bottom of each pit appears to be derived from a combination of groundwater, stormwater runoff from surrounding land, and precipitation. The other two waterbodies, a narrow drainage ditch (Waterbody F) and a small pond (Waterbody E), are also associated with pit operation: the ditch was created to convey water pumped from the central pit south to Horseshoe Lake and the pond is located in a shallow topographic depression just south of the central pit.

Stormwater from the northwestern portion of the Pretreatment Plant site is carried in three man-made intermittent drainage ditches (MS-WL-002, MS-WL-004, and MS-WL-005) that are channeled south to the central pit. These shallow ditches border narrow access tracks across the property. Prior to excavation of the pit in 2004-2005, historical aerials depict these drainages as flowing into Horseshoe Lake. Two similar ditches (MS-WM-006 and MS-WM-008) carry stormwater from the eastern portion of the site into the western Velasco Ditch. Based on field delineations conducted by Freeport LNG in March and April, 2012, and a subsequent Preliminary Jurisdictional Determination ("PJD") issued by the U.S. Army Corps of Engineers

("COE") on August 9, 2012 (COE, 2012), all five of these ditches are classified as wetlands. These wetlands are discussed further in Section 2.4.2.

Construction of the Velasco Levee, which parallels the east side of the Pretreatment Plant footprint, restricted natural drainage flow off site and necessitated the construction of the Velasco Drainage District pump station, located about 1.2 miles south of the site, to convey water east across the levee. Waterbody levels on the west side of the levee, including those on and adjacent to the Pretreatment Plant site, can be controlled during storm events by operation of the pump station.

2.3.2.3 Pipeline/Utility Line System

As shown in Figure 2.3-3, the proposed Pipeline/Utility Line System crosses twelve waterbodies, of which eight are perennial and four are intermittent. The perennial waterbodies are the FHC, the ICW[3], Oyster Creek, Horseshoe Lake[4], the eastern Velasco Ditch, the western Velasco Ditch, the CR 891 Ditch, and an unnamed pond. The intermittent waterbodies are two tributaries to Salt Bayou and two unnamed drainage channels. The western Velasco Ditch, the eastern Velasco Ditch, and the unnamed pond are crossed by the Pipeline/Utility Line System lateral section at the Pretreatment Plant; the eastern Velasco Ditch is also crossed by the main arterial Pipeline/Utility Line System as are eight of the remaining nine waterbodies (the exception being Horseshoe Lake [see Footnote 5]).

The FHC and ICW intersect just north of the Terminal Site and are described previously in Section 2.3.2.1. Oyster Creek is a shallow, narrow, tidally influenced waterbody that is used by pleasure craft and recreational fishing boats. The eastern Velasco Ditch is a man-made, tidally influenced waterbody that was created during the construction of the adjacent levee. The western Velasco Ditch has a similar origin and physical profile, although it is not tidally influenced due to the fact that it lies inside the Velasco Levee and its drainage connection to tidally influenced waters involves a one way flow south through a box culvert under State Highway ("SH") 332 that is maintained by five large capacity pumps at the Velasco Drainage District pumping station.

The two tributaries to Salt Bayou are shallow, intermittent waterbodies that are not tidally influenced where they are crossed by the proposed Pipeline/Utility Line System, according to National Wetlands Inventory ("NWI") data. The two unnamed drainage channels are located further north and fringe the embankment of an abandoned railroad just east of Freeport LNG's Stratton Ridge meter station.

[3] In addition to the collocated pipelines/utility lines between the Liquefaction Plant and the Pretreatment Plant, the ICW will be crossed by the new electric line that will utilize the same aerial infrastructure (poles) as that already in place for the electric line serving the Phase I Terminal facilities. As such, the electric line crossing is not included in impact acreage estimates (see Table 2.3-3) or evaluated further in Resource Report 2.

[4] The proposed route for the electric line that will connect the Pretreatment Plant with the local power grid crosses Horseshoe Lake, approximately 0.9 mile west of the Pretreatment Plant site. Because the electric line crossing will be overhead rather than underground and is at a conceptual routing phase only, it is not included in impact acreage estimates (see Table 2.3-3), or evaluated further in Resource Report 2.

2.3.3 Surface Water Designations and Sediment Quality

2.3.3.1 Federal Designations

With respect to surface waters on the proposed Pipeline/Utility Line System, the FHC, the ICW, and Oyster Creek are designated both as waters of the U.S. and federally navigable waterbodies; as such, construction activities involving dredge and fill are regulated by the COE under Section 404 of the CWA and all construction activities (involving dredge and fill or not) are regulated by the COE under Section 10 of the Rivers and Harbors Act of 1899 ("RHA"). The FHC and ICW are identified also as federal navigation projects regulated under the RHA. According to the local NWI map (see Figure 2.4-1), the FHC and ICW are designated as E1UBLX (Estuarine, Subtidal, Unconsolidated Bottom, Subtidal [water regime modifier], Excavated), whereas Oyster Creek is designated as E1UBL (Estuarine, Subtidal, Unconsolidated Bottom, Subtidal [water regime modifier]).

Including the FHC, the ICW, and Oyster Creek, nine of the twelve waterbodies[5] crossed by the proposed Pipeline/Utility Line System (see Table 2.3-3) have featured in previous Section 404/Section 10 permitting for the Phase I and NGL Extraction Projects;[6] consequently, their jurisdictional status as waters of the U.S. has been confirmed already. Similarly, the other three waterbodies (western Velasco Ditch [Waterbody G]), Horseshoe Lake, and the unnamed pond) are known waters of the U.S. that are regulated under Section 404 of the CWA.

Two named waterbodies are crossed by the proposed operational footprint of the Pretreatment Plant: the western Velasco Ditch (Waterbody G) and Horseshoe Lake (Waterbody A). Like the western Velasco Ditch, Horseshoe Lake is a known water of the U.S. and regulated under Section 404 of the CWA, as confirmed through the PJD issued by the COE on August 9, 2012 (COE, 2012) (see Appendix 2-E). According to the local NWI map (see Figure 2.4-2), vegetated portions of Horseshoe Lake are classified as PEM1F (Palustrine, Emergent, Persistent, Semi-permanently Flooded) wetland. The PJD also confirmed that four of the other five on-site waterbodies (C through F as referenced in Section 2.3.2.2) are not regulated under Section 404 of the CWA, given their man-made origin in upland areas (see Sections 2.3.4.2 and 2.4.2.2); conversely, the unnamed drainage channel associated with WL-1 (Waterbody B) is regulated under Section 404 of the CWA.

Like the FHC and ICW, the five other waterbodies at or adjacent to the Terminal site (Pond 1, Pond 2, and Drainage Channels A, B, and C) have featured in previous Section 404 and Section 10 permitting for the Phase I and Phase II Projects and, consequently, their jurisdictional status as waters of the U.S. has been confirmed already. Pond 1 represents a former wetland area classified as PEM1Cd (Palustrine, Emergent, Persistent, Seasonally Flooded, Partially Drained/Ditched) on the local NWI map. It was restored and enhanced to offset Phase I Project wetland/waterbody impacts. Pond 2 is classified as PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated) on the local NWI map. No stream-specific designations exist for Drainage Channels A, B, and C which, like Ponds 1 and 2, are features that have been substantially altered since the local NWI map was prepared.

[5] Table 2.3-3 shows 12 waterbodies, of which one (eastern Velasco Ditch) is crossed at three separate locations to give a total of 14 listed waterbody crossings.

[6] The NGL Extraction Project, which involved the proposed development of an NGL pipeline system along the existing send-out pipeline route, was referred to as the "Angler Pipeline Project" during Section 404/10 permitting.

The entire former DMPA west of the existing Phase I process area is classified on the local NWI map as L2USKh (Lacustrine, Littoral, Unconsolidated Shore, Artificially Flooded, Diked/Impounded). At the Terminal site, this area includes temporary workspace that was used during Phase I construction and still retains an aggregate overlay. The proposed Liquefaction Plant footprint is also wholly located within the former DMPA and overlaps the Phase I workspace.

Given the historical and recent use of the former DMPA for dredge spoil disposal and the fact that any impacts to waters of the U.S. originally existing at this location would have been permitted and mitigated when the DMPA was created, the current surface water features, as described in Section 2.3.2.1, are not considered waters of the U.S. and, therefore, do not require inclusion in any associated permitting initiative for the Liquefaction Project, as confirmed by the COE, Galveston District in a meeting with Freeport LNG on April 25, 2012.

2.3.3.2 State Designations

Surface water quality standards in the State of Texas define five general categories for water use: aquatic life, contact recreation, fish consumption, general use, and public water supply. Under the TCEQ's state-wide water quality assessment program, through which individual waterbodies are periodically investigated, a different set of water quality parameters (dissolved oxygen, pH, nutrient screening levels, bacteria levels, etc.) is measured for each use category to determine the degree to which the use is supported: fully supported, partially supported, or not supported. These three support designations are also applied to the individual parameters analyzed under each use category.

Under the TCEQ's statewide water quality assessment program, the closest monitoring station to the Terminal site is located in the Old Brazos River Channel approximately 3.5 miles upstream from the confluence of the FHC and the ICW. The most recent data sets for this station (TCEQ, 2008b, 2010) indicate that the only water quality or sediment concerns were an elevated level of nitrates in 2008 and elevated levels of chlorophyll-a and sediment-borne iron in 2010 (see also Section 2.3.1). For those parameters to which a support level was ascribed, the level was universally "fully supporting". Given that this sampling station is located in a more confined industrial setting than the waterways immediately surrounding the Terminal site, it is unlikely that water quality nearer to the Terminal would show any spatial decline; in fact, given the relative proximity of the FHC and the ICW to the open waters of the Gulf of Mexico, it may well be higher. Moreover, regular maintenance dredging of these waterways by the COE reduces the potential for long-term retention of contaminated sediments near the Terminal site.

Under the TCEQ's statewide water quality assessment program, the closest monitored waterbody to the proposed facilities beyond Quintana Island is the tidal portion of Oyster Creek, which runs within 0.2 mile east of the Pretreatment Plant site and is crossed by the proposed Pipeline/Utility Line System. The most recent data sets for this waterbody (TCEQ, 2008b, 2010) indicate that the only water quality or sediment concerns were elevated levels of bacteria and chlorophyll-a identified in less than one-quarter of samples taken in 2008 and 2010. The support levels ascribed for the chlorophyll-a and bacteria parameters were universally "no concern" and "fully supporting", respectively.

The use categories that apply to all waterbodies crossed by the proposed Liquefaction Project facilities are general use, aquatic life, and contact recreation. For those waterbodies within the Oyster Creek Tidal Segment (Segment 1109), including Oyster Creek, Horseshoe Lake, the western Velasco Ditch, and the eastern Velasco Ditch, all three use categories are

considered “fully supported”. For those waterbodies within the Old Brazos River Channel Tidal segment (Segment 1111), namely the FHC and ICW, the recreation use is fully supported but the aquatic life and general uses are listed as water quality concerns in the 2010 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) (TCEQ, 2011), based on elevated levels of chlorophyll-a and sediment-borne iron, as previously described.

As discussed in Section 2.3.1, no waterbodies or waterbody segments located on or close to the Liquefaction Project construction footprint are currently listed as impaired under Section 303(d) of the CWA (TCEQ, 2008a, 2011).

2.3.4 Surface Water Impacts

2.3.4.1 Quintana Island Terminal Site

2.3.4.1.1 Overview

Table 2.3-1 lists the jurisdictional waterbodies at or adjacent to the Terminal site and provides for each waterbody a quantitative and qualitative summary of anticipated impacts (if any) associated with construction and operation of the Liquefaction Plant. Impacts are considered direct if the waterbody is located within the proposed construction workspace, is temporarily or permanently disturbed, and consequent impact acreages can be calculated. Indirect impacts, such as potential changes in flow regime, occur beyond the construction workspace, are secondary in nature, and do not involve actual temporary or permanent impact acreages.

TABLE 2.3-1

Freeport LNG Liquefaction Project
Waterbodies and Associated Impacts at the Quintana Island Terminal Site

Waterbody Name	Waterbody Type	Temporary Impact Acreage	Permanent Disturbance Acreage	Impact Profile
WATERBODIES ON THE TERMINAL SITE				
Pond 1	Perennial	0.00	0.00	Indirect – stormwater and hydrostatic test discharges during construction
Pond 2	Perennial	0.00	0.00	No direct or indirect impacts
Drainage Channel A	Intermittent	0.08	0.02	Walkway crossing requiring in-stream culvert (accounts for temporary impact and permanent disturbance acreages) Overhead crossing for LNG pipeline and trough – no in-stream impact Bore or drill crossing for natural gas pipeline, nitrogen pipeline, and fiber optic cable between Phase I process area and Liquefaction Plant – no in-stream impact Indirect – stormwater discharges during construction and operation
Drainage Channel B	Intermittent	0.00	0.00	Indirect – stormwater discharges during construction and operation
Drainage Channel C	Intermittent	0.00	0.00	Indirect – stormwater discharges during construction and operation
WATERBODIES ADJACENT TO THE TERMINAL SITE				
Freeport Harbor Channel (“FHC”)	Perennial	0.00	0.00	No direct or indirect impacts
Intracoastal Waterway (“ICW”)	Perennial	0.00	0.00	EXISTING CONSTRUCTION DOCK Re-dredging: 32,000 yds^3 / 2.83 acres
		0.00	0.52	PROPOSED CONSTRUCTION DOCK Construction Dredging: 310,000 yds^3 / 6.45 acres
		0.00	0.02	FIRE WATER INTAKE STRUCTURE Construction Dredging and/or Off-shore Excavation: 1,700 yds^3 / 0.08 acre
	Total:	0.08	0.56	

The most significant direct impacts on surface waters are associated with new and existing structures on the ICW, namely the existing construction dock, the proposed construction dock, and the proposed fire water intake structure (see Figure 2.3-1). These structures and impacts are discussed more fully in Section 2.3.4.1.2. Direct impacts on surface

waters associated with onshore plant infrastructure are negligible and associated with construction of a driveway over Drainage Channel A, as discussed in Section 2.3.4.1.3.

2.3.4.1.2 Construction Docks and Fire Water Intake Structure

Proposed Construction Dock

A second construction dock will be installed on the south shore of the ICW, at the northwest corner of the proposed site for the Liquefaction Plant (see Figure 2.3-1). Current design plans indicate that the 300-foot-long by 75-foot-wide dock platform would extend over both shoreline and open water, covering an area of 0.52 acre. Some shoreline disturbance and off-shore dredging will be necessary to install the platform, which will be supported on piles. The extent to which dredging is required will depend primarily on the existing water depth and its ability to accommodate barges, which have a relatively shallow draft. Freeport LNG estimates that 310,000 yds^3 of material will be removed over 6.45 acres. The dock will be considered a permanent structure – at this time there are no plans for its removal following project completion.

Existing Construction Dock

The slip for the existing 200-foot-long by 70-foot-wide construction dock, located on the south shore of the ICW at the northeast corner the Phase I process area, was initially dredged to a depth of -14 feet in 2005 during Phase I Project construction. By March 2010, continued sediment deposition in the ICW had reduced the water depth in the vicinity of the dock to approximately 7 feet, inhibiting potential waterborne access. Consequently, removal of approximately 32,000 yds^3 of material will be necessary to accommodate barge entry and offloading.

Fire Water Intake Structure

The fire water intake structure will be installed in the vicinity of a former boat ramp on the south shore of the ICW at the northwest corner of the Phase I process area. The structure will consist of a 50-foot-long by 20-foot-wide (0.02 acre) concrete platform mounted on piles and supporting two diesel-driven pumps to withdraw water at the 5,000 gpm flow rate required for fire suppression. Diesel will be stored in two tanks, one for each pump, located on the concrete platform. To avoid or minimize surface water impacts from potential fuel spills or leaks, the two tanks and pumps will be accommodated with built in secondary containment; also the concrete platform will be curbed and drained to an onshore oil/water separator. An uptake pipe will be vertically mounted below the platform, extending into an excavated and/or dredged chamber to provide sufficient depth for unrestricted water flow. The pipe will be appropriately screened to limit entrainment of aquatic organisms during water uptake. Freeport LNG estimates that 1,700 yds^3 of material will be removed over 0.08 acre to create the chamber. The fire water intake structure will be a permanent structure.

Dredging and Dredge Spoil Disposal

Freeport LNG proposes to use conventional barge-mounted cutter/suction dredging or a combination of shore-based dragline and barge-mounted cutter/suction techniques during construction of the new construction dock and fire water intake structure. The same approach will be used for any dredging required at the existing construction dock, which is authorized under Department of the Army (“DA”) Permit SWG-2003-02110 as administered by the COE.

Freeport LNG will apply for a separate COE permit to cover dredging for the new construction dock and fire water intake structure.

Dredged material will be placed in Port Freeport's DMPA No. 1, approximately 2.1 miles northwest of the Terminal site and/or in one or more pre-approved DMPAs elsewhere. Adequate levee height will be maintained for proper containment and effluent quality will meet the requirements of the COE permits and TCEQ water quality certification. Based on the relatively low volume of dredged material likely to be generated overall, Freeport LNG anticipates that the material will be transported by dredge pipeline to the disposal point.

Impacts from dredging and dredge material placement are expected to be localized and short term. The COE performs periodic maintenance dredging of the ICW. During years when dredging is not performed, the ICW has a high sediment load. However, high shoaling rates occur locally and sediments are expected to fall out rapidly after resuspension. The effects of resuspension, including increased turbidity, would be limited to the period during and immediately following dredging. The primary impact to DMPA water quality would be increased turbidity resulting from equipment operation and deposition of the dredged material.

Freeport LNG estimates that 350 to 400 barge visits will occur during facility construction. In comparison, the nearby Port Freeport receives an average 3,000 barges and other large commercial vessels each year, all of which travel across or along the ICW in the vicinity of the Terminal site. According to the Texas Department of Transportation, some 116,994 barge one-way trips were made in 2008 along the ICW, moving more than 72 million tons of cargo. As such, the 350 to 400 barge visits for the Liquefaction Project would represent a 0.38 percent rise in transits and thus do not represent a level or type of shipping traffic that is cumulative to, or distinguishable from, that occurring on a day-to-day basis. Although water quality impacts can be associated with any vessel utilizing the ICW (through propeller wash, etc.), baseline water quality will not be impacted when, as in this case, the level and type of shipping traffic remains essentially unchanged.

2.3.4.1.3 On-shore Plant Infrastructure

The only waterbody that will be directly impacted by construction and operation of the onshore liquefaction facilities at the Terminal site is Drainage Channel A. As indicated in Figure 1.3-1 (Resource Report 1), Drainage Channel A will be crossed by a new LNG pipeline, LNG trough, natural gas pipeline, nitrogen pipeline, and fiber optic cable that will run between the Liquefaction Plant and the Phase I/Phase II LNG storage area to the east. The LNG pipeline and associated trough will span the channel via an overhead crossing at one location, while the natural gas pipeline, nitrogen pipeline, and fiber optic cable will be installed under the channel by bore or drill at a second location farther south. Discernible in-stream impacts will be avoided at both crossing locations.

In addition to the above-described pipeline and utility line crossings, Freeport LNG is planning to construct a narrow walkway across Drainage Channel A to allow pedestrian and cart access between the existing administration building on the east side of the channel and the proposed administration building at the Liquefaction Plant on the west side. Construction of the walkway will require installation of a concrete culvert and some bank-side disturbance. No permanent loss of waterbody acreage or redirection of drainage flow will occur although placement of the in-stream culvert is recognized as permanent disturbance in Table 2.3-1.

Indirect impacts to the three drainage channels (A, B, and C) on the Terminal site may include minor variations in stormwater flow regimes, caused by construction-related changes to surrounding topography and surface permeability during construction and operation. Pond 1 may also be subject to similar stormwater-related impacts and will receive discharge water during hydrostatic testing. None of these indirect impacts will have any significant environmental implications as all of the waterbodies were originally designed and built as drainage structures to convey stormwater to the ICW. Pond 2 will not be disturbed during facility construction or operation.

2.3.4.2 Pretreatment Plant Site

Table 2.3-2 lists the waterbodies at or adjacent to the Pretreatment Plant site and, for each waterbody, provides a quantitative and qualitative summary of anticipated impacts (if any) associated with construction and operation of the proposed facilities. Avoidance or minimization of negative impacts to surface waters and wetlands was an important design criterion for the proposed site layout. Consequently, impacts to the two naturally occurring waterbodies, Horseshoe Lake (with drainage channel) and the unnamed drainage channel associated with Wetland WL-1 (see Table 2.4-2), are collectively confined to 0.06 acre of permanent fill at the southern and northern extremities of the main Pretreatment Plant footprint. However, both the Horseshoe Lake drainage channel and the unnamed drainage channel, which cross the southeast and northeast corners of the footprint, respectively, will need to be redirected to maintain the current drainage flow into the western Velasco Ditch and through the Velasco Drainage District pump station.

TABLE 2.3-2

Freeport LNG Liquefaction Project
Waterbodies and Associated Impacts at the Pretreatment Plant Site

Waterbody Name	Waterbody Type/Jurisdictional Status [a]	Temporary Impact Acreage	Permanent Disturbance Acreage	Impact Profile
WATERBODIES ON THE PRETREATMENT PLANT SITE				
Horseshoe Lake and Drainage Channel (Waterbody A)	Perennial open water/ wetland complex (WL-9) in relict oxbow of Oyster Creek with open channel to Western Velasco Ditch COE Jurisdictional	0.02	0.01	Wetland periphery extends across south edge of operational plant footprint; channel crosses footprint of plant at southeast corner and south access road – requires redirection
Unnamed Drainage Channel (Waterbody B)	Perennial open channel through Wetland WL-1 to Western Velasco Ditch COE Jurisdictional	0.28	0.05	Crosses northeast corner of plant footprint – requires redirection
Open Water in Central Excavation Pit (Waterbody C)	Intermittent pooled water in bottom of pit COE Non-jurisdictional	0.00	10.56	Existing pit and accumulated open water will be modified to create stormwater detention pond for construction and operation
Open Water in Northwestern Excavation Pit (Waterbody D)	Intermittent pooled water in bottom of pit COE Non-jurisdictional	3.21	0.00	Pit will be site of soil excavation for construction fill – capacity to retain water will not be diminished
Unnamed Pond (Waterbody E)	Intermittent pond created from upland construction COE Non-jurisdictional	0.00	0.42	Impacted by construction of new permanent access road
Unnamed Drainage Ditch (Waterbody F) [b]	Intermittent ditch created for water pumped from central pit to Horseshoe Lake COE Non-jurisdictional	0.00	0.11	Impacted by fill and grading for temporary workspace
WATERBODIES ADJACENT TO THE PRETREATMENT PLANT SITE				
Western Velasco Ditch (Waterbody G)	Perennial borrow ditch along Velasco Levee COE Jurisdictional	0.28	0.43	Impacted by culvert installation for two new permanent access roads between Pretreatment Plant and CR 690
	Total (COE Jurisdictional):	3.21	11.09	
	Total (COE Non-jurisdictional):	0.58	0.49	
	Total:	3.79	11.58	

Notes

[a] Jurisdictional status is based on PJD issued on August 9, 2012 (COE, 2012).

[b] Recent field observations have indicated that, subsequent to Freeport LNG's wetland/waterbody delineation in March/April 2012, a portion (0.32 acre) of this non-jurisdictional, man-made ditch was filled by the original site owner during wind-down of the on-site sand extraction operation. The permanent disturbance acreage (0.11) presented in this table represents the remaining portion of the ditch.

With respect to the four unnamed, non-jurisdictional waterbodies (C through F) on the Pretreatment Plant site (see Section 2.3.2.2), the area in which the small pond (Waterbody E) and drainage ditch (Waterbody F) are located will be utilized for temporary workspace, requiring that these features be filled. Given that they are both man-made features associated with the commercial excavation of sand and clay that was recently terminated, and that they have no evident ecological value, Freeport LNG does not anticipate that their restoration would be useful. Moreover, as indicated in Table 2.3-2, the drainage ditch has been partially filled already by the original property owner. The two unnamed waterbodies that occupy the central excavation pit (Waterbody C) and the northwestern excavation pit (Waterbody D) will each be impacted in a different way as discussed below.

Freeport LNG intends to use the central excavation pit to develop a retention pond for stormwater runoff during construction and operation; a smaller detention pond (see Section 2.3.5.2.2) may also be installed in this area. As such, the existing pit topography and water retaining capacity will be modified considerably; however, the anticipated creation of shallower, vegetated side slopes is one of several factors that will very likely increase the ecological value of the waterbody, which currently constitutes an accumulation of very turbid, unproductive water in a highly erosional environment.

The northwestern pit is located in an area from which Freeport LNG is planning to remove clay-based soil for use as fill material on the main Pretreatment Plant footprint. Like the water in the central pit, the water in the northwestern pit is only present by virtue of recent material extraction and any environmental impacts, such as sedimentation and associated turbidity, that may be caused by Freeport LNG's intended activities will be no different from those attributable to past excavation.

2.3.4.3 Pipeline/Utility Line System

Table 2.3-3 lists the waterbodies that are crossed by the proposed Pipeline/Utility Line System and, for each waterbody, provides a quantitative summary of anticipated impacts (if any) associated with facility construction.

TABLE 2.3-3

Freeport LNG Liquefaction Project
Waterbodies and Associated Impacts for the Pipeline/Utility Line System

Bank-to-Bank Milepost		Waterbody Name	Flow Regime	Approximate Width (feet) [a]	Crossing Method	Temporary Impact (acres)
From	To					
0.79(A)	0.98(A)	Freeport Harbor Channel (FHC)	Perennial	970	HDD	0.00
1.63(A)	1.72(A)	Intracoastal Waterway (ICW)	Perennial	410	HDD	0.00
3.66(A)	3.67(A)	CR 891 Ditch	Perennial	49	Open Cut	0.10
3.73(A)	5.40(A)	Eastern Velasco Ditch	Perennial	N/A [b]	Open Cut (Push-Pull)	19.60
5.41(A)	5.59(A)	Eastern Velasco Ditch	Perennial	N/A [b]	HDD	0.00
5.59(A)	5.65(A)	Oyster Creek	Perennial	180	HDD	0.00
8.05(A)	8.05(A)	Unnamed Tributary to Salt Bayou	Intermittent	5	Open Cut	N/A [c]
8.48(A)	8.49(A)	Unnamed Tributary to Salt Bayou	Intermittent	75	Open Cut	0.20
0.21(B)	0.22(B)	Western Velasco Ditch	Perennial	80	HDD	0.00
0.14(B)	0.16(B)	Eastern Velasco Ditch	Perennial	105	HDD	0.00
0.00(B)	N/A [d]	Unnamed Pond [d]	Perennial	377	N/A[d]	0.70
0.21(D)	0.22(D)	Unnamed Drainage Channel	Intermittent	40	Open Cut	0.10
0.23(D)	0.23(D)	Unnamed Drainage Channel	Intermittent	19	Open Cut	0.10
0.31(E)	0.39(E)	Horseshoe Lake	Perennial	450	Overhead	0.00 [e]
					TOTAL:	20.8

Notes

N/A Not Applicable

[a] Waterbody widths provided in this table is based on review of USGS 7.5 minute series topographic quadrangle maps (Scale 1:24,000) and aerial based maps of the project area.

[b] The pipeline will be placed longitudinally in the borrow ditch using the push-pull method.

[c] Impacts associated with this waterbody are included in the wetland impact calculations in Table 2.4-3.

[d] This feature occurs in the ATWS for the HDD pull-back at the lateral pipeline/utility line crossing of the Velasco Levee – there will be no permanent pipeline/utility line crossing.

[e] Overhead crossing by electric line serving Pretreatment Plant – no in-stream impacts.

As described in Resource Report 1, Section 1.5.2.4.4, Freeport LNG is proposing to cross three of the major waterbodies on the Pipeline/Utility Line System (FHC, ICW, and Oyster Creek) by the horizontal directional drill ("HDD") method, thereby avoiding in-stream and riparian impacts, including disturbance of benthic substrate and shoreline vegetation. The fourth major waterbody, the eastern Velasco Ditch, will be crossed both longitudinally, by pipeline/utility line sections collocated with the existing send-out pipeline in the bed of the ditch, and laterally, by pipeline/utility line sections running across the ditch between the main arterial

route system and the Pretreatment Plant. HDD will be used for the lateral crossings; the push-pull open cut method will be used for the longitudinal installation. The Velasco Levee, CR 690, and the western Velasco Ditch will be included at the same HDD crossing location.

Approximately 8,840 feet of the longitudinal pipeline/utility line sections will be installed by the push-pull open cut method within the bed of the eastern Velasco Ditch. Use of this method, in which the pipe joints are welded on shore and pushed or pulled as a floating string through the water channel, will cause less in-stream disturbance than that associated with the installation of individual pipe joints. The primary surface water impact resulting from the push-pull method will be a temporary increase in the concentration of suspended sediments and consequent turbidity during construction.

As discussed in Resource Report 1, Sections 1.3.6 and 1.5.2.4.4, the Velasco Drainage District requires that the entry and exit points for the HDD at the Velasco Levee be set back at least 300 feet from the centerline of the levee, to ensure that the levee structure is not compromised by drilling activity. To enable the gas inflow and outflow pipelines to be tied in with the existing 42-inch-diameter send-out pipeline that fringes the eastern toe of the levee, and to allow the other proposed pipelines/utility lines to be collocated with the send-out pipeline, each line will be looped back to the send-out pipeline right-of-way for a distance of approximately 825 feet. This looping will require tie-in work within the open channel of the eastern Velasco Ditch.

Freeport LNG is proposing to cross the CR 891 Ditch, the two tributaries to Salt Bayou, and the two unnamed drainage channels further north by the conventional open cut wet trench method with equipment operating from the banks. Assuming water is present during construction, the primary impact will be the same as that associated with the push-pull method - a temporary increase in the concentration of suspended sediments and turbidity during construction.

2.3.5 Mitigation Measures

2.3.5.1 Construction

Mitigation measures that are generally applicable to and will be implemented for construction at all three project sites (Liquefaction Plant, Pretreatment Plant, and Pipeline/Utility Line System) are summarized in Section 2.3.5.1.1. Mitigation measures with greater specificity to each site are discussed in Sections 2.3.5.1.2 through 2.3.5.1.4.

2.3.5.1.1 Overview

Construction activities such as clearing and grading, crossing of waterbodies, dredging, equipment refueling, and hydrostatic test discharges can potentially affect water quality. Freeport LNG will work closely with the COE and other applicable regulatory agencies to ensure that waterbody impacts associated with the Liquefaction Project are appropriately permitted and mitigated. To avoid or minimize adverse impacts for the Liquefaction Project, Freeport LNG will implement protective measures similar to those described and approved for the Phase I and Phase II Projects. These include conformance with applicable permit conditions, the project-specific Plan and Procedures, and the additional measures described below.

During construction of the Liquefaction Project facilities, disturbed soils will be exposed to potential erosion. To minimize erosion and sedimentation impacts to surface waters, both on

site and off site, land disturbing activities will be conducted in compliance with the National Pollutant Discharge Elimination System ("NPDES")[7] Construction General Permit for stormwater discharges and a project–specific SWPPP, as required under the CWA, together with a project-specific *Erosion and Sediment Control Plan*. Freeport LNG will modify, where necessary, its existing plans to accommodate Liquefaction Project activities. Revision of these plans will involve careful consideration of site drainage requirements and selection of the most appropriate erosion/sedimentation controls, management strategies, and waste disposal measures.

Surface water quality could be impacted during construction by the accidental spill of fuel, lubricants, or other chemicals required for construction equipment. To counteract this potential, Freeport LNG will utilize its current SPCC Plan with project-specific changes made as necessary. During project operation, the potential for a chemical spill that could adversely impact surface waters or wetlands is low and would be similarly minimized by adherence to established spill control procedures.

2.3.5.1.2 Quintana Island Terminal Site

During construction, potential impacts involving stormwater discharges to surface waters at and adjacent to the Terminal are restricted to those involving erosion and sedimentation - Freeport LNG is not aware of any existing soil- or sediment-borne chemical contaminants that could migrate into surrounding waterbodies.

As discussed in Resource Report 1, Section 1.5.2.2.1, the stormwater collection basin in the northwest corner of the former DMPA will be developed during initial site preparation and will receive construction stormwater channeled from perimeter outfalls in the western sector of the former DMPA; stormwater in the eastern sector will be conveyed to Drainage Channel A on the eastern perimeter. Stormwater in both the collection basin and Drainage Channel A will be discharged to the ICW through dedicated outfall structures and in accordance with applicable permit requirements. The collection basin and other sediment-retaining devices will help to minimize the sediment load of the discharges and any consequent environmental impacts in the off-site receiving water (ICW).

As discussed in Section 2.3-1, the Gulf of Mexico appears on the most recent Section 303(d) list of impaired waterbodies (TCEQ, 2011), due to the amount of mercury detected in edible fish tissue. Most of the mercury in fish in the Gulf of Mexico is thought to originate from atmospheric deposition (Wallace and Swann, 2002) and is not attributable to surface runoff from adjacent industrial sites such as the Terminal. As such, construction activities are not expected to have any measurable impact on mercury levels in the Gulf of Mexico or adjacent surface waters.

Water quality in Pond 1 at the Terminal site will not be affected by hydrostatic test discharges because only new pipe will be subject to testing and no chemicals will be added to the test water. New pipe is considered to be clean and contact with the metal surface will not introduce contamination into the test water. Freeport LNG will discharge hydrostatic test water through a hay bale dewatering structure or filter bag in an upland area, from which it will drain into Pond 1. Freeport LNG will use appropriate energy dissipation devices, containment

[7] The NPDES program, as it applies to most oil and gas facilities in Texas, including LNG plants, is administered by the U.S. Environmental Protection Agency ("EPA").

structures, and other BMPs to minimize erosion and sedimentation at the point of discharge. The rate of flow will be controlled to prevent any temporary flooding of adjacent land.

Mitigation measures that will be implemented for construction dock installation and dredging in the ICW are discussed in Section 2.3.4.1.2.

2.3.5.1.3 Pretreatment Plant Site

As discussed in Resource Report 1, Section 1.5.2.3.1, Freeport LNG intends to modify the western sector of the central pit to form a retention pond for receipt of stormwater discharges during facility construction and operation. Construction discharges will be channeled to the retention pond.

The design and operation of all stormwater discharge and treatment facilities for plant construction will be in accordance with applicable regulations and permits, including NPDES regulations and the Federal Emergency Management Agency ("FEMA") regulations embodied in the permit requirements of the Velasco Drainage District and the Brazoria County Floodplain Administrator.

2.3.5.1.4 Pipeline/Utility Line System

As indicated in Table 2.3.3, Freeport LNG is proposing to use HDD at 6 of the 14 waterbody crossing locations on the Pipeline/Utility Line System, including all four major waterbodies (FHC, ICW, Oyster Creek, and eastern Velasco Ditch) crossed underground.

The primary risk associated with directional drilling is the potential for inadvertent releases of drilling mud, commonly known as "frac-outs". In small quantities, drilling mud that enters a waterbody will not adversely affect overall water quality; in larger quantities, however, the release of drilling mud could adversely affect water quality and, consequently, resident aquatic life. Containment and disposal of the non-toxic mud (bentonite) used for HDD will be performed in accordance with permit requirements.

Freeport LNG has prepared a draft HDD monitoring and contingency plan for the Liquefaction Project that describes the remedial steps that will be taken to address frac-outs and drill failures (see Appendix 2-D). Standard clean-up practices for frac-outs include the deployment of straw bales, silt fencing, or turbidity curtains, and the subsequent use of mechanical or natural means to remove the drilling mud. The final version of the plan will include site-specific construction figures showing the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction.

For the HDD crossings of the Velasco Levee, Freeport LNG will follow the engineering design requirements set forth in "Technical Specification – Horizontal Directional Drilling under the Freeport, Texas Hurricane Flood Protection System" (Velasco Drainage District, 2011).

2.3.5.2 Operation

2.3.5.2.1 Quintana Island Terminal Site

Following construction of the Liquefaction Plant, a larger area of impervious surface materials will exist at the Terminal site resulting in a potential increase in stormwater runoff volumes. To accommodate this increase and any topographic changes resulting from site

development, new systems of catchment areas and drainage conduits will be designed. For operation of the Liquefaction Plant, the existing Stormwater Management Plan for the Quintana Island Terminal will be revised to incorporate the new facilities. Stormwater discharges from the Liquefaction Plant will be via outfalls regulated under the NPDES program.

During facility operation, stormwater runoff from the western portion of the Liquefaction Plant site will follow the existing drainage slope west to the new stormwater collection basin in the northwest corner of the former DMPA. The Liquefaction Plant site will be graded such that sheet flow will enter a constructed conveyance system of shallowly sloped concreted troughs that will collect and carry the stormwater to perimeter outfall locations. Before arriving at the outfalls, the stormwater will pass through sediment traps in surficial Stormceptor® chamber devices. These devices are designed to remove sediments and hydrocarbon oil from the stormwater. From the perimeter outfalls, the stormwater draining to the west will empty into a peripheral ditch system connected to the collection basin. Prior to discharge into the collection basin, the stormwater will pass through an oil/water separator.

A similar system to that described above will be installed for stormwater draining from the eastern portion of the Liquefaction Plant site, except the stormwater will be conveyed to the existing drainage channel (Drainage Channel A) on the site's eastern perimeter, rather than the collection basin in the northwest corner. Stormwater in both the collection basin and Drainage Channel A will be discharged to the ICW through dedicated outfall structures and in accordance with applicable permit requirements. Portions of the site where the topography remains unchanged will retain their natural drainage.

No process water discharges will be associated with the Liquefaction Plant; therefore, other than spilled or leaked material entering waterbodies directly or through stormwater runoff, the most likely potential pathway for process-related chemicals to enter local waterbodies is air deposition. Given the fact that the Gulf of Mexico appears on the most recent Section 303(d) list of impaired waterbodies (TCEQ, 2011) due to the bioaccumulation of mercury in fish tissue, and most of the mercury is derived from air deposition (Wallace and Swann, 2002), a general public concern might center on the impact of liquefaction operations with respect to any increase in overall air emissions at the Terminal. However, as discussed below, this is not a realistic concern.

Downstream components in the liquefaction trains are highly sensitive to mercury and mercury compounds; therefore, before liquefaction, it is necessary to remove the trace amounts present in the source gas. Natural gas in the U.S. is generally very low in mercury content and has the lowest amount when compared to other global sources. The mercury content of wellhead gas generally ranges from 0.0005 parts per billion by volume ("ppbv") to 0.05 ppbv. Despite the amounts of mercury in wellhead gas being so small, liquefaction units need to have source gas that contains no more than 1 part per trillion (0.001 part ppbv) on a consistent basis.

As described in Resource Report 1, Section 1.3.9, mercury in the feed gas for Freeport LNG's Liquefaction Plant at the Quintana Island Terminal will be removed at the upstream Pretreatment Plant, using an active carbon bed filled with an adsorbent that binds the mercury into a non-water-soluble, non-hazardous, solid waste called mercuric sulfide. The carbon adsorbent needs to be replaced every 5 to 50 years, depending on the mercury concentration. Typically, the mercuric sulfide is disposed of in a landfill and the beds refilled with adsorbent.

Because the gas used as a fuel source for the liquefaction process is the same quality gas that will be converted to LNG, the amount of mercury contained in any emissions

associated with the Liquefaction Plant will be significantly lower than in pipeline quality natural gas and operation of the liquefaction facilities will have no measurable impact on mercury levels in the Gulf of Mexico or adjacent surface waters.

2.3.5.2.2 Pretreatment Plant Site

Following construction of the proposed Pretreatment Plant, a new area of impervious surface materials will exist at the site, resulting in a potential increase in stormwater runoff volumes. To accommodate this increase and any topographic changes resulting from site development, new systems of catchment areas and drainage conduits will be designed. For operation of the Pretreatment Plant, a new site-specific *Stormwater Management Plan* will be developed.

The design and operation of all stormwater discharge and treatment facilities for plant operation will be in accordance with applicable regulations and permits, including NPDES and FEMA regulations embodied in the permit requirements of the Velasco Drainage District and the Brazoria County Floodplain Administrator. A separate discharge permit for gas plants will be required from the Railroad Commission of Texas ("RRC"). Applications for new permits will be filed with the applicable agencies and authorities. Each permit requires an extensive suite of analyses to establish a baseline and monitor discharges from oil and gas operations. These analyses include the constituents that conceivably could be found in stormwater discharges from the operational footprint of the Pretreatment Plant.

As discussed in Resource Report 1, Section 1.5.2.3.3, operational stormwater discharges from the Pretreatment Plant footprint will be directed through stormceptor devices to a detention pond that will be designed to contain the "first flush" (up to 1 inch of rainfall during the design storm). Surface water runoff in excess of the first flush will flow through a standpipe drain to the larger retention pond developed in the central excavated pit and used for construction discharge receipt (see Section 2.3.5.1.3). In the event that the runoff contains oil or some other form of contamination, the detention pond will enable a smaller volume of water to be treated or removed than if all the runoff was allowed to enter the retention pond directly. Oil/water separators will be used to treat water prior to discharge into the detention pond. Once the water is considered clean, it will be discharged to the retention pond within 36 hours. Water from the retention pond will be pumped into Horseshoe Lake, which connects directly with the western Velasco Ditch further downstream. As described in Section 2.3.2.2, water in the western Velasco Ditch is pumped across the Velasco Levee at the Velasco Drainage District pump station, located about 1.2 miles south of the site.

In addition to mercury, as discussed in Section 2.3.5.2.1, the Pretreatment Plant is designed to remove three other contaminants from the feed gas for the liquefaction process: carbon dioxide ("CO_2"), sulfur compounds, and water.

The CO_2 that is present in natural gas would freeze in the cryogenic liquefaction process if not removed beforehand. The maximum allowable concentration of CO_2 is 2 percent, which is the same specification for generally all natural gas pipelines. CO_2 is removed in the Pretreatment Plant's amine system and then released into the air.

Sulfur compounds, including hydrogen sulfide ("H_2S"), are present in trace amounts in untreated natural gas and could cause damage to liquefaction equipment and a failure of LNG to meet industrial specifications. The maximum allowable concentration of H_2S is 4 parts per million ("ppm"), which is the same specification for all natural gas pipelines. The maximum

allowable concentration of sulfur compounds is approximately 20 ppm. These components are removed in the same amine system as the CO_2 and are incinerated in a thermal oxidizer. Within the thermal oxidizer, 98 percent of the H_2S will be converted to elemental sulfur and water vapor.

Water (H_2O) would freeze when the natural gas is liquefied, if not removed beforehand. Water is also used in the amine process, resulting in wet gas. The small amount of water present in both cases is removed using a molecular sieve, which acts as a desiccant and adsorbs the water from the gas. The water is then recovered and reused in the plant.

Once the natural gas is treated, it is further purified to remove NGL (butanes, pentanes, and ethane), which are heavier hydrocarbons that would freeze during the liquefaction process if not removed beforehand. The NGLs will be "scrubbed" from the gas via a Joule-Thompson ("J-T") recovery unit and transported by the 8-inch NGL pipeline for commercial use at the INEOS Plant, located about 5 miles north northwest of the proposed Pretreatment Plant site.

Of the constituents listed above, none would result in significant waste generation and none would be disposed of in any stormwater effluent streams originating from the processing unit areas or other equipment areas at the Pretreatment Plant.

2.3.5.2.3 Pipeline/Utility Line System

Operation of the Pipeline/Utility Line System is not expected to have any significant impact on waterbodies. No new impervious areas outside of existing facility fencelines will be developed that could increase stormwater runoff. Also, as discussed in Resource Report 1, Section 1.6.1, all facilities will be operated and maintained in accordance with government safety standards and regulations that are intended to ensure adequate protection for the public and to prevent facility accidents and failures. For the Pipeline/Utility Line System, these standards and regulations include, but are not limited to, those set forth by the U.S. Department of Transportation ("DOT") in Title 49 Code of Federal Regulations ("CFR") Part 192 and the RRC pipeline safety regulations found in Texas Administrative Code Title 16, Part 1, Chapter 8. These provisions are designed to ensure pipeline integrity and minimize the risk of structural failures that could cause leaks or spills of conveyed materials into waterbodies. Under DOT requirements, isolation valves will be installed on the NGL pipeline at Oyster Creek to minimize the risk of in-stream contamination by NGLs in the unlikely event of a pipeline failure.

2.3.6 Surface Water Usage for Facility Construction and Operation

2.3.6.1 Hydrostatic Test Water

Prior to placement in service, pipe sections associated with the Liquefaction Project facilities will be hydrostatically or pneumatically tested depending on the type of pipe and its intended function. Table 2.3-4 shows hydrostatic testing requirements (uptake source(s)[8]/rate, discharge location/rate, holding time, and volume) for the Liquefaction Project.

[8] The information presented in this section is provisional with respect to hydrostatic test water sources – while a combination of wells and piped water from the underground storage site is anticipated, other sources such as the Brazos Water Authority, municipal supplies, and the Terminal's air tower basin and/or firewater system, cannot be excluded from consideration. Given the relatively low volumes of water required, the diversity of potential sources, and the geographic spread of the proposed facilities, a lack of sufficient water volume or overuse of one single source is unlikely to occur.

TABLE 2.3-4

Freeport LNG Liquefaction Project
Hydrostatic Testing Uptake and Discharge Requirements

Facility	Source	Uptake Rate (gpm)	Volume (x 1000 gallons)	Holding Time (hours)	Discharge Location	Discharge Rate (gpm)
Liquefaction Plant	On-site and/ or Quintana Well(s)	150	67	8	Terminal [a]	100
Pretreatment Plant	PTP [b]	150	48	8	PTP [c]	50
Pipelines						
Nitrogen	UGS	150	105	8	Terminal [a]	100
NGL	PTP [b]	150	67	8	PTP [c]	100
BOG	PTP [b]	150	115	8	Terminal [a]	100
NG Interconnect Inflow	PTP [b]	150	45	8	PTP [c]	50
NG Interconnect Outflow	PTP [b]	150	45	8	PTP [c]	50
Utility Lines						
Water Line	UGS	50	50	4	PTP [c]	50
		TOTAL:	542			

Notes

gpm gallons per minute
NG natural gas
PTP Pretreatment Plant
UGS underground storage (existing Freeport LNG water line from Dow Chemical Company Plant)

[a] Discharge location will be to Pond 1 in accordance with Freeport LNG's Plan and Procedures.
[b] Source at PTP may be composed of a combination of water from UGS (UGS waterline to PTP) and well(s) at PTP.
[c] Discharge location will be an upland area and in accordance with Freeport LNG's Plan and Procedures.

Depending on the volume required, water for hydrostatic testing of plant piping at the Terminal site may be obtained from the two existing on-site wells or a combination of the existing on-site wells and the Town of Quintana's two existing municipal wells. Currently, Freeport LNG estimates that 67,000 gallons of water will be needed to test new pipe sections for the Liquefaction Plant. Upon test completion, the water will be discharged to the man-made pond (Pond 1) that lies south of the Phase I LNG storage tanks. As discussed in Section 2.3.2.1, this pond has a hydraulic connection to the ICW via Drainage Channel A.

Water for hydrostatic testing of plant piping at the Pretreatment Plant site may be obtained from a new on-site well at the Pretreatment Plant site or from the new water line that will supply process water to the Pretreatment Plant from an existing source at the Stratton Ridge underground storage site (see Section 2.2.6.2).

Water for hydrostatic testing of pipelines beyond the Terminal site and the Pretreatment Plant site may be obtained from several sources, including those described above (see Footnote 8).

Hydrostatic testing will ensure that pipe sections are free from leaks and that the required margin of safety is provided for operation at anticipated pressures. Hydrostatic testing

will be conducted in accordance with the requirements of DOT pipeline safety regulations in Title 49 CFR Part 192, along with Freeport LNG's project-specific Procedures and facility-specific testing protocols. Discharges resulting from hydrostatic testing of oil and gas facilities require permit authorization from the RRC; discharges to waters of the state require additional NPDES authorization. All hydrostatic test wastewater discharges associated with the Liquefaction Project will be in compliance with applicable permit and CWA Section 401 water quality certification requirements.

2.3.6.2 Potable, Service, and Process Water

As described in Section 2.2.6.2, only potable and service water will be required for operation of the new Liquefaction Plant and, except for fire water, this will be derived from the same sources (i.e., the Town of Quintana's two existing water supply wells and the two existing on-site water wells) that provide water for the Phase I supply systems. Because air cooling will be used in the liquefaction process, water for cooling will not be required.

Fire water will be derived from the ICW via the intake structure described in Section 2.3.4.1.2. As stated previously, a flow rate of approximately 5,000 gpm would be needed during an actual fire suppression event. However, periodic testing will not require water flow through the complete fire water system; rather testing would be restricted to the pumps and valves at the intake structure, thereby limiting uptake duration and volume.

As described in Section 2.2.6.2, process water will be required for the Pretreatment Plant and will be derived from an on-site well and/or a water utility line that will be constructed from Freeport LNG's Stratton Ridge underground storage site to the Pretreatment Plant.

2.3.6.3 Cooling Water for LNG Carriers

As discussed in Resource Report 1, Section 1.3.2 and Resource Report 3, Section 3.2.3.1.2 (Ballast Water Discharges), LNG exports through the Liquefaction Project will not result in any increase in the maximum number of ship visits – 400 per year – that corresponds with the LNG handling volume threshold authorized by the Commission order approving the Phase II Project (Docket No. CP05-361-000).

The intake of cooling water by individual ships visiting the Terminal to receive LNG for export will be of no different duration to the intake of cooling water associated with the authorized Phase I and Phase II import operations. In terms of flow rate and volume, water intakes associated with operation of the Liquefaction Project are predicted to be lower than those authorized for Phase I and Phase II operations. This is because power for loading LNG onto a carrier is derived from onshore pumps while power for off-loading LNG from a carrier is derived from the vessel's engines, which consequently generate less power and utilize proportionately less cooling water during loading than off-loading. Therefore, cooling water associated with operation of the Liquefaction Project will have no effect on surface waters beyond that previously authorized by the Commission for the Phase I and Phase II Projects.

2.4 Wetlands

The information presented in this section is based primarily on field delineation surveys that were conducted for Freeport LNG's Phase I Project, Phase II Project, NGL Extraction Project, and Liquefaction Project. Information that was originally collected for the Phase I and Phase II Projects between 2003 and 2005 was re-evaluated and corroborated through

contemporary field investigations in 2010 and 2011. Information for the proposed Pretreatment Plant site is based on a field delineation survey that was completed by Freeport LNG in March through May, 2012.

2.4.1 Quintana Island Terminal Site

2.4.1.1 Wetland Features

As indicated in Figure 2.3-1, the Quintana Island Terminal site supports several wetland areas. The local NWI map in Figure 2.4-1 is provided for reference purposes, although given the extensive industrial development that has taken place over the last several years, this map clearly does not present an accurate portrayal of current site conditions.

Some wetlands on the Terminal site were originally delineated prior to Phase I construction and others were delineated in anticipation of Phase II construction; these wetlands were recently re-delineated ahead of the Liquefaction Project. These include the estuarine emergent wetlands on the east side of the Terminal site (WL-1, WL-2, WL-3), between the proposed East Temporary Workspace site and the existing LNG carrier berthing area, along with a small palustrine wetland (WL-4) that fringes the northwest corner of the proposed temporary workspace located east of the Phase I process area. Vegetation descriptions for these wetlands are provided in Resource Report 3, Section 3.4.1.1.

Elsewhere, several wetlands, including the three discontinuous *Spartina alterniflora* beds (WL-5, WL-6, WL-7) fringing the ICW and the emergent vegetation areas (WL-8, WL-9) associated with Pond 1, were created or enhanced as part of the compensatory mitigation plan for the Phase I Project. Wetland WL-6 was originally represented by emergent vegetation in Drainage Channel B, near the outlet to the ICW.

2.4.1.2 Wetland Impacts and Mitigation

Table 2.4-1 lists the wetlands on the Terminal site and indicates that there will be no temporary or permanent impacts on wetlands at the Terminal site associated with the Liquefaction Project. Freeport LNG will ensure the avoidance of indirect impacts (e.g., from stormwater runoff) on those peripheral wetlands that lie beyond the proposed construction workspace through adherence to permit conditions and implementation of the Liquefaction Project's Plan, Procedures, SWPPP, and SPCC Plan.

TABLE 2.4-1

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts at the Quintana Island Terminal Site

Wetland No.	Wetland Type	Temporary Workspace (acres)	Permanent Footprint (acres)	Comment
WL-1	Estuarine Emergent	Not Impacted		Adjacent to existing LNG berthing area
WL-2	Estuarine Emergent	Not Impacted		Adjacent to existing LNG berthing area
WL-3	Estuarine Emergent	Not Impacted		Adjacent to existing LNG berthing area
WL-4	Palustrine Scrub-Shrub	Not Impacted		Adjacent to East Temporary Workspace
WL-5	Estuarine Emergent	Not Impacted		*Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-6	Estuarine Emergent	Not Impacted		*Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-7	Estuarine Emergent	Not Impacted		*Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-8	Palustrine Emergent	Not Impacted		Associated with Pond 1 - compensatory mitigation wetland
WL-9	Palustrine Emergent	Not Impacted		Associated with Pond 1 - compensatory mitigation wetland
	Total:	0.00	0.00	

2.4.2 Pretreatment Plant

2.4.2.1 Wetland Features

The local NWI map provided in Figure 2.4-2 suggests that approximately 246 acres (89 percent) of the Pretreatment Plant site is located within an extensive palustrine emergent wetland complex that is bordered by Horseshoe Lake to the south and west, the western Velasco Ditch to the east, and an oxbow relict of Oyster Creek to the north and west. Most of this wetland complex is classified as PEM1A (Palustrine, Emergent, Persistent, Temporarily Flooded). However, based on Freeport LNG's actual field delineation and as indicated in Figure 2.3.2, wetlands are much less extensive than portrayed on the NWI map, accounting for approximately 47 acres (17 percent) of the 276-acre site.

As depicted in Figure 2.3-2, 14 wetlands (WL-1 through WL-12, WL-19, and WL-20) and 2 wetland mosaics (WM-6 and WM-8) were documented during the field delineation. Subsequently, one of these wetlands (WL-10), identified as non-jurisdictional in the COE's PJD (COE, 2012), was filled by the original site owner during wind-down of the on-site sand extraction operation. Of the remaining 13 wetlands, 2 (WL-1 and WL-9) are large, naturally occurring wetland complexes that are associated with an unnamed drainage channel and the Horseshoe Lake drainage channel, respectively; both channels run through the wetlands and provide surface water drainage to the western Velasco Ditch (see Table 2.3-2). Seven of the wetlands (WL-2 through WL-8) and the two wetland mosaics (WM-6 and WM-8) are located wholly or partially within man-made drainage ditches (which are classified in this resource report

as wetlands, not waterbodies). Two wetlands (WL-11 and WL-12) are located entirely within disturbed upland construction areas and have resulted from topographic modifications. WL-19 is located in a shallow excavated depression associated with the northwestern excavation pit, although wetland conditions may have existed here historically given its proximity to WL-20, which is part of the extensive palustrine emergent wetland that extends off-site to the north of Freeport LNG's property and includes WL-1 to the southeast.

A descriptive summary of wetlands vegetation for the Pretreatment Plant site is provided in Resource Report 3, Section 3.4.1.2.

2.4.2.2 Wetland Impacts and Mitigation

As indicated in Table 2.4-2, construction and operation of the Pretreatment Plant will have temporary and permanent impacts on wetlands within the associated construction workspace. Figure 2.3-2 shows the type and extent of the wetlands at the Pretreatment Plant site, based on the field delineation performed in March through May, 2012. The jurisdictional status of each wetland, as indicated in Table 2.4-2, is based on the COE's field review undertaken on July 18, 2012 and subsequent written confirmation provided on August 9, 2012.

TABLE 2.4-2

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts at the Pretreatment Plant Site

Wetland No. [b]	Wetland Type	Temporary Workspace (acres)	Permanent Footprint (acres)	Jurisdictional Status under CWA Section 404 [a]
WL-1	Palustrine Emergent	2.41	4.14	Jurisdictional
WL-2	Palustrine Emergent	2.17	0.12	Jurisdictional
WL-3	Palustrine Emergent	0.16	0.00	Jurisdictional
WL-4	Palustrine Emergent	0.13	0.24	Jurisdictional
WL-5	Palustrine Emergent	0.08	0.24	Jurisdictional
WL-6	Palustrine Emergent	0.01	0.37	Jurisdictional
WL-7	Palustrine Emergent	0.08	0.00	Jurisdictional
WL-8	Palustrine Emergent	0.01	0.73	Jurisdictional
WL-9	Palustrine Emergent	1.63	1.62	Jurisdictional
WL-11	Palustrine Emergent	0.13	0.00	Jurisdictional
WL-12	Palustrine Emergent	0.02	0.00	Jurisdictional
WL-19	Palustrine Emergent/Scrub-Shrub	0.24	0.00	Jurisdictional
WL-20	Palustrine Emergent	0.47	0.00	Jurisdictional
WM-6	Palustrine Emergent/Upland Mosaic (20 percent wetland)	0.01	0.03	Jurisdictional
WM-8	Palustrine Emergent/Upland Mosaic (50 percent wetland)	0.03	0.06	Jurisdictional
	Total:	7.58	7.55	

Notes

[a] Jurisdictional status is based on PJD issued on August 9, 2012 (COE, 2012).

[b] WL-10 no longer exists and WL-13 through WL-18 are located beyond the Pretreatment Plant site, hence the associated gaps in the numbering sequence.

The relatively small wetlands impact acreage for the Pretreatment Plant site reflects Freeport LNG's intent to avoid or minimize wetland impacts to the extent practicable during facility layout design. As such, maximum use has been made of upland areas for both the main operational footprint and peripheral temporary workspace. The extensive emergent wetland associated with Horseshoe Lake in the southern sector of the property has largely been avoided.

Of the 13 wetlands listed in Table 2.4-2, 4 small wetlands (WL-3, WL-7, WL-11, and WL-12) are located wholly in the temporary construction workspace and will be temporarily disturbed during site preparation. Freeport LNG can restore these wetlands after construction,

although given the fact that three of the wetlands (WL-03, WL-11, and WL-12) were inadvertently created by previous site construction activities, an alternative course of mitigation may be more valuable from an environmental standpoint and Freeport LNG will explore potential options with the COE. Likewise, beyond the four wetlands wholly located within the temporary workspace, the origin and impact status of the remaining nine wetlands, which are located variously within the temporary construction workspace and the operational facility footprint, will likely influence the extent of wetlands restoration and compensatory mitigation required for the Pretreatment Plant site as a whole.

Upon completion of the Pretreatment Plant, and if required as a condition of CWA Section 404 permit authorization, the topography of the emergent wetlands within the temporary workspaces will be restored as site drainage plans allow and the areas will be allowed to revegetate naturally, in accordance with Freeport LNG's project-specific Procedures and *Wetland Restoration and Monitoring Plan*. Redirection of drainage flows, together with compensatory mitigation for permanent loss of wetland acreage and decline in functional quality, will be coordinated with the COE and other applicable regulatory agencies during the Section 404 permitting process.

Freeport LNG estimates that compensatory mitigation will be required for the permanent fill of an estimated 7.55 acres of palustrine emergent wetland at the Pretreatment Plant site. Such mitigation could include purchase of credits in a wetland mitigation bank, placement of other wetlands (on or off site) in a long-term conservation agreement prohibiting development, and creation, extension, or restoration of other wetlands (on or off site). The final approach may include a combination of various options. FLNG will provide the COE with a *Compensatory Wetland Mitigation Plan* offering specific details of the anticipated quantitative and qualitative wetland impacts resulting from Pretreatment Plant development and the mitigation measures to be adopted; this will be separate from the *Compensatory Wetland Mitigation Plan* for Phase I and Phase II activities at the Terminal.

2.4.3 Pipeline/Utility Line System

2.4.3.1 Wetland Features

Between MP 1.17(A) and MP 5.39(A), the main artery of the Pipeline/Utility Line System (which follows the existing 42-inch-diameter gas pipeline) crosses multiple estuarine emergent wetland areas that constitute individual sections of a larger estuarine wetland expanse. The longest wetland crossing in this segment is from MP 2.36(A) to MP 3.66(A), between SH 332 and the CR 891 Ditch. North of MP 5.39(A), the main artery of the Pipeline/Utility Line System crosses smaller, less extensive palustrine emergent wetlands.

In total, 36 emergent wetlands are crossed by the main artery of the Pipeline/Utility Line System, consisting of 22 estuarine intertidal emergent wetlands and 2 palustrine intertidal emergent wetlands in the southern segment and 12 palustrine emergent wetlands in the northern segment. Eleven wetlands are crossed beyond the main route artery: 2 palustrine emergent wetlands and 3 estuarine emergent wetlands east of the Pretreatment Plant site are crossed by the pipeline/utility line interconnects (gas inflow, gas outflow, BOG, NGL, nitrogen, water, fiber optic) that run between the north end of the Pretreatment Plant and the main route on the east side of the Velasco Levee, and 6 palustrine wetlands are crossed by the NGL pipeline and fiber optic cable route section between the existing 42-inch-diameter pipeline and the INEOS Plant to the north.

A descriptive summary of wetlands vegetation for the Pipeline/Utility Line System is provided in Resource Report 3, Section 3.4.1.3.

2.4.3.2 Wetland Impacts and Mitigation

As indicated in Table 2.4-3, construction and operation of the Pipeline/Utility Line System will have temporary impacts, but no permanent impacts, on wetlands within the associated construction workspace. Figure 2.3-3 shows the type and extent of the wetlands within the proposed construction workspace, based on field delineations performed for the Phase I and Phase II Projects between 2002 and 2005, the NGL Extraction Project in August 2010, and the HDD workspace at MP 4.55(A)/0.15(B) in May 2012, along with corroboratory field reconnaissance of previous surveys in September 2010 and February 2011. The local NWI map in Figure 2.4-3 is provided for reference purposes.

TABLE 2.4-3

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts for the Pipeline/Utility Line System

Wetland No.	Location Along Pipeline and Utility Line Route		Crossing Length (feet) [a]	Wetland Type	Temporary Impact (acres) [b]	Permanent Impact (acres)
	From (Milepost)	To (Milepost)				
WL-1	0.01(A)	0.68(A)	262	Palustrine Emergent	0.5	0.0
WL-2	1.12(A)	1.16(A)	215	Palustrine Emergent	0.5	0.0
WL-3	1.17(A)	1.18(A)	60	Estuarine Emergent	0.1	0.0
WL-4	1.19(A)	1.51(A)	1710	Estuarine Emergent	3.9	0.0
WL-5	2.01(A)	2.29(A)	1507	Estuarine Emergent	2.6	0.0
WL-6	2.30(A)	2.35(A)	240	Estuarine Emergent	0.4	0.0
WL-7	2.36(A)	2.71(A)	1879	Estuarine Emergent	3.3	0.0
WL-8	3.59(A)	3.66(A)	375	Estuarine Emergent	0.9	0.0
WL-9	3.68(A)	3.69(A)	N/A [a]	Estuarine Emergent	0.1	0.0
WL-10	3.73(A)	3.75(A)	N/A [a]	Estuarine Emergent	0.1	0.0
WL-11	3.83(A)	3.86(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-12	3.94(A)	3.95(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-13	3.99(A)	4.01(A)	N/A	Estuarine Emergent	<0.1	0.0
WL-14	4.08(A)	4.12(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-15	4.14(A)	4.14(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-16	4.36(A)	4.38(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-17	4.38(A)	4.55(A)	N/A [a]	Estuarine Emergent	0.4	0.0
WL-18	4.56(A)	4.57(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-19	4.62(A)	4.63(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-20	4.62(A)	4.64(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-21	4.96(A)	4.97(A)	7	Estuarine Emergent	<0.1	0.0
WL-22	5.25(A)	5.26(A)	N/A [a]	Estuarine Emergent	<0.1	0.0
WL-23	5.32(A)	5.40(A)	N/A [a]	Estuarine Emergent	0.1	0.0
WL-24	5.36(A)	5.39(A)	N/A [a]	Estuarine Emergent	0.1	0.0
WL-35	7.23(A)	7.29(A)	205	Palustrine Emergent	0.3	0.0
WL-26	7.32(A)	7.35(A)	N/A [a]	Palustrine Emergent	0.1	0.0
WL-27	7.33(A)	7.62(A)	731	Palustrine Emergent	1.6	0.0
WL-28	7.69(A)	7.72(A)	22	Palustrine Emergent	0.2	0.0
WL-29	8.03(A)	8.06(A)	40	Palustrine Emergent	0.1	0.0
WL-30	8.20(A)	8.26(A)	94	Palustrine Emergent	0.3	0.0
WL-31	8.43(A)	8.48(A)	250	Palustrine Emergent	0.6	0.0
WL-32	8.50(A)	8.60(A)	415	Palustrine Emergent	1.1	0.0

TABLE 2.4-3

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts for the Pipeline/Utility Line System

Wetland No.	Location Along Pipeline and Utility Line Route		Crossing Length (feet) [a]	Wetland Type	Temporary Impact (acres) [b]	Permanent Impact (acres)
	From (Milepost)	To (Milepost)				
WL-33	8.72(A)	8.75(A)	N/A [b]	Palustrine Emergent	0.1	0.0
WL-34	8.83(A)	8.84(A)	7	Palustrine Emergent	<0.1	0.0
WL-35	9.45(A)	9.45(A)	12	Palustrine Emergent	<0.1	0.0
WL-36	9.47(A)	9.47(A)	13	Palustrine Emergent	<0.1	0.0
WL-37	0.00(B)	N/A [c]	745	Estuarine Emergent	1.3	0.0
WL-38	0.04(B)	0.04(B)	N/A [a]	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-39	0.09(B)	0.11(B)	N/A [a]	Estuarine Emergent	0.1	0.0
WL-40	0.11(B)	0.12(B)	37	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-41	0.13(B)	0.13(B)	24	Estuarine Emergent	<0.1	0.0
WL-42	0.14(D)	0.17(D)	45	Palustrine Emergent	0.2	0.0
WL-43	0.21(D)	0.21(D)	19	Palustrine Emergent	<0.1	0.0
WL-44	0.24(D)	0.32(D)	465	Palustrine Emergent	1.1	0.0
WL-45	0.34(D)	0.34(D)	25	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-46	0.60(D)	0.62(D)	10	Palustrine Emergent	<0.1	0.0
WL-47	0.64(D)	0.65(D)	N/A [a]	Palustrine Emergent	<0.1	0.0
				Total:	20.2 [d]	0.0

Notes

N/A Not Applicable

[a] Wetland is within the temporary workspace area but not directly crossed by the proposed pipelines or utility lines.
[b] Construction impacts for the pipeline are based on a nominal 100-foot-wide construction right-of-way.
[c] Includes all temporary workspace east of MP 0.0(B).
[d] 0.1 of total reflects a collective rounding up of <0.1 values.

Of the ancillary aboveground facilities (gas pipeline interconnect mainline valve ["MLV"] and emergency shutdown ["ESD"] valve station, NGL meter station and MLVs, Air Liquide meter station, and pig/launchers receivers), the only facilities that will impact wetlands are the MLV/ESD station and pig launchers/receivers at the Pretreatment Plant site; as such, these impacts are included in Table 2.4.2.

Construction of the pipelines and utility lines outside of the Terminal site and the Pretreatment Plant site will temporarily impact 47 emergent wetlands, consisting of 25 estuarine intertidal emergent wetlands in the southern part of the route system, 19 palustrine emergent wetlands, all but 2 of which are in the northern part of the route system, and 3 emergent/scrub-shrub wetlands in the northern part of the route system. In total, 20.2 acres of wetlands will be

temporarily impacted, consisting of 13.5 acres of estuarine intertidal emergent wetlands and 6.7 acres of palustrine emergent wetlands. Of these 20.2 acres, 17.4 acres will be on route segments that are collocated with Freeport LNG's existing 42-inch-diameter send-out pipeline and 2.8 acres will be on route segments that are not collocated with Freeport LNG's existing 42-inch-diameter send-out pipeline but may be collocated with other pipelines.

Wetland impacts will occur within the 100-foot-wide construction right-of-way and at two Additional Temporary Workspaces ("ATWS"). One ATWS (MP 3.68[A]) is associated with the push-pull line installation along the eastern Velasco Ditch; the other ATWS is associated with the lateral HDD crossing of the Velasco Levee at MP 4.55(A)/0.15(B). At both locations, a small section of wetland will be temporarily disturbed to allow sufficient room for line maneuvering.

During and following construction, Freeport LNG will ensure that the temporary wetland impacts associated with the pipeline and utility line facilities are appropriately addressed through adherence to permit conditions and implementation of the protective measures in the project-specific Plan, Procedures, *Wetland Restoration and Monitoring Plan*, SWPPP, and SPCC Plan. For wetlands, these protective measures include:

- minimizing vegetation clearing and soil disturbance;
- avoiding unnecessary vehicular traffic and equipment use;
- installing and maintaining erosion and sedimentation control devices such as hay bales and silt fences;
- restricting the duration of construction to the extent practicable;
- using timber construction mats or layers of timber to create a temporary work surface in wet conditions; and
- using low pressure ground equipment in wet conditions to minimize vegetation damage, soil compaction, and rutting.

Through the same combination of measures, Freeport LNG will strive to avoid indirect impacts (e.g., from stormwater runoff) to those peripheral wetlands that lie beyond the proposed construction workspace.

The *Wetland Restoration and Monitoring Plan* describes practices for reestablishing wetland species and for subsequent revegetation monitoring to ensure that all disturbed areas are successfully restored.

2.5 References

Baker (Jr.), E.T. 1979. Report 236: Stratigraphic and Hydrologic Framework of Part of the Coastal Plains of Texas, Texas Department of Water Resources, Austin, Texas. Available online at http://www.twdb.state.tx.us/publications/reports/GroundWaterReports/GWReports/R236/R236.pdf; accessed June 2012.

Brazoria County Groundwater Conservation District (BCGCD). 2011. Groundwater Issues Fact Sheet (dated October 2005). Available online at http://www.bcgroundwater.org/; accessed June 2012.

Brazoria County Groundwater Conservation District (BCGCD). 2008. Groundwater Management Plan. Available online at http://www.bcgroundwater.org/; accessed June 2012.

Coplin, L.S. and J. Lanning-Rush. 2002. Water-level Altitudes 2002 and Water-level Changes in the Chicot, Evangeline, and Jasper Aquifers and Compaction 1973-2001 in the Chicot and Evangeline Aquifers, Houston-Galveston Region, Texas. U.S. Geological Survey Open-File Report 02-134.

Entrix, Inc. 2004. Environmental Due Diligence Study – Freeport LNG Property, Brazoria County, Freeport, Texas.

Fort Bend Subsidence District. 2010. 20th Annual Groundwater Report. FBSD Resolution # 2010-277: February 24, 2010.

Google Earth. 2010. Aerial Imagery – dated February 16, 2010.

LBG-Guyton Associates. 2010. Freeport LNG – Liquefaction Plant, Groundwater Supply Study.

Ryder, P. 1996. Groundwater Atlas of the United States, U.S. Geological Survey HA 730-E. Available online at http://pubs.usgs.gov/ha/ha730/ch_e/E-text6.html; accessed April 2011.

Texas Commission on Environmental Quality (TCEQ). 2008a. 2008 Texas 303(d) List (March 19, 2008); available online at http://www.tceq.texas.gov/assets/public/compliance/monops/water/08twqi/2008_303d.pdf; accessed June 2012.

Texas Commission on Environmental Quality (TCEQ). 2008b. 2008 Texas Water Quality Inventory - Basin Assessment Data by Segment (March 19, 2008) – San Jacinto-Brazos Coastal Basin. Available online at http://www.tceq.texas.gov/assets/public/compliance/monops/water/08twqi/ 2008_basin11.pdf; accessed June 2012.

Texas Commission on Environmental Quality (TCEQ). 2010. Draft 2010 Texas Water Quality Inventory: Assessment Results for Basin 11 - San Jacinto-Brazos Coastal (February 5, 2010). Available online at http://www.tceq.texas.gov/assets/public/compliance/monops/water/10twqi/2010_basin11.pdf; accessed June 2012.

Texas Commission on Environmental Quality (TCEQ). 2011. Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) (November 18, 2011). Available online at http://www.tceq.texas.gov/waterquality/assessment/10twqi/10twqi; accessed June 2012.

Texas Groundwater Association (TGWA). 2009. Texas Ground Water Entities. Available online at http://www.tgwa.org; accessed May 2011.

Texas Groundwater Protection Committee. 2010. Joint Groundwater Monitoring and Contamination Report. Available on line at http://www.tgpc.state.tx.us/; accessed June 2012.

Texas Water Commission (TWC). 1963. Bulletin 6305: Reconnaissance Investigation of the Ground-Water Resources of the Gulf Coast Region, Texas. Available online at

http://www.twdb.state.tx.us/publications/reports/GroundWaterReports/bulletins/B6305/B6305.pdf; accessed April 2011.

Texas Water Development Board (TWDB). 2012a. Water Well Data. Available online at http://wiid.twdb.state.tx.us/ims/wwm_drl/viewer.htm?TITLE=Texas&DISCL=0&APPNO=0&Box=1245095:6911262:2676370:7512127; accessed June 2012.

Texas Water Development Board (TWDB). 2012b. Brazoria County - Groundwater Database Report - Water Quality Report. Available online at http://www.twdb.state.tx.us/groundwater/data/Database%20Reports/Brazoria/Water%20Quality.pdf; accessed June 2012.

U.S. Army Corps of Engineers (COE). 2012. SWG-2003-02110; Preliminary Jurisdictional Determination, Freeport LNG Pretreatment Site, Sorrell Property, in Brazoria County, Texas. Issued August 9, 2012.

U.S. Department of Agriculture. 2000. Official Series Description – Surfside Series. Available online at https://soilseries.sc.egov.usda.gov/OSD_Docs/S/SURFSIDE.html; accessed December 2011.

U.S. Department of Energy (DOE). 2006. Site Selection for the Expansion of the Strategic Petroleum Reserve – Final Environmental Impact Statement. DOE/EIS-0385.

U.S. Environmental Protection Agency (EPA). 2011. Region 6 Sole Source Aquifers. Available online at www.epa.gov/region6/water/swp/ssa/ssa.htm; accessed June 2012.

Velasco Drainage District. 2011. Technical Specification – Horizontal Directional Drilling under the Freeport, Texas Hurricane Flood Protection System. Dated August 2, 2011.

Wallace, R.K. and L. Swann. 2002. Mercury in Fish - Frequently Asked Questions. Mississippi-Alabama Sea Grant Consortium, Ocean Springs, Mississippi. MASGP-03-004. Available online at http://www.masgc.org/pdf/masgp/03-004.pdf; accessed June 2012.

FREEPORT LNG

LIQUEFACTION PROJECT

APPENDIX 2-A

Figures

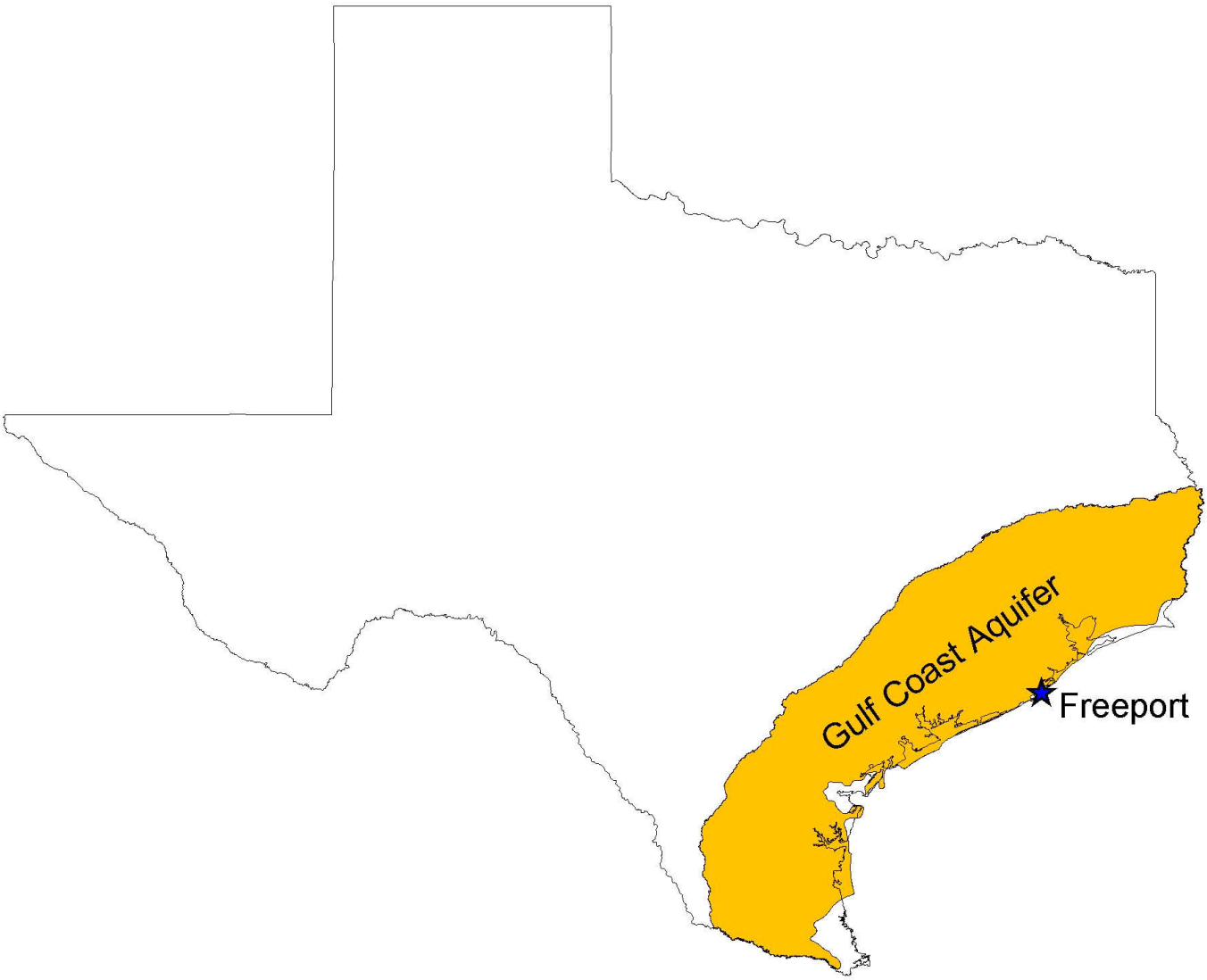
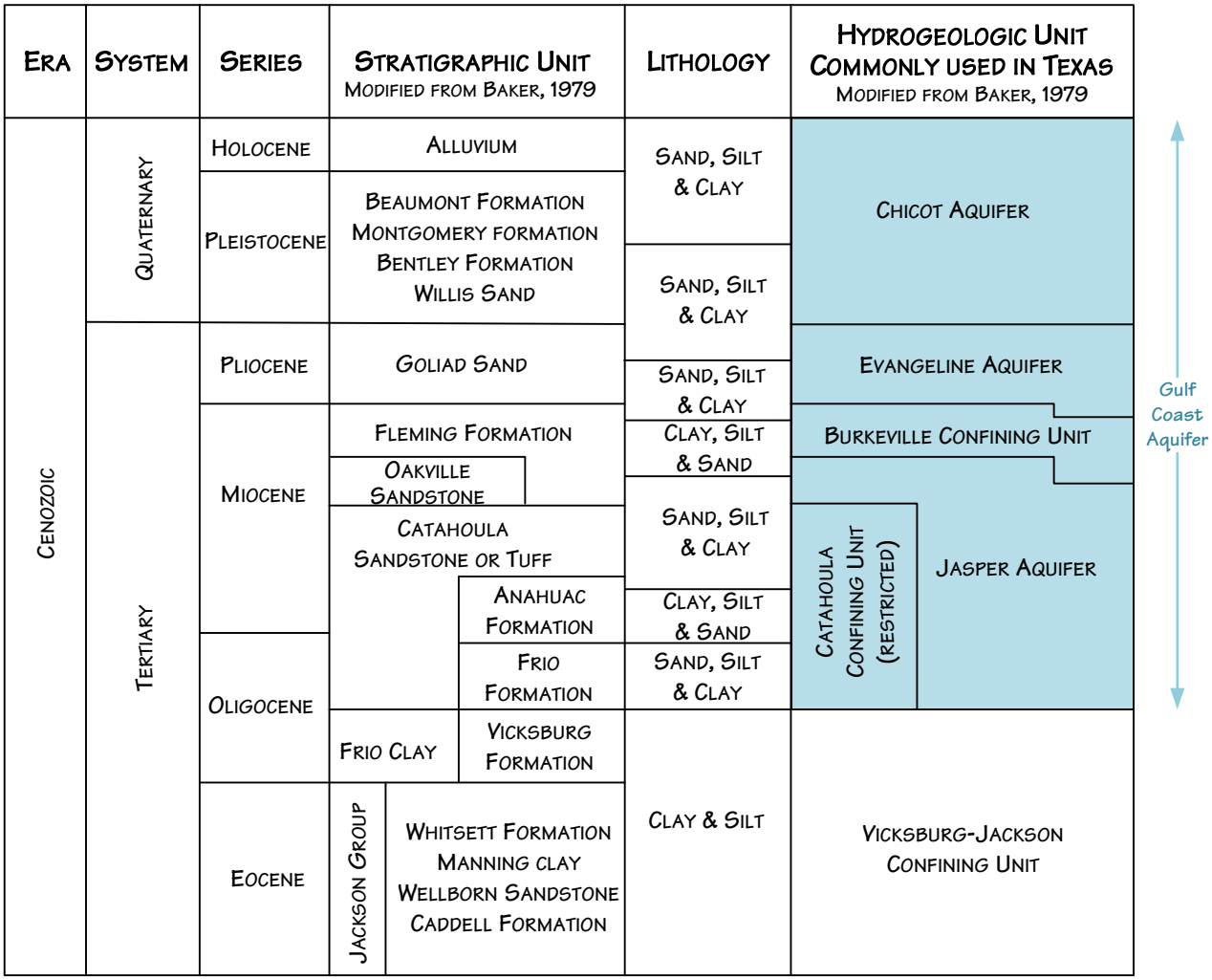


Figure 2.2-1
Freeport LNG - Liquefaction Project
Location of the Gulf Coast Aquifer in Texas

DATE: 01/20/05
REVISED: 05/09/11
SCALE: Not to Scale
DRAWN BY: JPBOENTJE
M:\Clients\D-F\FRE\Liquefaction_ArcGIS \2011\05_FRE_PH2_Fig_211_Gulfaq.mxd



SOURCE: ADAPTED FROM FIGURE 55 (HYDROGEOLOGY-CORRELATION) IN GROUND WATER ATLAS OF THE UNITED STATES, OKLAHOMA-TEXAS, HA 730-E. (HTTP://PUBS.USGS.GOV/HA/HA730/CH_E/GIF/E055.GIF)

For environmental review purposes only.

FREEPORT LNG

Figure 2.2-2
Freeport LNG - Liquefaction Project
Hydrogeological Units of Gulf Coast Aquifer

DATE: 5/6/2011
REVISED: 5/9/2011
SCALE: NTS
DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\FRE\FREEPORTLNG\LIQUEFACTION\FRE_HYDRO_UNITS_GULFCOAST_AQUIFER.VSD

Data Source: Texas Water Development Board - Water Information Integration and Dissemination System ("WIID") Groundwater Database and Submitted Driller's Report, 2012; Available online at: http://wiid.twdb.texas.gov/

INEOS Plant

Stratton Ridge Meter Station (Existing)

Stratton Ridge Underground Storage Site - Compressor Station (Existing)

Stratton Ridge Underground Storage Site - Cavern Well Pad (Existing)

Pipeline/Utility Line System (Proposed)

Pretreatment Plant Site (Proposed)

Electric Line (Proposed)

Quintana Island Terminal (Existing)

Exxon Mobil Property Boundary

Electric Line (Proposed)

DMPA Property Boundary

Texas

Water Well

1-Mile Buffer of Liquefaction Project Area

N

0 0.25 0.5 1 Miles

Figure 2.2-3
Freeport LNG - Liquefaction Project
Water Wells within One Mile of the Liquefaction Project Area
Brazoria County, Texas

FREEPORT LNG

NATURAL RESOURCE GROUP

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_2_3_NGL_Liquefaction_Project_WaterWells.mxd | 1:55,000 | REVISED: 08/06/2012 | DRAWN BY: JEBAKKEN

Data Source: Texas Water Development Board - Water Information Integration and Dissemination System ("WIID") Groundwater Database and Submitted Driller's Report, 2012; Available online at: http://wiid.twdb.texas.gov/

Quintana Island Terminal (Existing)
DMPA Property Boundary
Exxon Mobil Property Boundary
Land Boundary (within one mile of Terminal and Adjoining DMPA)

0 2,250 4,500 Feet

This information is for environmental review purposes only.

Well Type (Status)

- Domestic (Active)
- Domestic (Assumed Active)
- Federal Government Well (Unused)
- Industrial (Active)
- Industrial (Assumed Active)
- Industrial (No Data)
- Industrial (Plugged or Destroyed)
- Industrial (Unused)
- Public (Active)
- Public (Unused)

N

Figure 2.2-4
Freeport LNG - Liquefaction Project
Water Wells Within One Mile of the Quintana Island Terminal Site
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_2_4_NGL_Liquefaction_Project_WaterWells.mxd | 1:27,000 | REVISED: 08/03/2012 | DRAWN BY: JEBAKKEN

Data Source: Texas Water Development Board - Water Information Integration and Dissemination System ("WIID") Groundwater Database and Submitted Driller's Report, 2012; Available online at: http://wiid.twdb.texas.gov/

0 2,000 4,000 Feet

This information is for environmental review purposes only.

Well Type (Status)

- Commercial (Active)
- Domestic (Active)
- Domestic (Assumed Active)
- Industrial (Active)
- Public (Active)
- Public Supply (Assumed Active)
- Pretreatment Plant Site (Proposed)
- Land Boundary (within one mile of Pretreatment Plant Site)

N

Figure 2.2-5
Freeport LNG - Liquefaction Project
Water Wells Within One Mile of theProposed Pretreatment Plant Site
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_2_5_NGL_Liquefaction_Project_WaterWells.mxd | 1:24,000 | REVISED: 08/01/2012 | DRAWN BY: JEBAKKEN

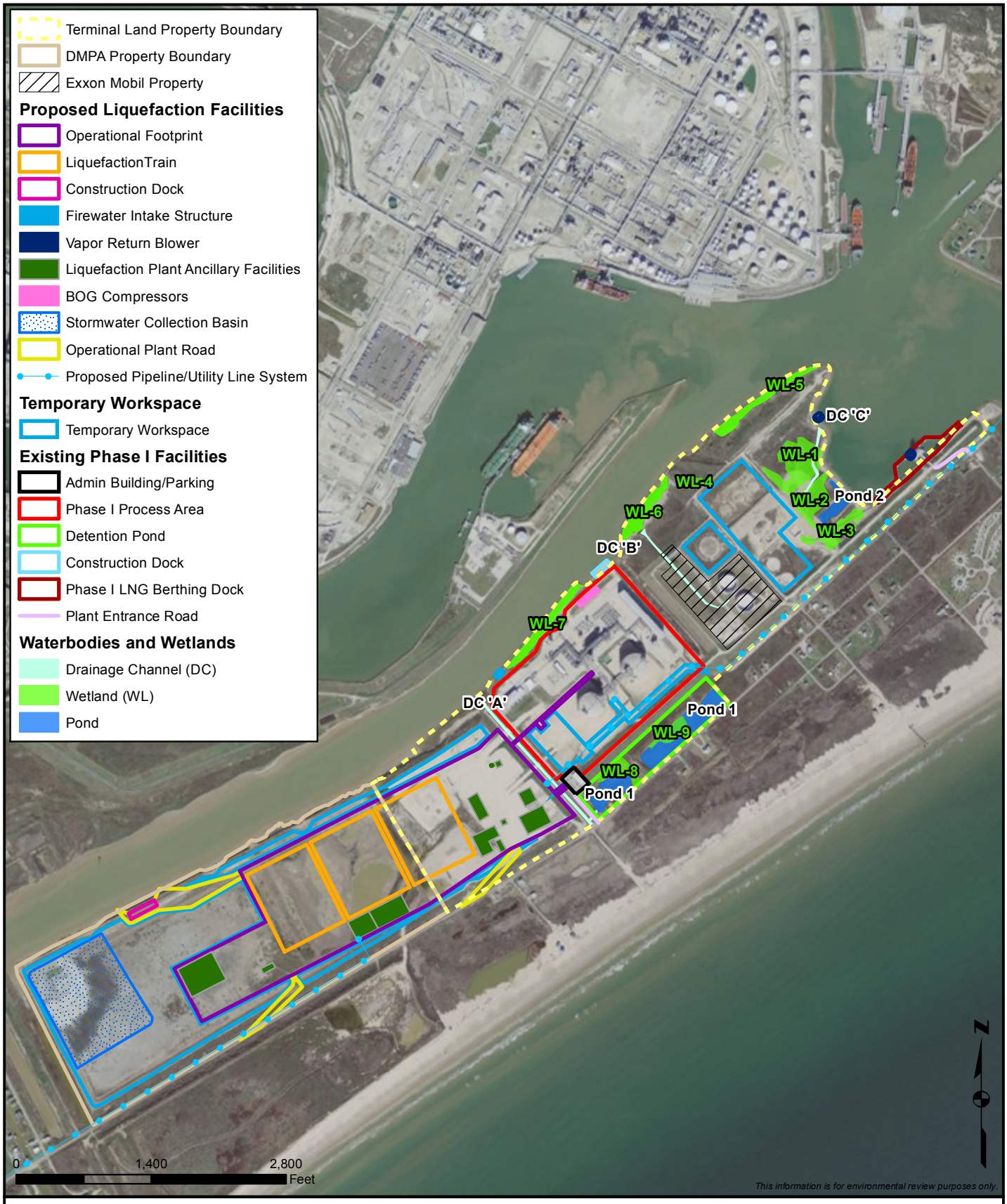


Figure 2.3-1
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands at the Quintana Island Terminal Site - Field Delineation Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_1_NGL_Terminal_Water_Wetlands.mxd	1:16,800	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

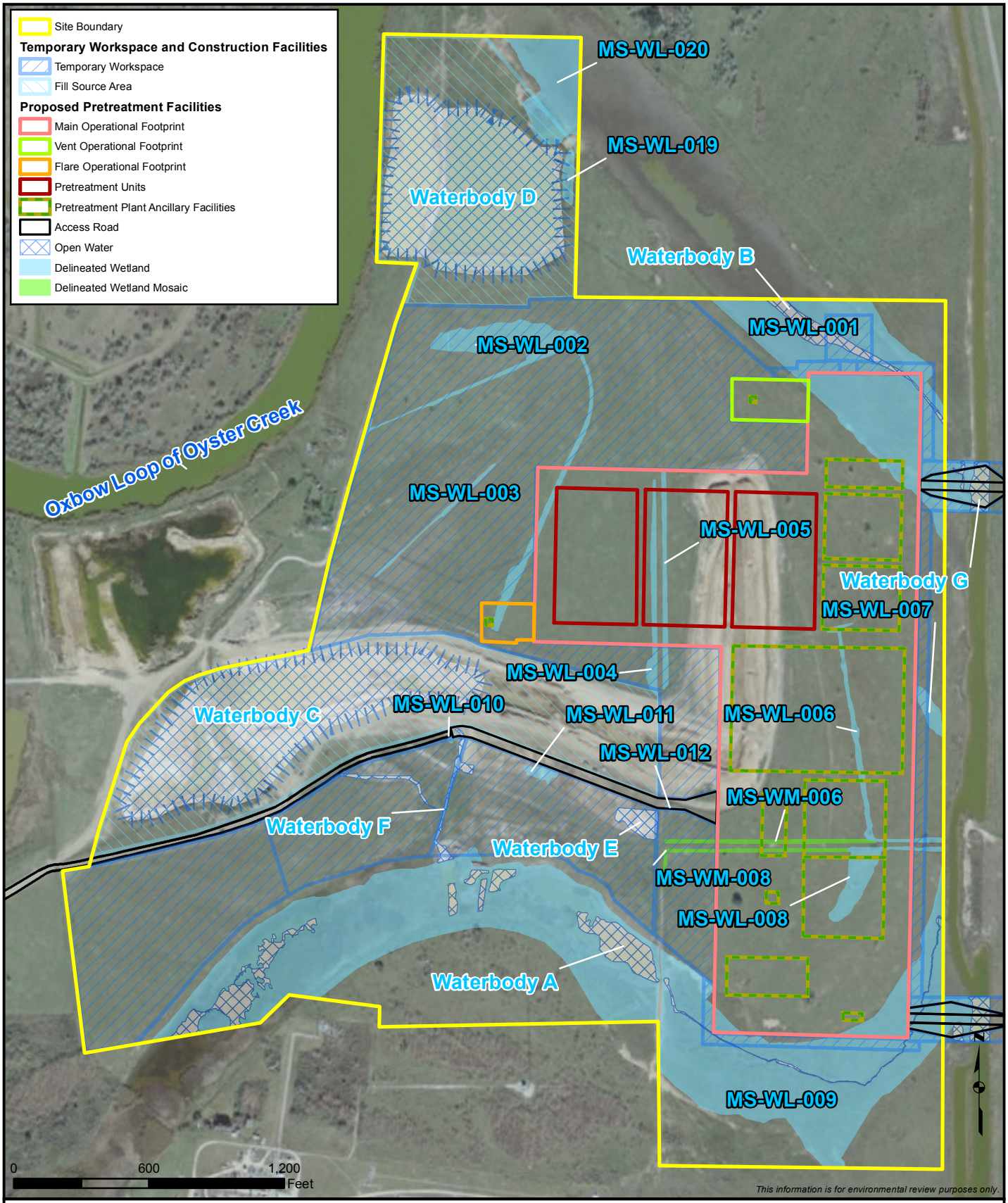


Figure 2.3-2
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands at the Pretreatment Plant Site - Field Delineation Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_2_NGL_Pretreatment_Water_Wetlands.mxd	1:7,200	REVISED: 08/15/2012	DRAWN BY: JEBAKKEN

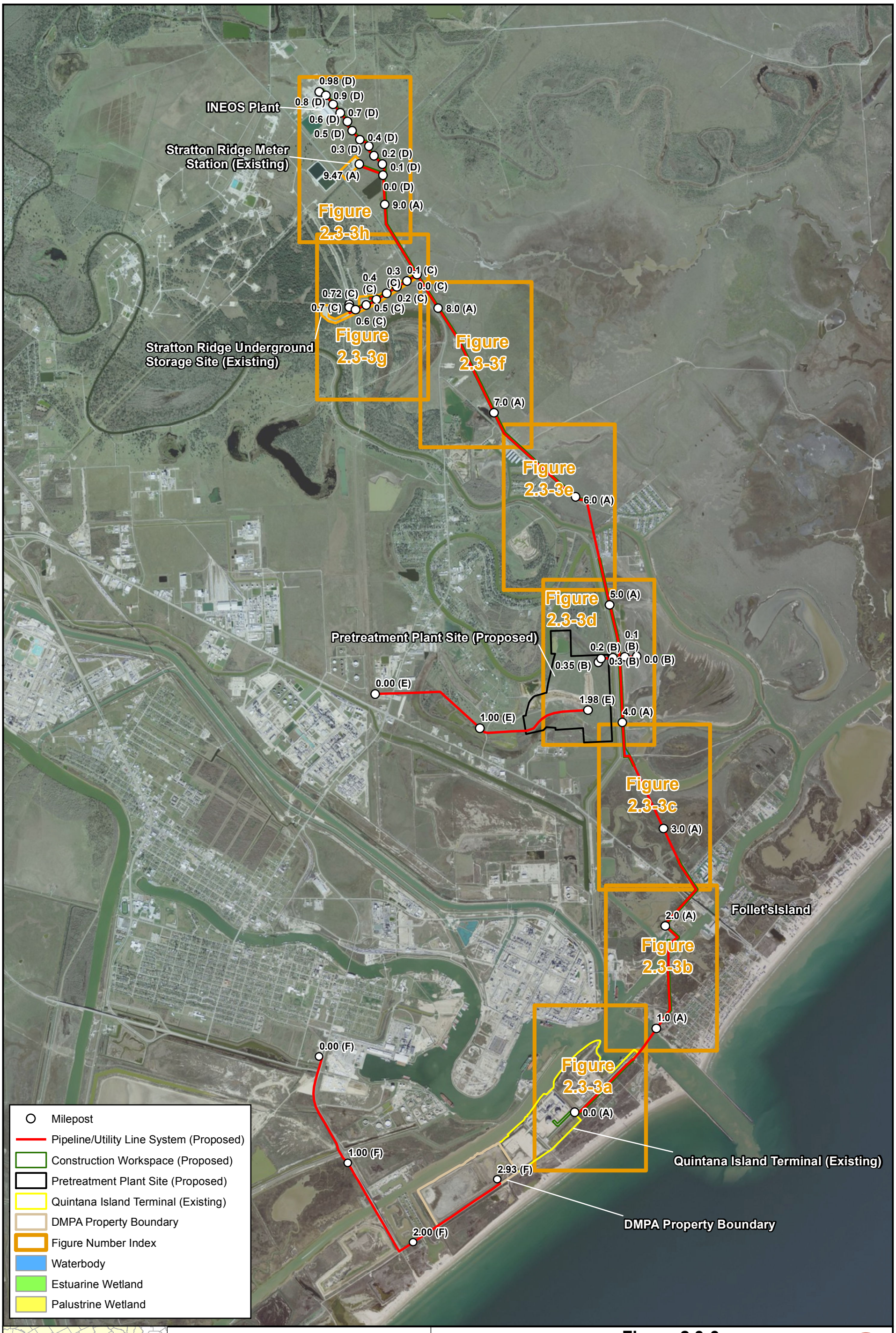


Figure 2.3-3
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3_NGL_Liquefaction_Facilities_Water_Wetlands_Overview.mxd	1:48,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

Figure 2.3-3a
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 0.0(A) to MP 0.8(A) MP 0.0(F) to MP 2.93(F)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:6,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

Figure 2.3-3b
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 0.7(A) to MP 2.4(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd | 1:6,000 | REVISED: 08/23/2012 | DRAWN BY: JEBAKKEN

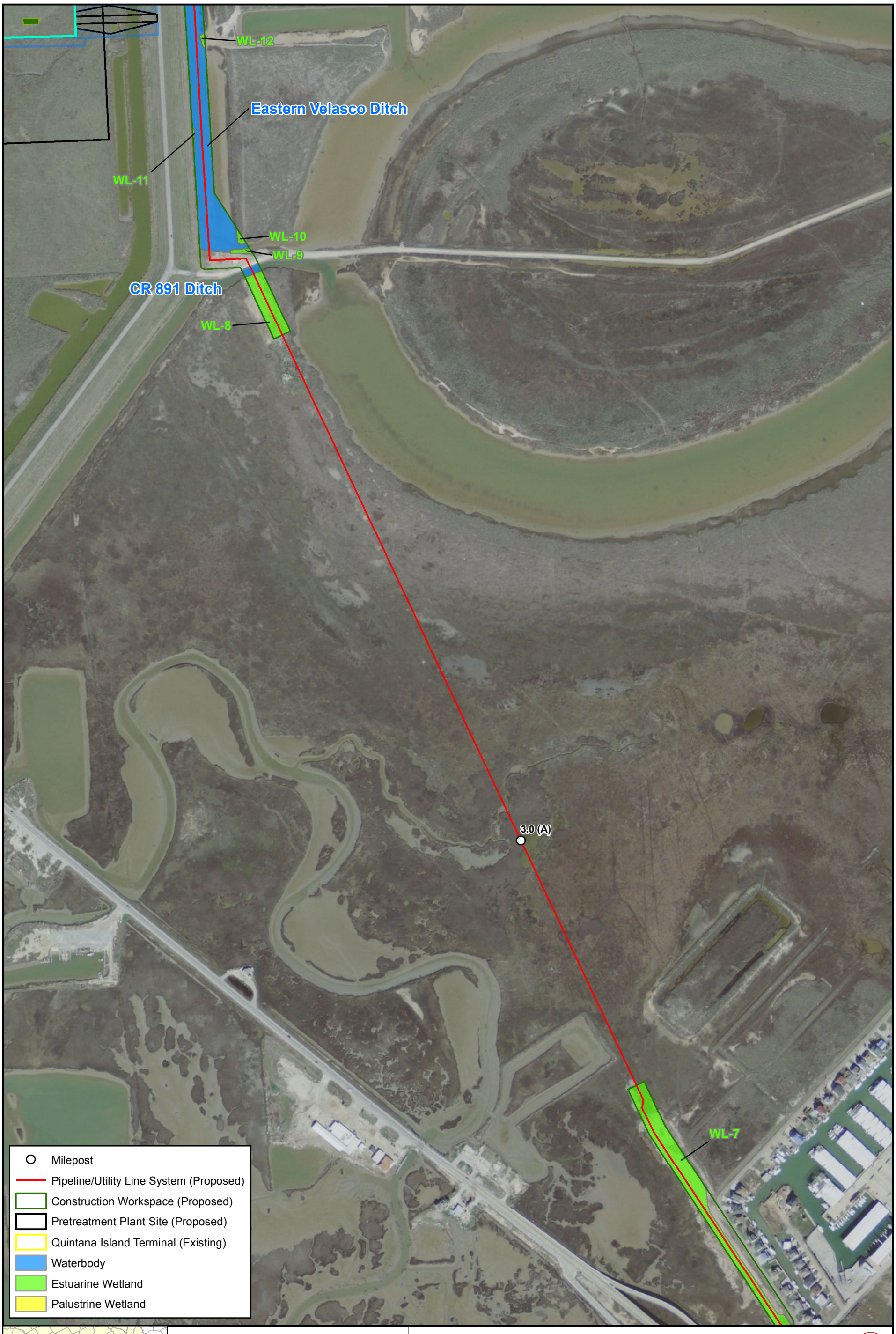


Figure 2.3-3c
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 2.4(A) to MP 3.9(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:6,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

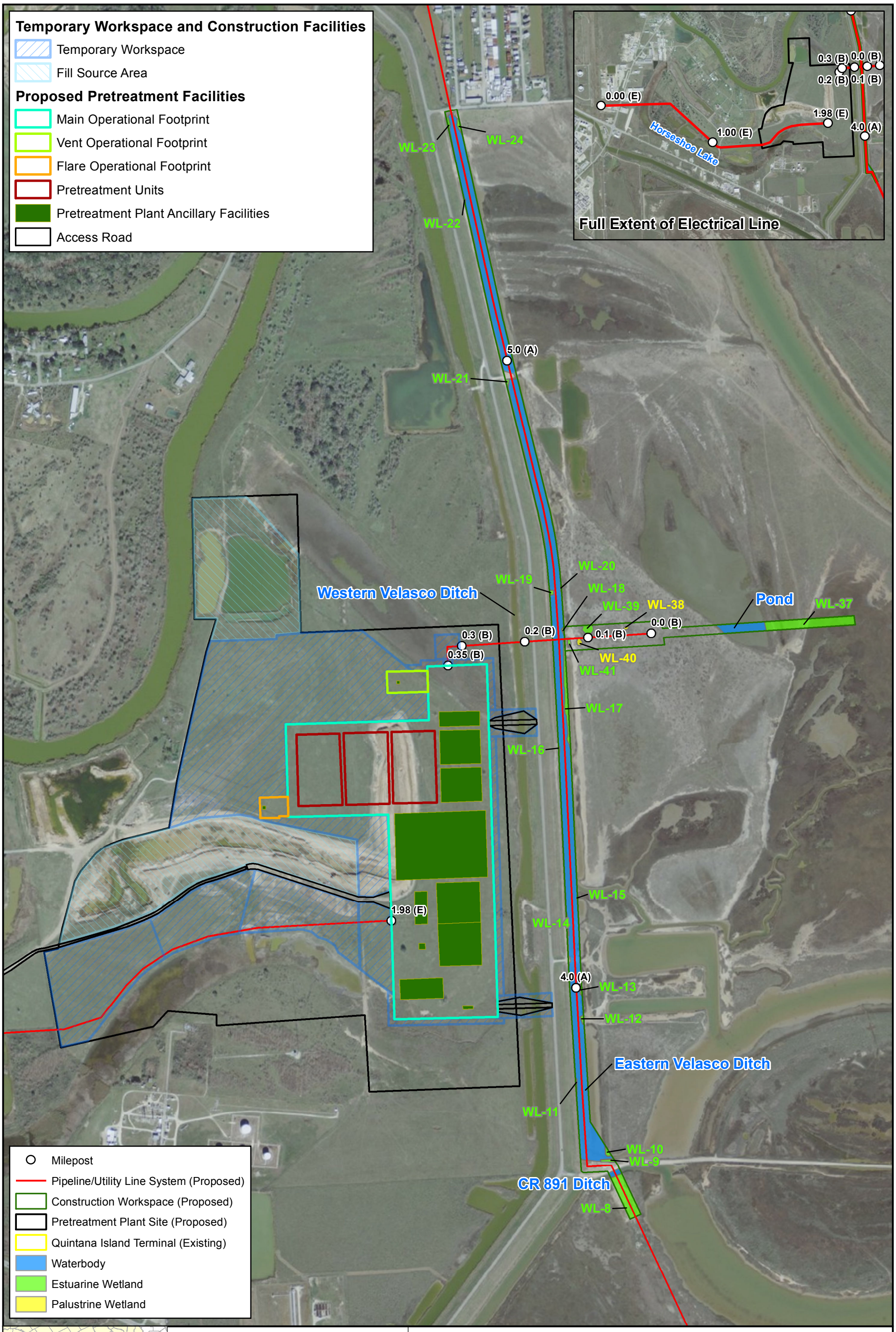


Figure 2.3-3d
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map

MP 3.5(A) to MP 5.5(A) MP 0.0(B) to MP 0.35(B) MP 0.0(E) to MP 1.98(E)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:9,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

Figure 2.3-3e
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 5.2(A) to MP 6.8(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:6,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

WL-30

Tributary to Salt Bayou

WL-29

8.0 (A)

WL-28

WL-27

WL-26

WL-25

7.0 (A)

Milepost
Pipeline/Utility Line System (Proposed)
Construction Workspace (Proposed)
Pretreatment Plant Site (Proposed)
Quintana Island Terminal (Existing)
Waterbody
Estuarine Wetland
Palustrine Wetland

Texas

0 250 500 1,000 Feet

N

Figure 2.3-3f
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 6.6(A) to MP 8.2(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd | 1:6,000 | REVISED: 08/23/2012 | DRAWN BY: JEBAKKEN

Figure 2.3-3g

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map

MP 8.2(A) to MP 8.7(A) MP 0.0(C) to MP 0.72(C)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:6,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

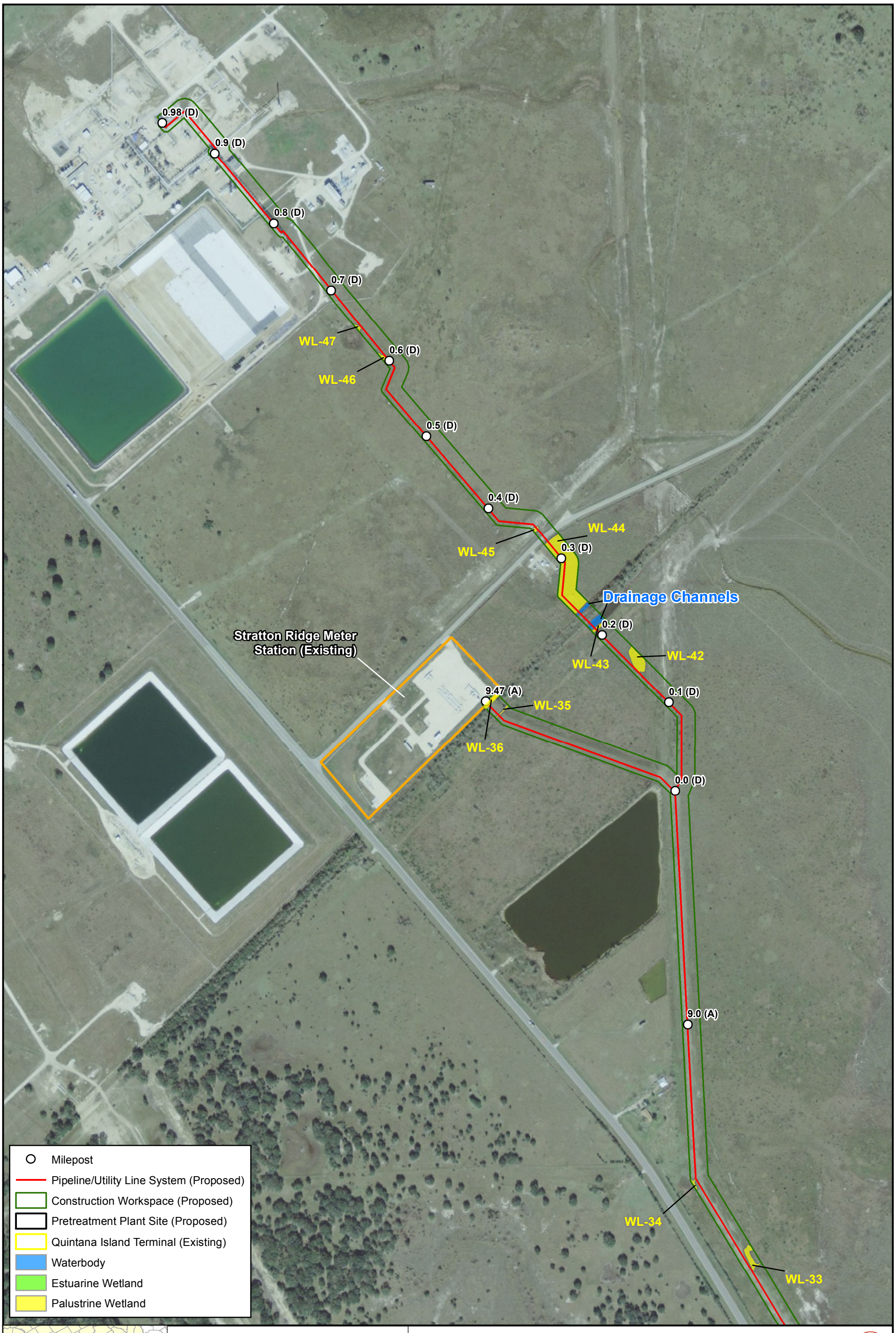


Figure 2.3-3h

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map

MP 8.7(A) to MP 9.47(A) MP 0.0(D) to 0.98(D)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_3_3a_NGL_Liquefaction_Facilities_Water_Wetlands.mxd	1:6,000	REVISED: 08/23/2012	DRAWN BY: JEBAKKEN

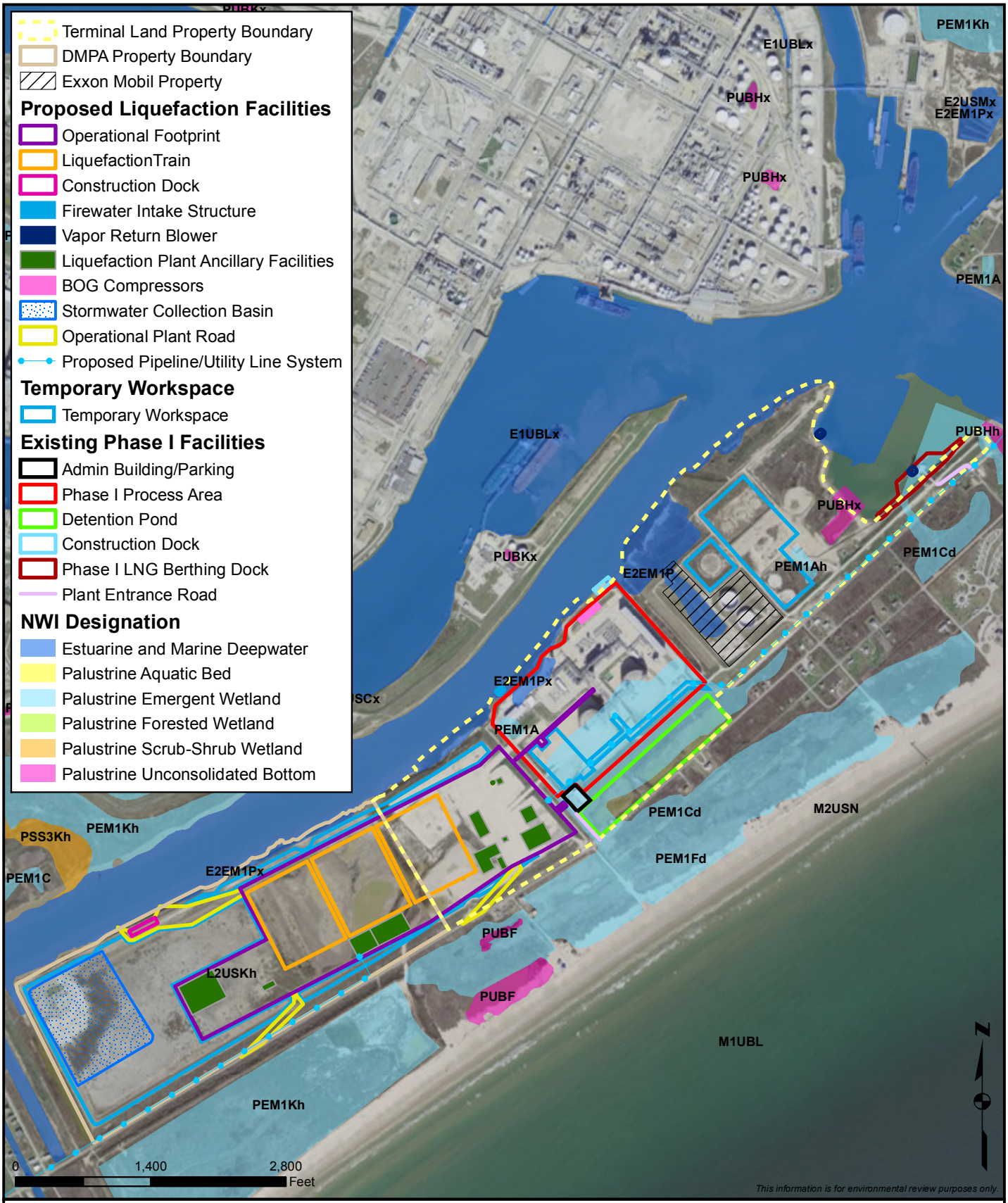


Figure 2.4-1
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands at the Quintana Island Terminal Site - National Wetlands Inventory Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_1_NGL_Terminal_NWI.mxd	1:16,800	REVISED: 08/06/2012	DRAWN BY: JEBAKKEN

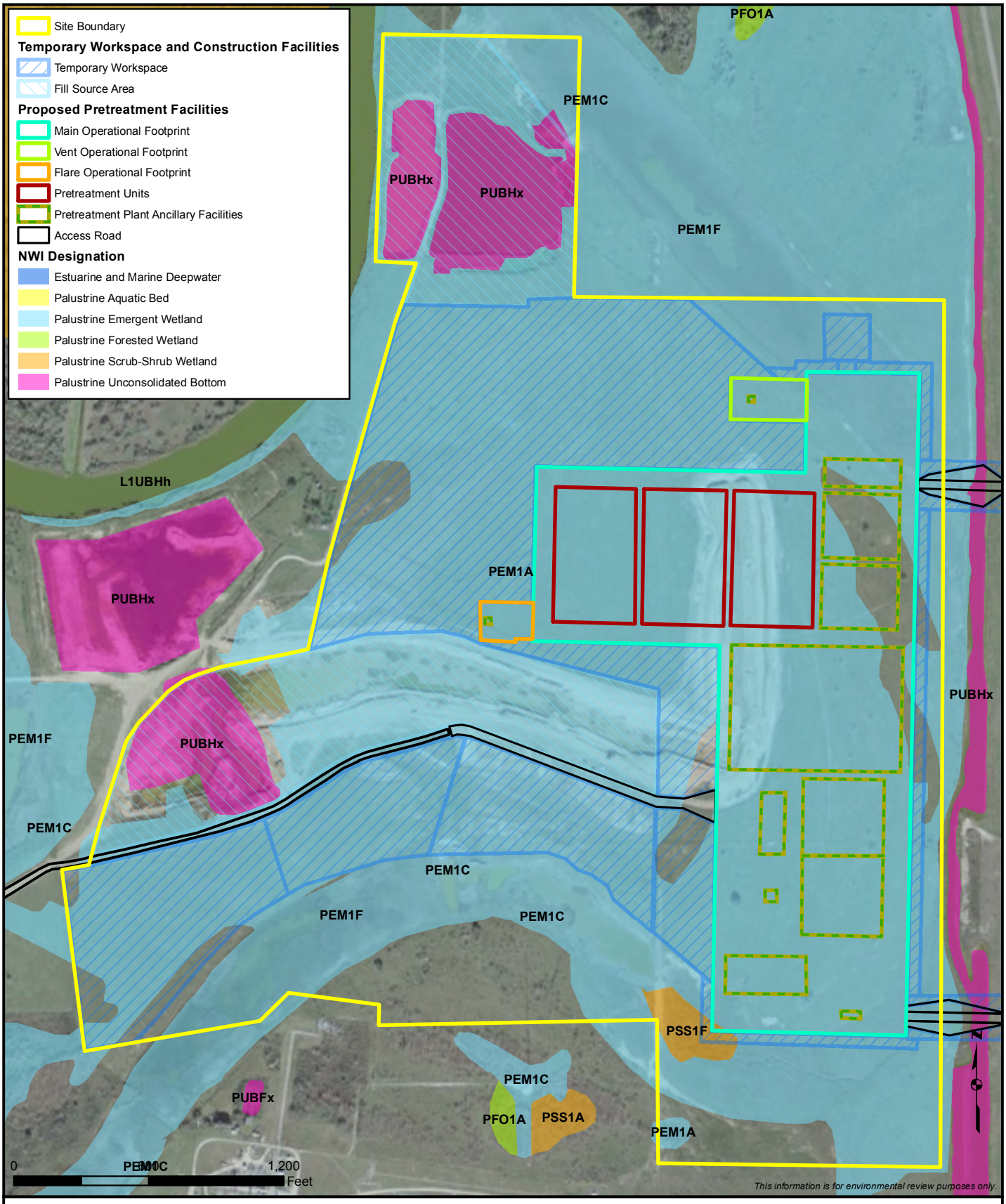


Figure 2.4-2
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands at the Pretreatment Plant Site - National Wetlands Inventory Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_2_NGL_Pretreatment_NWI.mxd	1:7,200	REVISED: 08/02/2012	DRAWN BY: JEBAKKEN

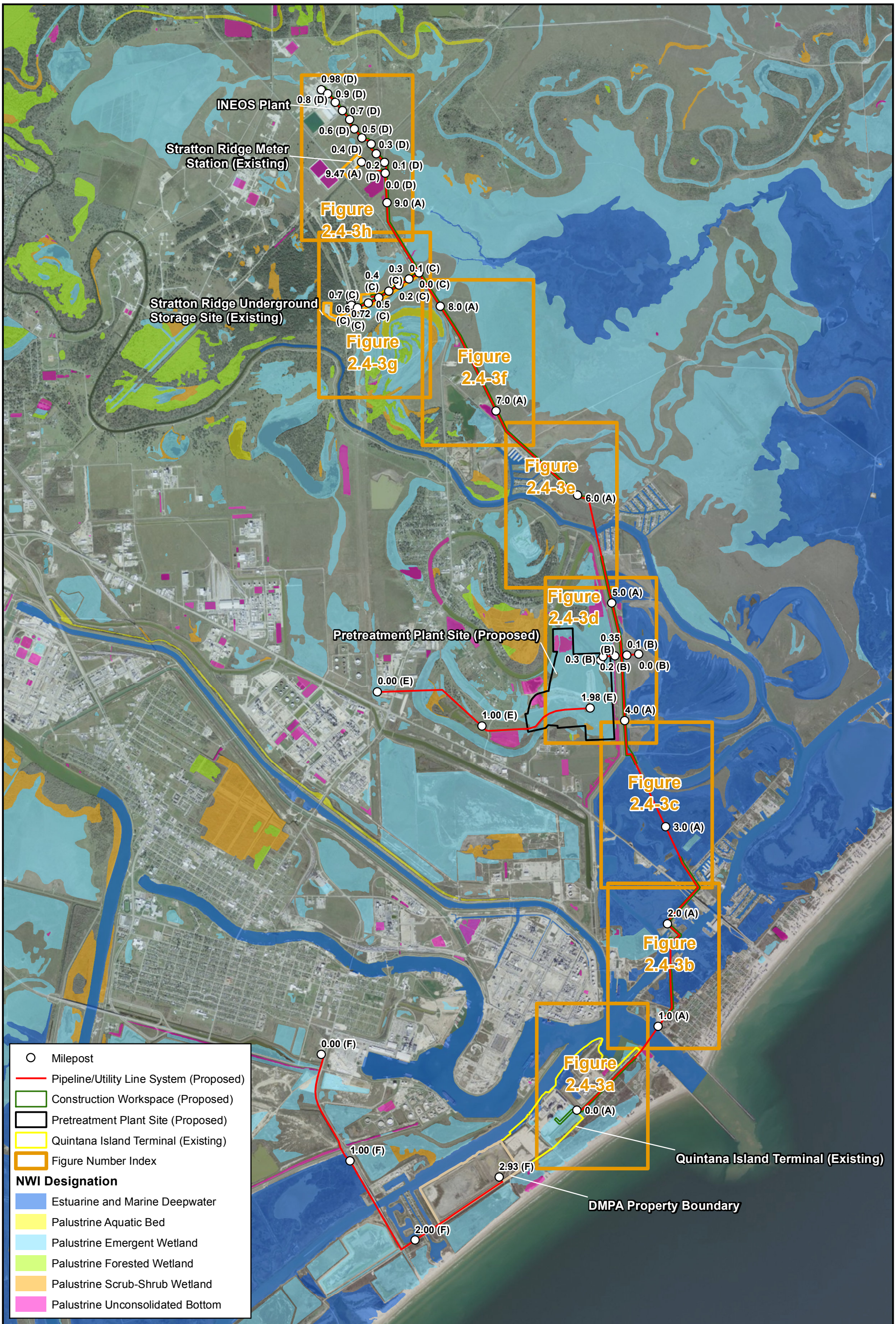


Figure 2.4-3

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3_NGL_Liquefaction_Facilities_NWI_Overview.mxd	1:48,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

Figure 2.4-3a
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map
MP 0.0(A) to MP 0.8(A) MP 0.0(F) to MP 2.93(F)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

Figure 2.4-3b

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map

MP 0.7(A) to MP 2.4(A)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

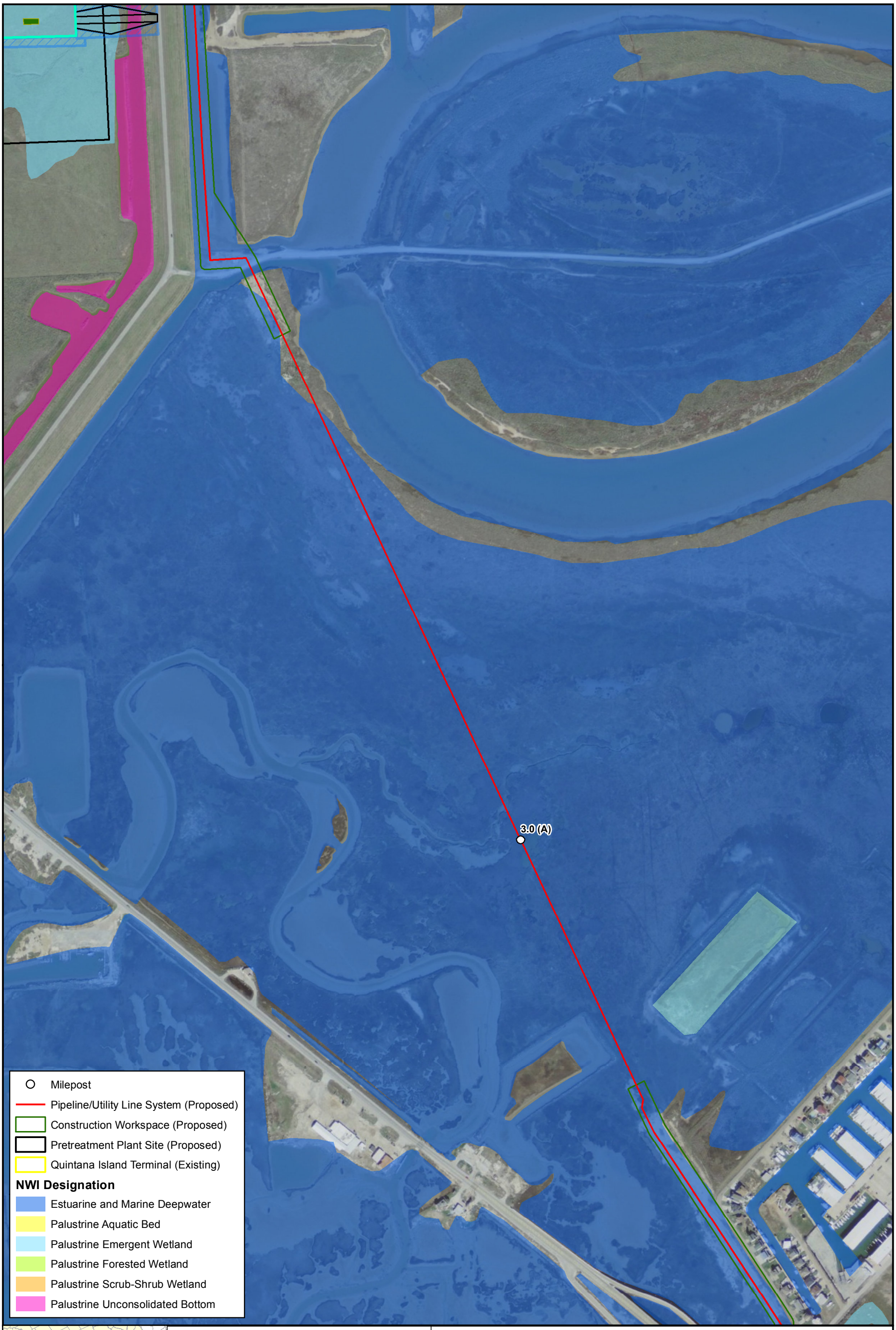


Figure 2.4-3c

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map

MP 2.4(A) to MP 3.9(A)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

Temporary Workspace and Construction Facilities
- Temporary Workspace
- Fill Source Area

Proposed Pretreatment Facilities
- Main Operational Footprint
- Vent Operational Footprint
- Flare Operational Footprint
- Pretreatment Units
- Pretreatment Plant Ancillary Facilities
- Access Road

Full Extent of Electrical Line

0.00 (E)
1.00 (E)
1.98 (E)
4.0 (A)
0.3 (B)
0.2 (B)
0.1 (B)
0.0 (B)

5.0 (A)
0.3 (B)
0.35 (B)
0.2 (B)
0.1 (B)
0.0 (B)
1.98 (E)
4.0 (A)

Velasco Storm Protection
Levee Borrow Ditch

- Milepost
- Pipeline/Utility Line System (Proposed)
- Construction Workspace (Proposed)
- Pretreatment Plant Site (Proposed)
- Quintana Island Terminal (Existing)

NWI Designation
- Estuarine and Marine Deepwater
- Palustrine Aquatic Bed
- Palustrine Emergent Wetland
- Palustrine Forested Wetland
- Palustrine Scrub-Shrub Wetland
- Palustrine Unconsolidated Bottom

Texas

0 250 500 1,000 Feet

N

Figure 2.4-3d
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map
MP 3.5(A) to MP 5.5(A) MP 0.0(B) to MP 0.35(B) MP 0.0(E) to MP 1.98(E)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:9,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

6.0 (A)

Oyster Creek

Milepost
Pipeline/Utility Line System (Proposed)
Construction Workspace (Proposed)
Pretreatment Plant Site (Proposed)
Quintana Island Terminal (Existing)

NWI Designation

Estuarine and Marine Deepwater
Palustrine Aquatic Bed
Palustrine Emergent Wetland
Palustrine Forested Wetland
Palustrine Scrub-Shrub Wetland
Palustrine Unconsolidated Bottom

Texas

0 250 500 1,000 Feet

N

Figure 2.4-3e
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map
MP 5.2(A) to MP 6.8(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

Tributary to
Salt Bayou

8.0 (A)

7.0 (A)

Milepost
Pipeline/Utility Line System (Proposed)
Construction Workspace (Proposed)
Pretreatment Plant Site (Proposed)
Quintana Island Terminal (Existing)

NWI Designation

Estuarine and Marine Deepwater
Palustrine Aquatic Bed
Palustrine Emergent Wetland
Palustrine Forested Wetland
Palustrine Scrub-Shrub Wetland
Palustrine Unconsolidated Bottom

0 250 500 1,000 Feet

N

Figure 2.4-3f

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map

MP 6.6(A) to MP 8.2(A)
Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd | 1:6,000 | REVISED: 08/03/2012 | DRAWN BY: JEBAKKEN

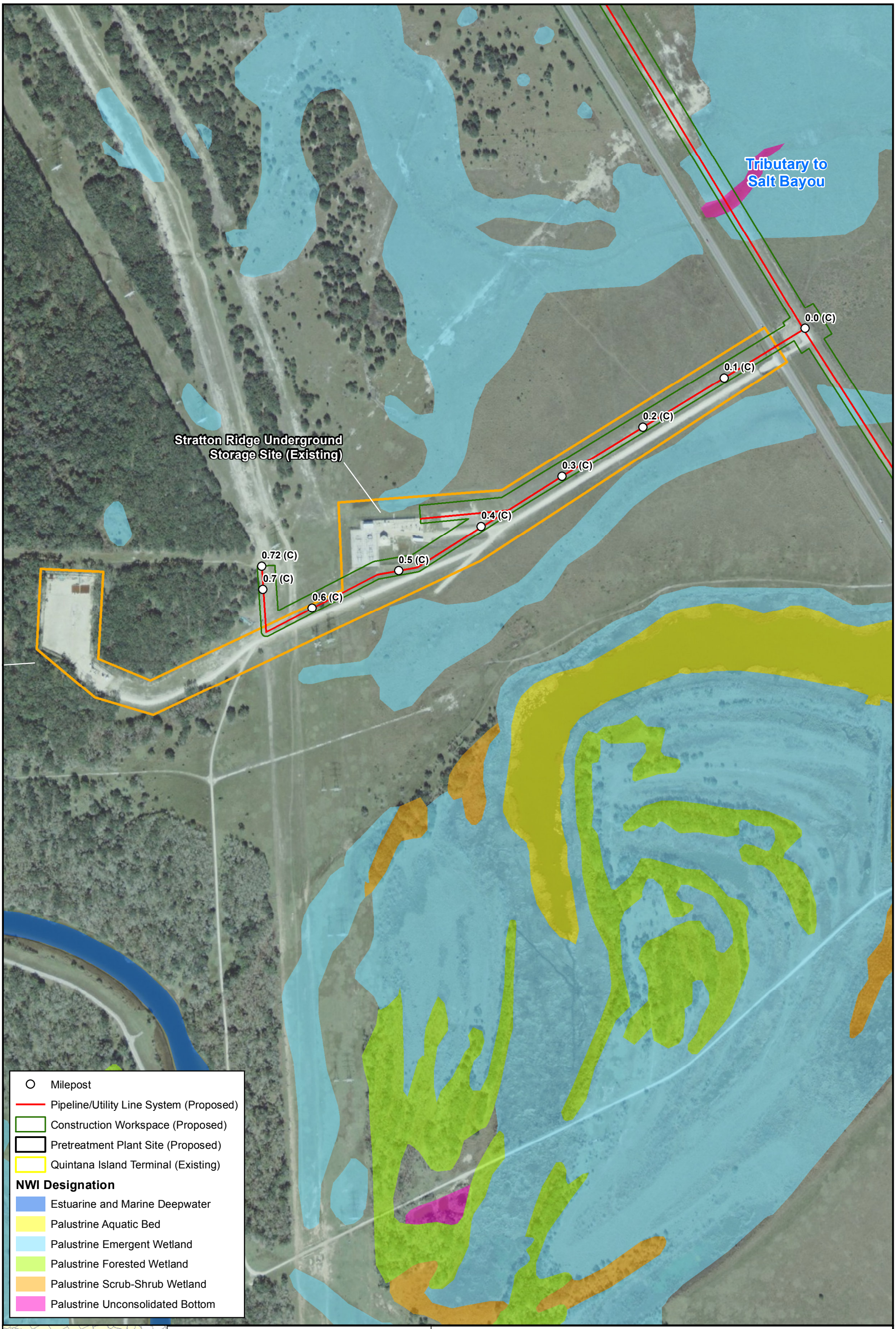


Figure 2.4-3g

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map

MP 8.2(A) to MP 8.7(A) MP 0.0(C) to MP 0.72(C)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

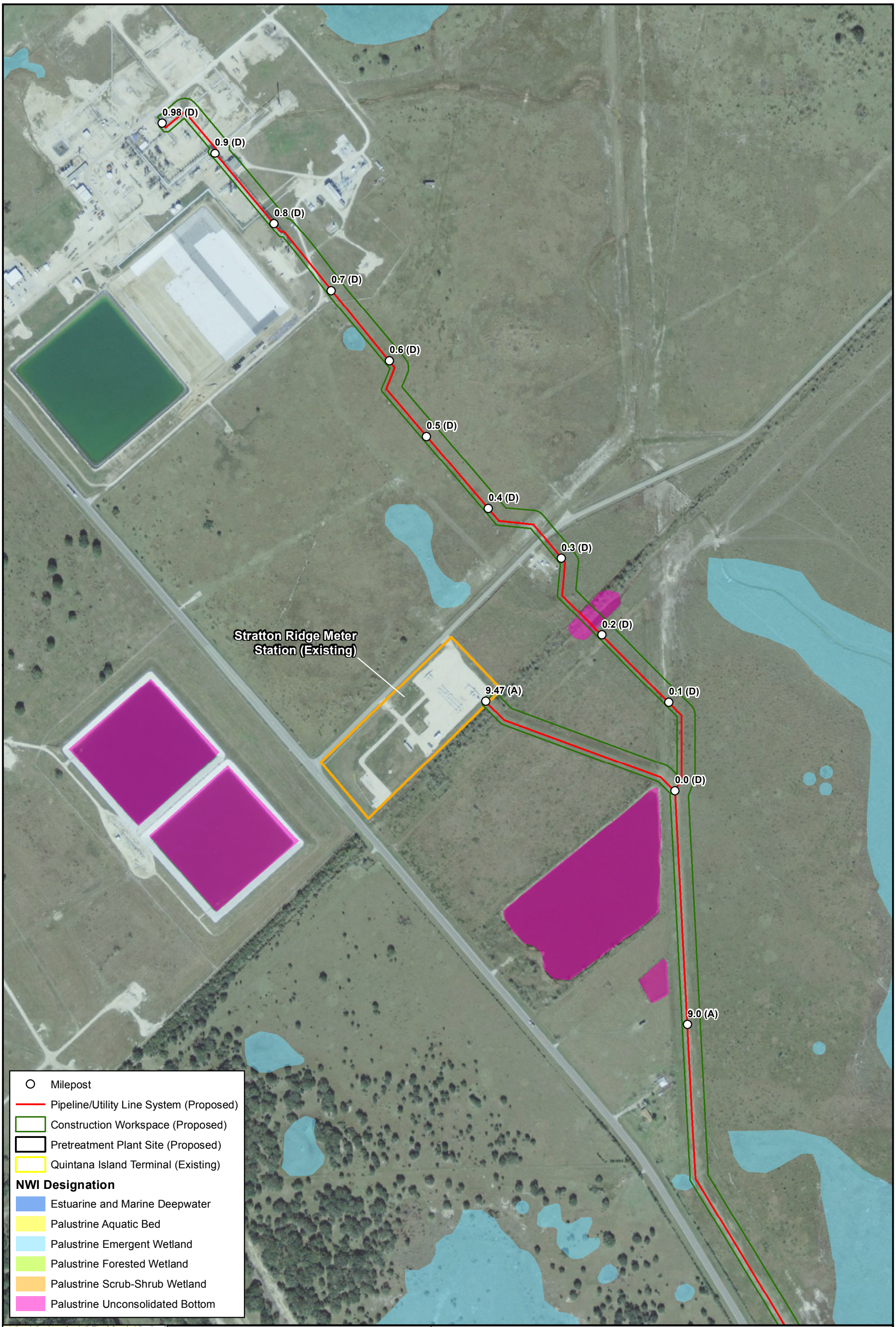


Figure 2.4-3h

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands on the Pipeline/Utility Line System - National Wetlands Inventory Map

MP 8.7(A) to MP 9.47(A) MP 0.0(D) to 0.98(D)

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2012\06\RR_Figures_FRE_RR_2_4_3a_NGL_Liquefaction_Facilities_NWI.mxd	1:6,000	REVISED: 08/03/2012	DRAWN BY: JEBAKKEN

FREEPORT LNG

LIQUEFACTION PROJECT

APPENDIX 2-B

Site-Specific Crossing Plans
(Draft)

APPENDIX 2-B

SITE-SPECIFIC CROSSING PLANS
(DRAFT)

Site Specific Crossing Plan for Proposed NGL, Nitrogen, Water, and Fiber Optic Lines – Oyster Creek Crossing (MP 5.62[A])

Site Specific Crossing Plan for Proposed BOG, Nitrogen, and Fiber Optic Lines – Freeport Harbor Channel Crossing (MP 0.89[A])

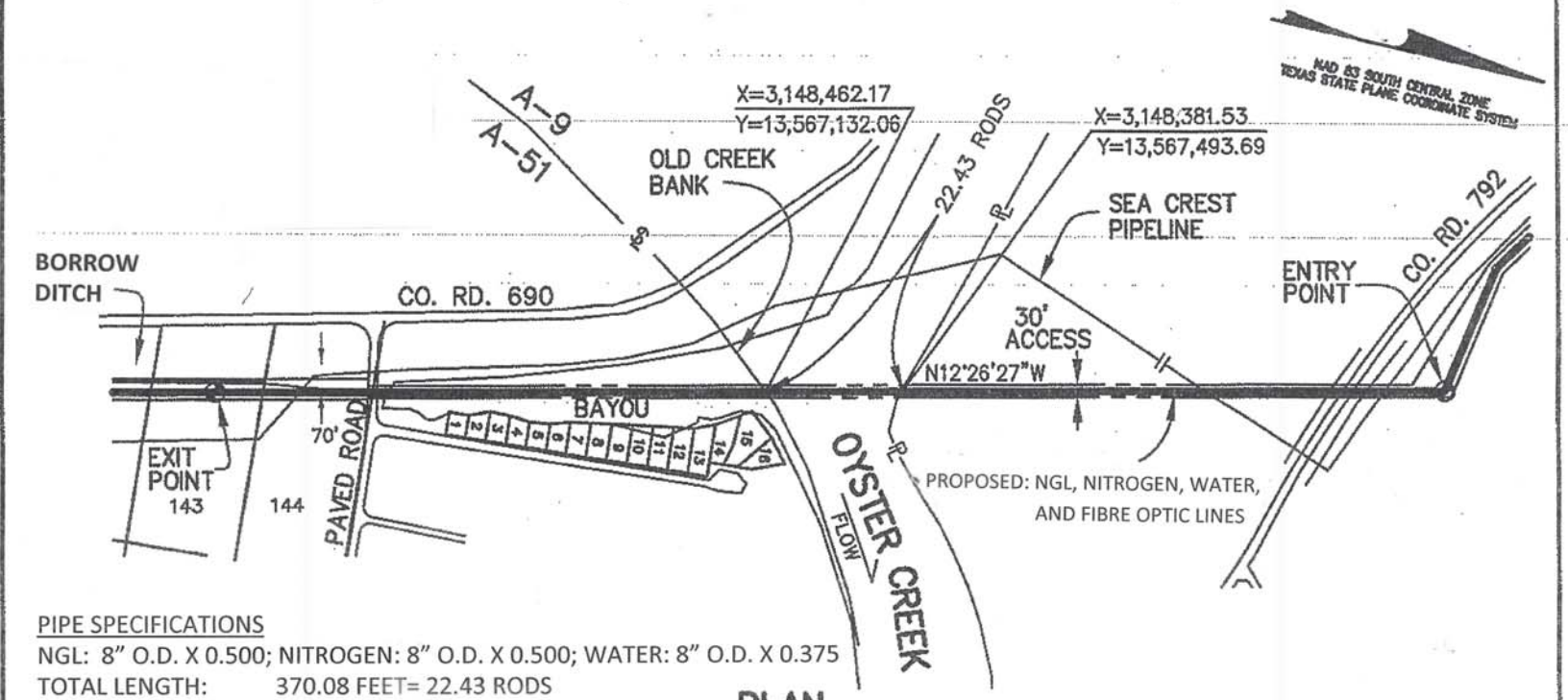
Site Specific Crossing Plan for Proposed BOG, Nitrogen, and Fiber Optic Lines – Gulf Intracoastal Waterway Crossing (MP 1.68[A])

Site Specific Crossing Plan for Proposed BOG, Nitrogen, and Fiber Optic Lines – Wetland and Slough Crossing (MP 3.01[A])

Site Specific Crossing Plan for Proposed Gas Inflow, Gas Outflow, BOG, NGL, Nitrogen, Water, and Fiber Optic Lines – Eastern Velasco Ditch and Levee Crossing (MP 4.55[A])

BRAZORIA COUNTY, TEXAS

F.J. CALVIT SURVEY, A-51 & B.T. ARCHER SURVEY, A-9



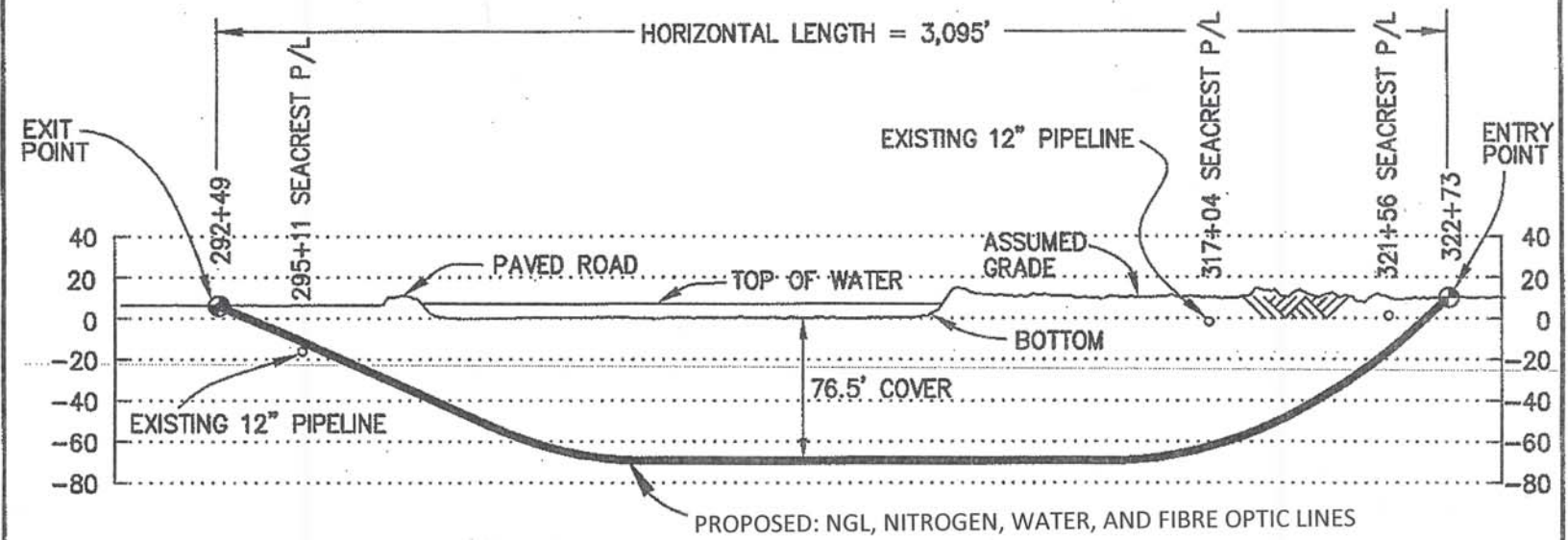
PIPE SPECIFICATIONS

NGL: 8" O.D. X 0.500; NITROGEN: 8" O.D. X 0.500; WATER: 8" O.D. X 0.375

TOTAL LENGTH: 370.08 FEET= 22.43 RODS

PERMANENT EASEMENT (0.25 AC.)

PLAN
1"=500'



DESIGN FACTOR: 0.50
COATING: 14-16 MILS FBE W/ 26 MILS ABRASION RESISTANT COATING
MAOP: NGL=1440; NITROGEN=740
TEST PRESSURE: NGL=2160; NITROGEN=1110
PRODUCTS: NATURAL GAS LIQUID; NITROGEN; WATER; FIBRE OPTIC
CONSTRUCTION METHOD: DIRECTIONAL DRILL

PROFILE
1"=500' HORIZ.
1"=100' VERT.

BEARINGS BASED ON TEXAS STATE PLANE COORDINATES SYSTEM NAD 83, SOUTH CENTRAL ZONE, DERIVED FROM GPS OBSERVATIONS.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT NO.

BRAZORIA COUNTY, TEXAS

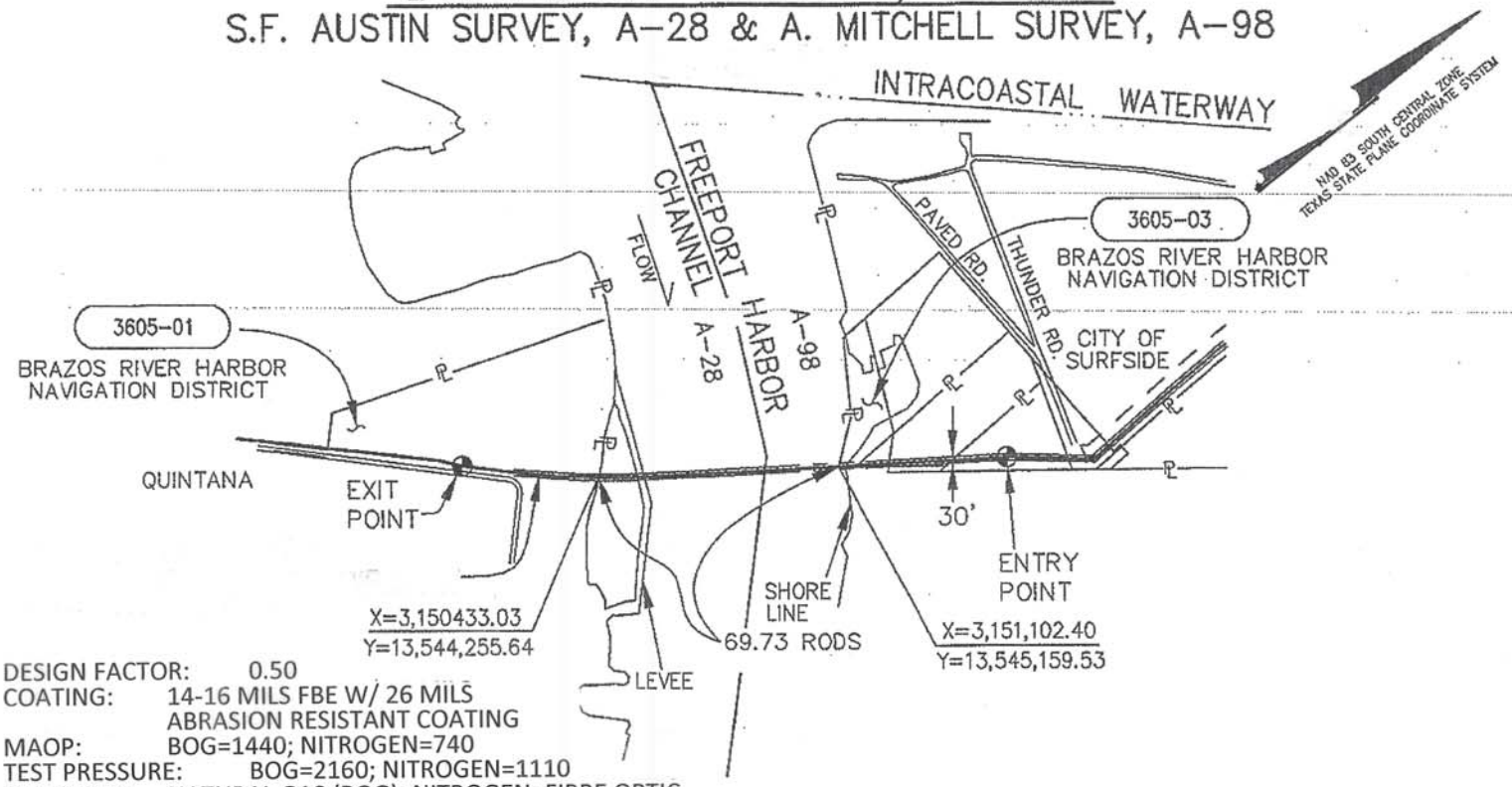
Freeport LNG Development
333 Clay St. Suite 5050, Houston, Tx. 77002-4173

SITE SPECIFIC CROSSING PLAN
PROPOSED: NGL, NITROGEN, WATER, AND FIBRE OPTIC LINES
OYSTER CREEK CROSSING

DRAWN BY:	DATE:	DWG. NO.	REV.
CHECKED BY:	DATE:		
SCALE: AS SHOWN	APP.:		

BRAZORIA COUNTY, TEXAS

S.F. AUSTIN SURVEY, A-28 & A. MITCHELL SURVEY, A-98

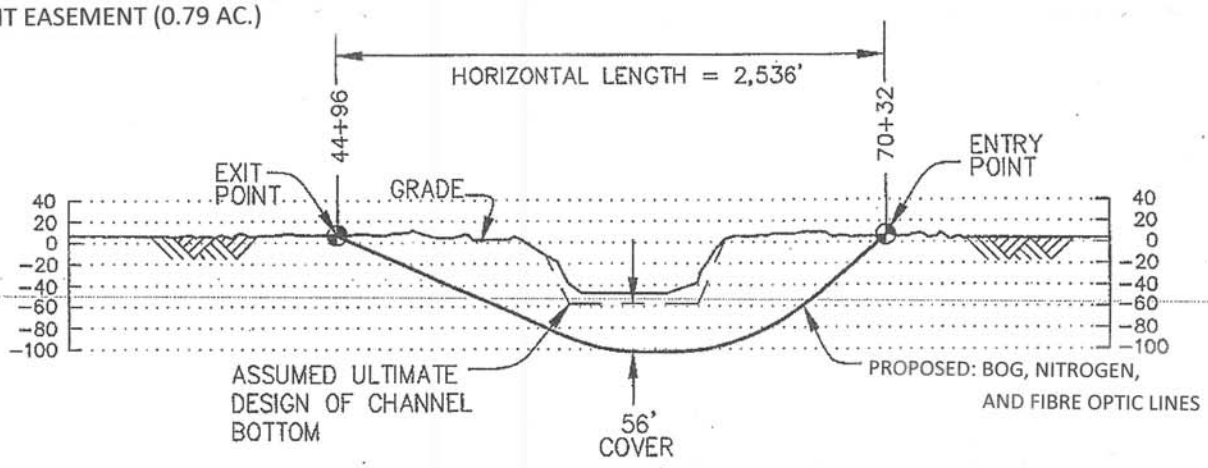


DESIGN FACTOR: 0.50
COATING: 14-16 MILS FBE W/ 26 MILS ABRASION RESISTANT COATING
MAOP: BOG=1440; NITROGEN=740
TEST PRESSURE: BOG=2160; NITROGEN=1110
PRODUCTS: NATURAL GAS (BOG); NITROGEN; FIBRE OPTIC
CONSTRUCTION METHOD: DIRECTIONAL DRILL

PLAN
1"=1000'

PIPE SPECIFICATIONS

BOG: 12" O.D. X 0.500; NITROGEN: 0.500
TOTAL LENGTH: 1150.5 FEET= 69.73 RODS
PERMANENT EASEMENT (0.79 AC.)



PROFILE
1"=1000' HORIZ.
1"=200' VERT.

BEARINGS BASED ON TEXAS STATE PLANE COORDINATES SYSTEM NAD 83, SOUTH CENTRAL ZONE, DERIVED FROM GPS OBSERVATIONS.

REV.	DATE	BY	DESCRIPTION	CHK.
			AS-BUILT	
			REVISED AND REISSUED	
			ISSUED FOR CONTRACTOR REVIEW	
			REVISED AND REISSUED	

PROJECT NO.

BRAZORIA COUNTY, TEXAS

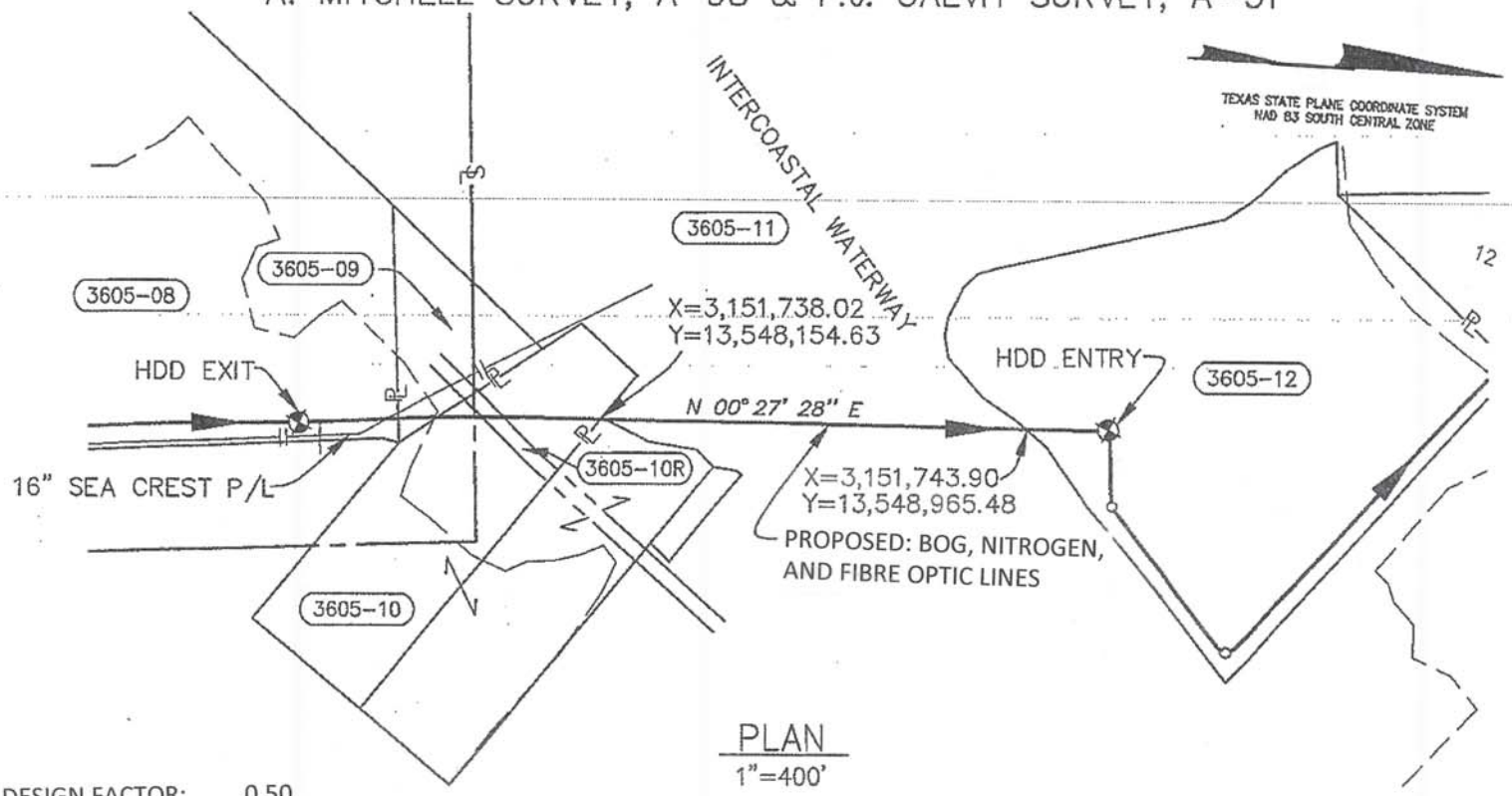
Freeport LNG Development
333 Clay St. Suite 5050, Houston, Tx. 77002-4173

SITE SPECIFIC CROSSING PLAN
PROPOSED: BOG, NITROGEN, AND FIBRE OPTIC LINES
FREEPORT HARBOR CHANNEL CROSSING

DRAWN BY:	DATE:	DWG. NO.	REV.
CHECKED BY:	DATE:		
SCALE: AS SHOWN	APP.:		

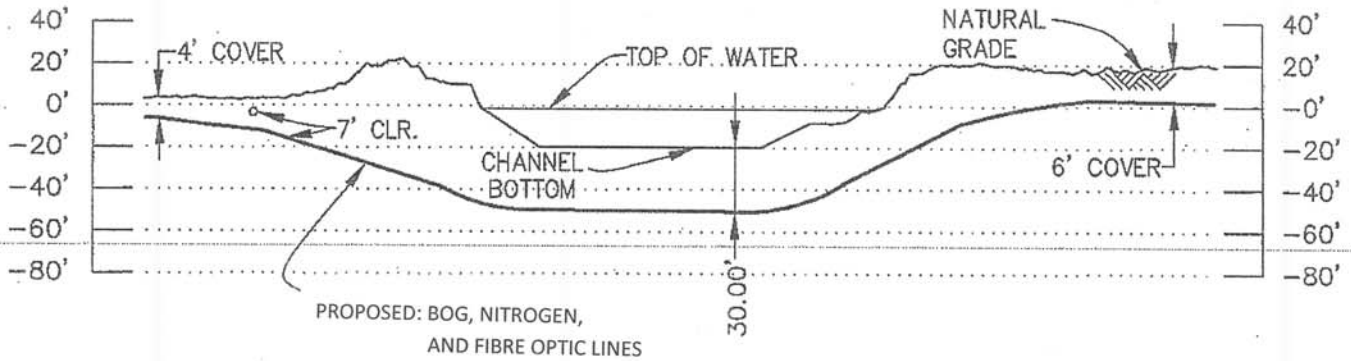
BRAZORIA COUNTY, TEXAS

A. MITCHELL SURVEY, A-98 & F.J. CALVIT SURVEY, A-51



PLAN
1"=400'

DESIGN FACTOR: 0.50
COATING: 14-16 MILS FBE W/ 26 MILS ABRASION RESISTANT COATING
MAOP: BOG=1440; NITROGEN=740
TEST PRESSURE: BOG=2160; NITROGEN=1110
PRODUCTS: NATURAL GAS (BOG); NITROGEN; FIBRE OPTIC
CONSTRUCTION METHOD: DIRECTIONAL DRILL



PIPE SPECIFICATIONS
BOG: 12" O.D. X 0.500; NITROGEN: 0.500
TOTAL LENGTH: 810.54 FEET= 49.12 RODS
PERMANENT EASEMENT (0.558 AC.)

PROFILE
1"=400' HORIZ.
1"=100' VERT.

BEARINGS BASED ON TEXAS STATE PLANE COORDINATES SYSTEM NAD 83, SOUTH CENTRAL ZONE, DERIVED FROM GPS OBSERVATIONS.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT NO.

BRAZORIA COUNTY, TEXAS

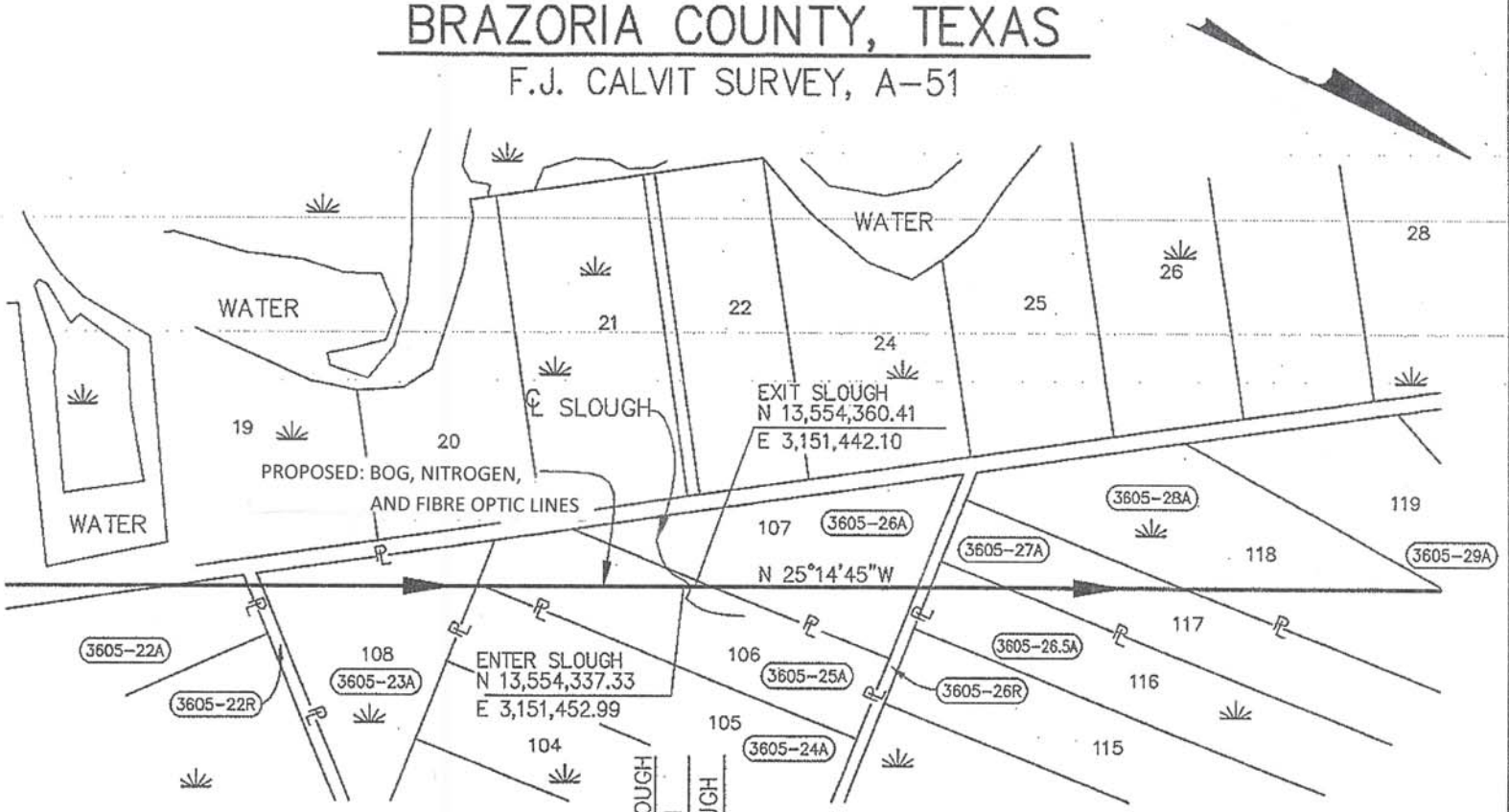
Freeport LNG Development

SITE SPECIFIC CROSSING PLAN
PROPOSED: BOG, NITROGEN, AND FIBRE OPTIC LINES
GULF INTRACOASTAL WATERWAY CROSSING

DRAWN BY:	DATE:	DWG. NO.	REV.
CHECKED BY:	DATE:		
SCALE: AS SHOWN	APP.:		

BRAZORIA COUNTY, TEXAS

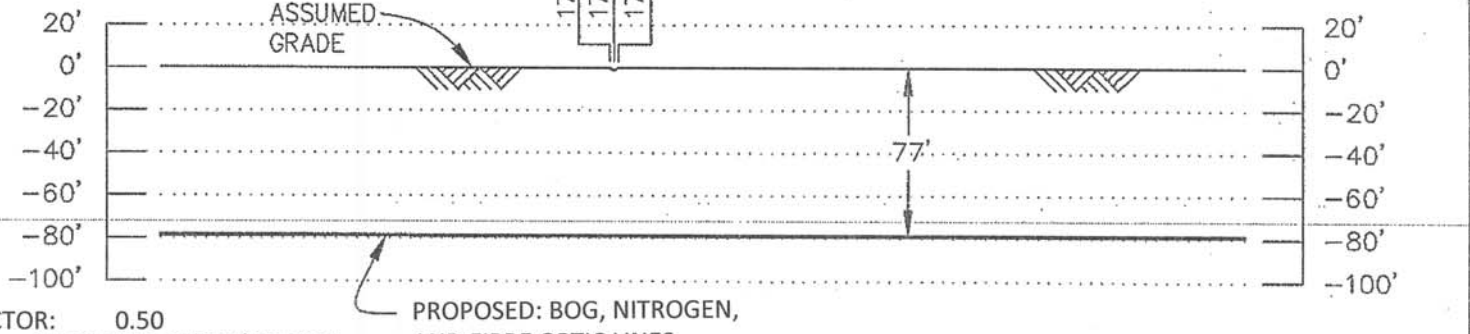
F.J. CALVIT SURVEY, A-51



PLAN
1"=500'

PIPE SPECIFICATIONS

BOG: 12" O.D. X 0.500; NITROGEN: 0.500
TOTAL LENGTH: 4965 FEET= 300.06 RODS
PERMANENT EASEMENT (0.204 AC.)



DESIGN FACTOR: 0.50
COATING: 14-16 MILS FBE W/ 26 MILS ABRASION RESISTANT COATING
MAOP: BOG=1440; NITROGEN=740
TEST PRESSURE: BOG=2160; NITROGEN=1110
PRODUCTS: NATURAL GAS (BOG); NITROGEN; FIBRE OPTIC
CONSTRUCTION METHOD: DIRECTIONAL DRILL

PROFILE
1"=500' HORIZ.
1"=100' VERT.

BEARINGS BASED ON TEXAS STATE PLANE COORDINATES SYSTEM NAD 83, SOUTH CENTRAL ZONE, DERIVED FROM GPS OBSERVATIONS.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT NO.

BRAZORIA COUNTY, TEXAS

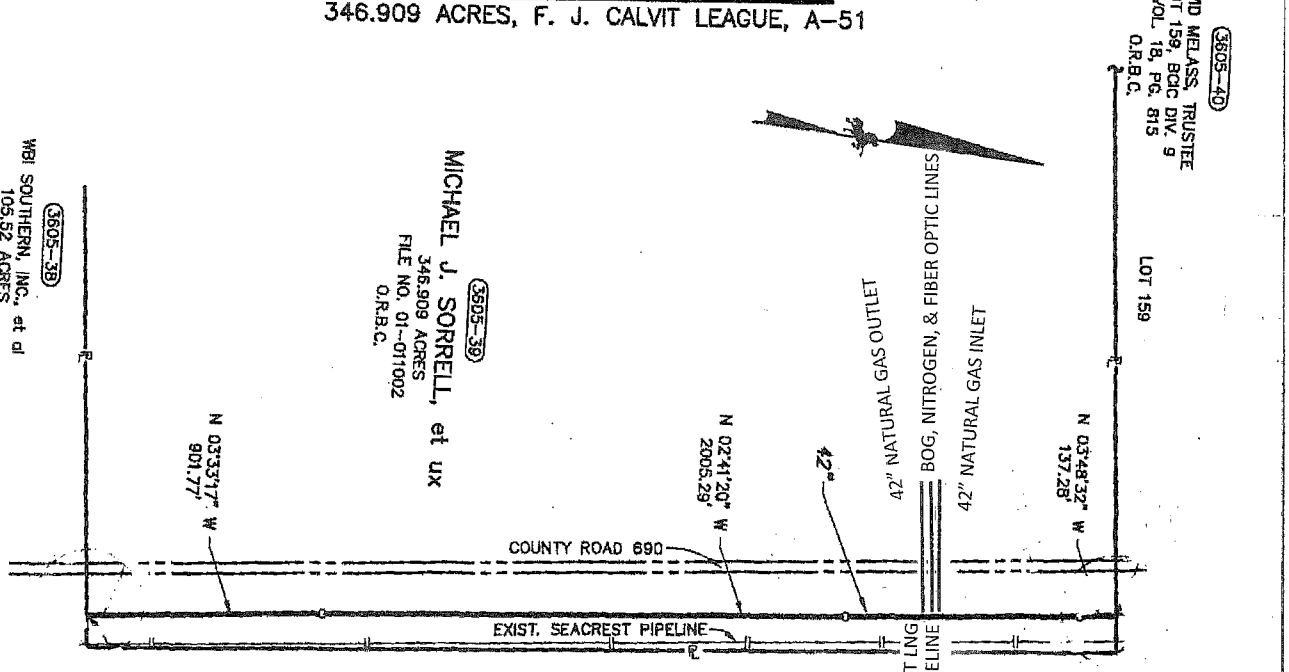
Freeport LNG Development
333 Clay St. Suite 5050, Houston, Tx. 77002-4173

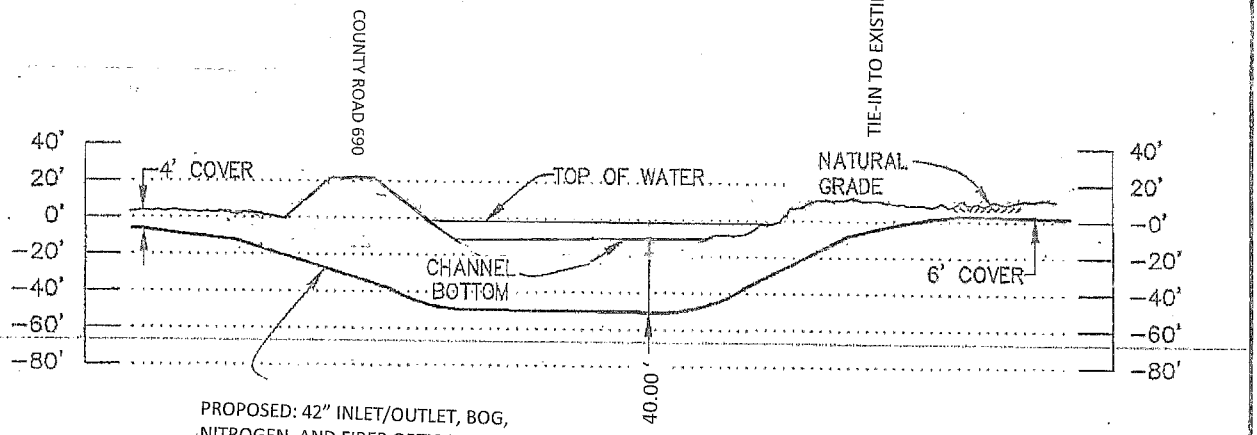
SITE SPECIFIC CROSSING PLAN
PROPOSED: BOG, NITROGEN, AND FIBRE OPTIC LINES
WETLAND AND SLOUGH CROSSING

DRAWN BY:	DATE:	DWG. NO.	REV.
CHECKED BY:	DATE:		
SCALE: AS SHOWN	APP.:		

BRAZORIA COUNTY, TEXAS

346.909 ACRES, F. J. CALVIT LEAGUE, A-51





PROPOSED: 42" INLET/OUTLET, BOG, NITROGEN, AND FIBER OPTIC LINES
TIE-IN TO EXISTING FREEPORT LNG 42" PIPELINE

PROFILE

1"=400' HORIZ.
1"=100' VERT.

BEARINGS BASED ON TEXAS STATE PLANE COORDINATES SYSTEM NAD 83, SOUTH CENTRAL ZONE, DERIVED FROM GPS OBSERVATIONS.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT NO.

BRAZORIA COUNTY, TEXAS

Freeport LNG Development

SITE SPECIFIC CROSSING PLAN

PROPOSED: 42" INLET/OUTLET, BOG, NITROGEN, AND FIBER OPTIC LINES
TIE-IN TO EXISTING FREEPORT LNG 42" PIPELINE AND HDD UNDER CR 690

DRAWN BY:	DATE:	DWG. NO.	REV.
CHECKED BY:	DATE:		
SCALE: AS SHOWN	APP.:		

FREEPORT LNG

LIQUEFACTION PROJECT

APPENDIX 2-C

Spill Prevention, Control, and Countermeasure (SPCC) Plan (Draft)

Spill Prevention Control & Countermeasure Plan

for

Freeport Liquefaction Project
Freeport, Texas

Developed by:
Zachry/ CBI Joint Venture
Environmental Services
Construction Engineering Department

Project No. 8757

June 2012

PROFESSIONAL ENGINEER'S CERTIFICATION STATEMENT

The undersigned Registered Professional Engineer is familiar with the requirements of Part 112 of Title 40 of the *Code of Federal Regulations* (40 CFR part 112) and has visited and examined the facility, or has supervised examination of the facility by appropriately qualified personnel. The undersigned Registered Professional Engineer attests that this Spill Prevention, Control, and Countermeasure Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of 40 CFR part 112; that procedures for required inspections and testing have been established; and that this Plan is adequate for the facility. [40 CFR 112.3(d)]

This certification in no way relieves the owner or operator of the facility of his/her duty to prepare and fully implement this SPCC Plan in accordance with the requirements of 40 CFR part 112. This Plan is valid only to the extent that the facility owner or operator maintains, tests, and inspects equipment, containment, and other devices as prescribed in this Plan.

_____
Printed Name

_____
Signature

[SEAL]

_____
State Registration No.

_____
Date

MANAGEMENT APPROVAL AND DESIGNATED PERSON

(40 CFR 112.7)

The Zachry/CBI Joint Venture (CONTRACTOR) is committed to prevent any discharges and to remediate any spills and releases that do occur by providing necessary personnel equipment, and materials at all times. The company will also solicit assistance from non-company resources including emergency response contractors, consultants and remediation contractors to remedy spill situations.

This Plan has the full approval of CONTRACTOR management with authority to commit the necessary resources to fully implement this plan and expeditiously respond to a release of oil. The company intends to fully support the provisions of this Plan and has activated this Plan according to the guidelines set forth herein. All personnel with responsibilities covered by this Plan are familiar with the contents of the plan and act in accordance with its provisions.

MANAGEMENT APPROVAL

Steve Slocum
Authorized Facility Representative

Project Manager
Title

_____
Signature

_____
Date

DESIGNATED SPILL RESPONSE COORDINATOR

Tom Tucker
Authorized Facility Representative

Project HSE Manager
Title

_____
Signature

_____
Date

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

PART 1.0: INTRODUCTION

Purpose

The purpose of this Spill Prevention, Control, and Countermeasure (SPCC) Plan is to describe measures implemented by Zachry/ CBI Joint Venture (CONTRACTOR), its partners, and all subcontractors in order to minimize potential for oil discharges, and to prepare CONTRACTOR to respond in a safe, effective, and timely manner to a discharge.

This Plan has been prepared to meet the requirements of Title 40, Code of Federal Regulations, part 112 (40 CFR part 112).

In addition, this Plan is used as a reference for oil storage information and testing records, as a tool to communicate practices on preventing and responding to discharges with employees, as a guide to facilitate inspections, and as a resource during emergency response situations.

Based on expected petroleum storage quantities associated with CONTRACTOR's construction scope this facility does not pose a risk of substantial harm under 40 CFR part 112, as recorded in the "Substantial Harm Determination" included in Appendix B of this Plan.

Key Management Actions

This Plan provides guidance on key actions that CONTRACTOR must perform to comply with the SPCC rule, which includes the following:

- Complete weekly and annual site inspections as outlined in the Inspection, Tests, and Records section of this Plan using the inspection checklists included in Appendix C.

- Perform preventive maintenance of equipment, secondary containment systems, and discharge prevention systems described in this Plan as needed to keep them in proper operating conditions.

- Conduct discharge prevention briefings and training as outlined in the Personnel, Training, and Spill Prevention Procedures section of this Plan and document them on the log included in Appendix E.

- In addition to agency notification, if either of the following occurs, a copy of the SPCC Plan must also be submitted to the EPA Region 6

- Regional Administrator (RA):
    - The facility discharges more than 1,000 gallons of oil into or upon the navigable waters of the U.S. or adjoining shorelines in a single spill event; or
    - The facility discharges oil in quantity greater than 42 gallons in each of two spill events within any 12-month period.
- Technical components of this SPCC Plan must be reviewed at least once every five (5) years and as appropriate include more effective prevention and control technology, if such technology will significantly reduce the likelihood of a spill event . Plan amendments and other than administrative changes, must be certified by a Professional Engineer.
- Amend the SPCC Plan within six (6) months whenever there is a change in facility design, construction, operation, or maintenance that materially affects the facility's spill potential. The revised Plan must be certified by a Professional Engineer (PE).
- Review the Plan on an annual basis. Update the Plan to reflect "administrative changes" that are applicable, such as personnel changes or revisions to contact information, such as phone numbers. Administrative changes must be documented in the Plan review log of Section 1.2 of this Plan, but do not have to be certified by a PE.

PART 2.0: PLAN ADMINISTRATION

2.1 Location of SPCC Plan
(40 CFR 112.3(e))

In accordance with 40 CFR 112.3(e), a complete copy of this SPCC Plan is maintained on-site in the CONTRACTOR construction field office. The office is attended during normal business hours, i.e., 7:00 AM to 4:30 PM, Monday – Friday.

2.2 Plan Review
(40 CFR 112.3 and 112.5)

2.2.1 Changes in Facility Configuration

In accordance with 40 CFR 112.5(a), CONTRACTOR will amend this plan where there is any change in the facility design, construction, operation, or maintenance that materially affects the facility's potential for an oil discharge, including, but not limited to:

- commissioning of containers;
- reconstruction, replacement, or installation of piping systems;
- construction or demolition that might alter secondary containment structures;
- changes of product or service, revisions to standard operation, modification of testing/inspection procedures, and use of new or modified industry standards or maintenance procedures.

Amendments to the Plan made to address changes of this nature are referred to as technical amendments, and must be certified by a PE. Non-technical amendments can be done (and must be documented in this section) by the *Designated Spill Response Coordinator*.

Non-technical amendments include the following:

- change in the name or contact information (i.e., telephone numbers) of individuals responsible for the implementation of this Plan; or
- change in the name or contact information of spill response or cleanup contractors.

CONTRACTOR must make the needed revisions to the SPCC Plan as soon as possible, but no later than six months after the change occurs. The Plan must be implemented as soon as possible following any technical amendment, but *no later than six months* from

the date of the amendment. As applicable, the *Designated Spill Response Coordinator* is responsible for initiating and coordinating review and amendment of this SPCC Plan.

2.2.2 Scheduled Plan Reviews

In accordance with 40 CFR 112.5(b), CONTRACTOR – Environmental Services Group shall review the SPCC Plan at least once every five years. Revisions to the Plan, if needed, are made within six months of the five-year review. A registered Professional Engineer certifies any technical amendment to the Plan, as described above, in accordance with 40 CFR 112.3(d).

2.2.3 Records of Plan Review

Scheduled reviews and Plan amendments are recorded in the Plan Review Log (Table 1-1). This log must be completed even if no amendment is made to the Plan as a result of the review. Unless a technical or administrative change prompts an earlier review of the Plan.

Table 2-1: Plan Review Log

Reviewed By	Date	Activity	PE Certification	Comments
John Brawner	6/27/2012	Prepare Draft Plan		Initial Draft SPCC plan
David M. Turner, P.E.	6/28/2012	Finalize Draft Plan for Internal Review		Revise Plan

2.3 Facilities Equipment Not Yet Fully Operational
(40 CFR 112.7)

This section is not applicable to this Project.

2.4 Cross-Reference with SPCC Provisions
(40 CFR 112.7)

This SPCC Plan may not follow the exact order presented in 40 CFR part 112. Section headings identify, where appropriate, the relevant section(s) of the SPCC rule. For clarity, Appendix K includes a cross-reference of Plan sections relative to applicable parts of 40 CFR part 112.

PART 3.0: GENERAL FACILITY INFORMATION

Facility Name / Address:	Freeport LNG Development, L.P. 1500 Lamar Street Quintana, Texas 77541
Facility Type:	Industrial Construction
Operator (Construction Phase Only):	Zachry Industrial, Inc. P.O. Box 240130 527 Logwood Street San Antonio, Texas 78224-0130
Operator – Facility Contacts:	Steve Slocum Project Manager Office – TBD Cell – (602) 206-8688 TBD Project Environmental Manager Office – TBD Cell – TBD Tom Tucker Project HSE Manager Office – TBD Cell – (361) 244-4768 Radermon Scypion Project Equipment Superintendent Office – TBD Cell – (409) 293-7969
Operator – Corporate Contacts:	David M. Turner, P.E. Manager, Environmental Services Office – (210) 588-5285 Cell – (210) 478-0623

	John Brawner Project Environmental Support Manager Office – (210) 588-5172 Cell – (512) 828-2832
Owner – Facility Contacts:	Michael Johns Director, Regulatory Affairs Office – 979-415-8720 Cell –

3.1 Facility Description
(40 CFR 112.7(a)(3))

3.1.1 Location and Activities

Quintana Island is located southeast of Freeport Texas between the Gulf of Mexico and the Intracoastal Waterway (ICW). The approximate coordinates of the site are Latitude 28° 56' N and Longitude 95° 19' W. The site, shown in Figure 3-1, occupies approximately 140 acres for the main terminal and another 46 acres for the marine terminal. The Terminal is located on Quintana Island on the west side of the Freeport Channel (Ship Channel) and south of the ICW.

FLNG intends to install liquefaction capacity of 13.2 MTPA, nominal. The liquefaction project will be executed with 3 trains, each with 4.4 MTPA liquefaction capacity. The Liquefaction Trains will be located on the DMPA property. See Figure for the location of these trains.

The pretreatment facility for the liquefaction trains will be located at Oyster Creek with the total required pretreatment capacity for all trains for a total of 13.2 MTPA LNG production. The details of each train design are explained in the following sections.

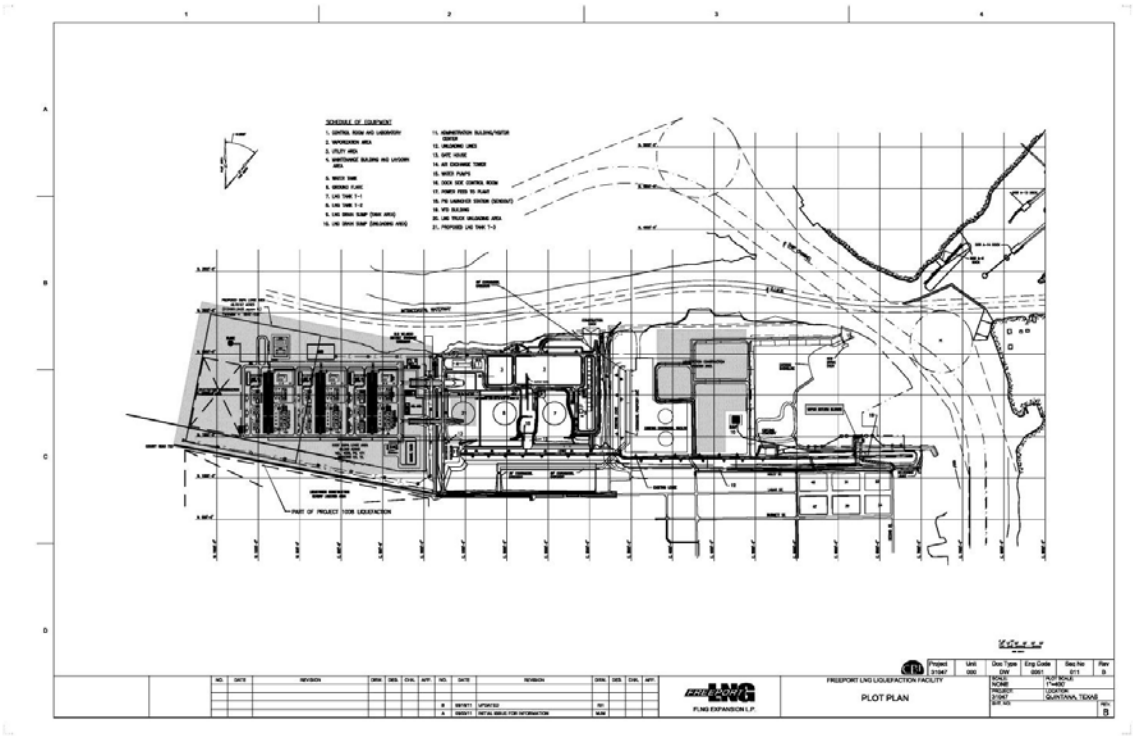


Figure 3-1: Plot Plan

3.1.2 DMPA Liquefaction Facility

All 3 Trains of the liquefaction project consist each of a nominal 4.4 MTPA APCI C3-MR liquefaction train, based on an air cooled design installed as identical configurations on the DMPA property. The DMPA liquefaction trains will include installation of the following basic systems and modifications to the existing facility:

- Connection to the existing 36" natural gas send-out line to provide a supply of treated natural gas from Stratton Ridge.
- Three identical 4.4 MTPA Liquefaction trains, each consisting of a heavy hydrocarbons removal unit and de-methanizer, propane pre-cooled refrigeration system, propane and mixed refrigerant compression cycles, the Main Cryogenic Heat Exchanger (MCHE) and associated vessels
- Electric driven propane and refrigerant compressors
- Cooling for the liquefaction trains provided by air coolers

- Piping modifications/additions to allow LNG transfer from the liquefaction units into the existing LNG storage tanks, recirculation lines as well as directly loading the LNG carrier
- Addition of auxiliary systems such as refrigerant component storage and transfer systems; LIN unit; heavy hydrocarbon transfer; oily/waste water collection systems; LNG spill containment; etc.
- Expansion or addition of the required utility systems such as: electrical power distribution; instrument air; inert gas (nitrogen), fresh water (potable and service water); firewater tank and firefighting equipment
- Installing of an additional Flare system in the DMPA area.

3.1.3 Off Site Facilities

Multiple natural gas pretreatment trains (sized to produce treated gas for an overall nominal 13.2 MTPA liquefaction demand) will be installed near Oyster Creek. The trains will each consist of an amine sweetening system to remove CO2 and sulfur compounds from the natural gas prior to a molecular sieve dehydration system to remove water down to very low levels acceptable for the design and operation of the cryogenic heat exchanger, and a mercury removal unit to protect the downstream aluminum equipment from damaging corrosion mechanisms. The pretreatment systems will be located at the upstream end of the 42" natural gas pipeline connected to the LNG Terminal.

Construction activities at this facility require the handling, storage, use, and distribution of petroleum products such as gasoline, diesel and lubricants. Typically storage containers will consist of portable aboveground portable containers, portable 55-gallon drums, fuel / lubricant storage vehicles, and/or oil filled operational equipment. Upon completion of the project, all petroleum storage containers associated with construction activities will be removed from the Project Site.

Additionally, as construction activities are completed, petroleum containing equipment and systems will undergo commissioning activities. These activities will most likely require additional quantities of oil to be stored on site. The Designated Spill Response Coordinator will be responsible for initiating such Plan revisions.

In addition to requirements of 40 CFR 112, this facility is also regulated by Spill Prevention and Reporting requirements stipulated by FERC and the General Land Office of Texas.

3.1.4 Oil Handling and Storage

Summary of oil containers, content, and capacities are listed below. Construction needs have the tendency to cause frequent changes to quantities. The Designated Spill Response Coordinator will review Table 3-1 on a monthly basis to appropriately document petroleum storage activities.

Oil storage will consist of a single portable aboveground storage tanks and a varying stock of drums used to store oil and other oil containing materials to support the equipment maintenance operations.

CONTRACTOR will operate a fuel transport truck throughout the site that will be used to deliver oil and fuel to on site mobile equipment. Truck will be parked on site overnight with the potential to be full; the potential capacity of this truck shall therefore be counted in the total storage capacity for this facility.

Table 3-1: Oil Product Storage Containers (TBD)

ID	Storage Capacity	Content	Description
ALL STORAGE CONTAINERS ARE TO BE CONFIRMED AT MOBILIZATION			
Portable Storage Containers – Skid Mounted Aboveground Storage Tank			
AST - 1	500	Gasoline	Portable aboveground storage tank with secondary containment pan
Portable Storage Containers – Lubricant Storage Connex			
NA			
Vehicle Storage Containers – Lube / Fuel Truck			
V-1	1142 Gallons	Misc. lubricants, transmission fluids, used oil, diesel fuel, etc.	Vehicle will be parked overnight in designated area w/ secondary containment berm. All tanks are equipped with steel secondary containment pans.
Portable Storage – Drums / Totes			
Misc	10 X 55 gallon (ea.)	varies	Typ. 55 gallon (ea.) – Used oil filters, absorbents, absorbent pads, spill response waste, synthetic oil, etc. Containers will be stored in appropriately sized secondary containment.
Oil-Filled Operational Equipment - KR 806-3 Hydraulic Drill Rig			
OF-1	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-2	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-3	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-4	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-5	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-6	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-7	166 gallons	Hydraulic Oil	Hydraulic Drilling Rig
OF-8	169 gallons	Diesel Fuel	DCA125USJC Generator
Subtotal	**1,331 gallons**		
TOTAL POTENTIAL STORAGE (GALLONS)			**3,523**

Other containers: (1) 25 yard capacity roll off box with water tight bladder and roll over tarp. Container will be used to provide protected storage for any spill response and clean up materials generated throughout the construction process. This container is associated with waste storage and not product storage so is not considered as part of the storage capacity of this facility.

3.2 Evaluation of Discharge Potential

3.2.1 Distance to Navigable Waters and Adjoining Shorelines and Flow Paths

Quintana Island is located southeast of Freeport Texas between the Gulf of Mexico and the Intracoastal Waterway (ICW). The Terminal is located on Quintana Island on the west side of the Freeport Channel (Ship Channel) and south of the ICW. The site, shown in Figure 1-1, occupies approximately 140 acres for the main terminal and another 46 acres for the marine terminal.

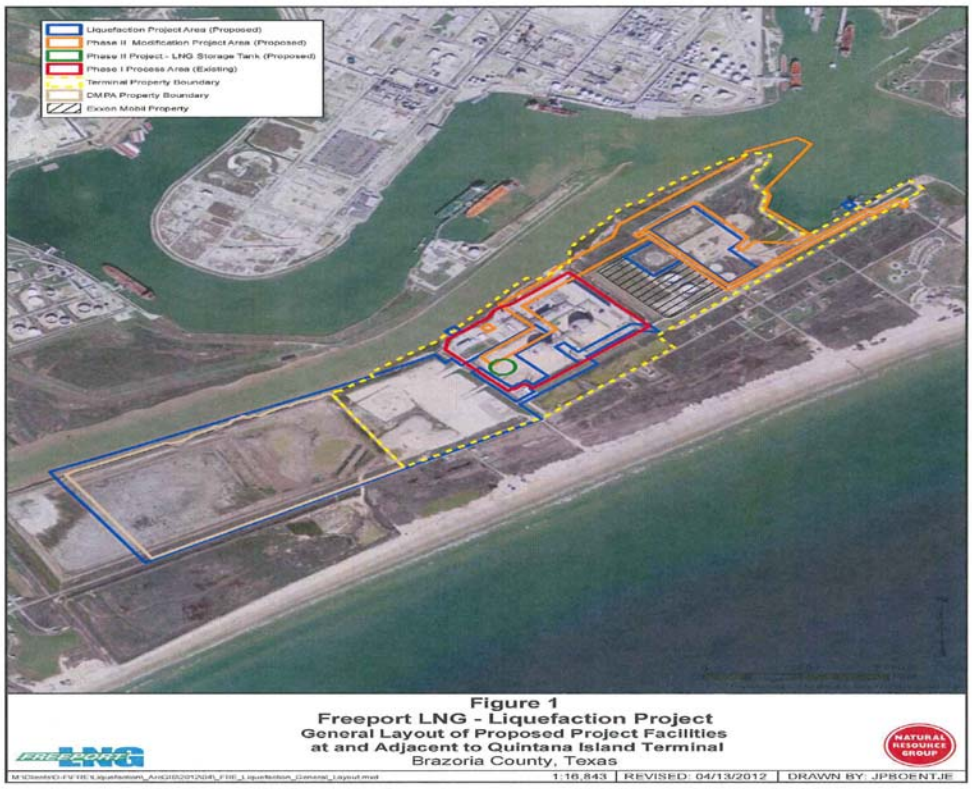


Figure 3-2: General Layout

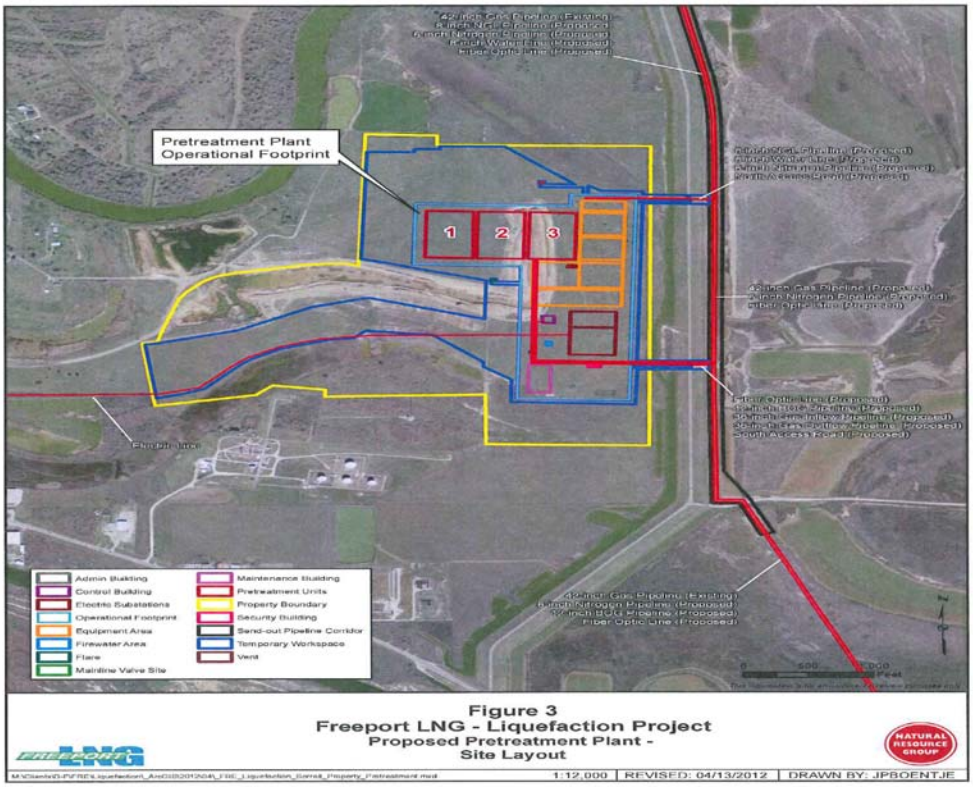


Figure 3-3: Proposed Pretreatment Plant

3.2.2 Discharge History

Table 2-2 summarizes the facility's discharge history.

Table 2-2: Oil Discharge History*

Description of Discharge	Corrective Actions Taken	Plan for Preventing Recurrence
N/A		

*At time of plan development, there have been no reportable discharges related to construction of Facility.

PART 4.0: DISCHARGE PREVENTION – GENERAL PROVISIONS

The following measures are implemented to minimize potential for oil discharges during the handling, use, or transfer of oil products at the facility. All oil-handling personnel receive training in the proper implementation of these measures.

4.1 Compliance with Applicable Requirements
(40 CFR 112.7(a)(2))

Non-destructive integrity evaluation is not performed on the 500-gallon portable storage tank with secondary containment pan or the 55-gallon storage drums. Tank is elevated off the ground. The tank is inspected regularly and following a regular schedule in accordance with the Steel Tank Institute (STI) SP-001 tank inspection standard as described in this Plan. Any leakage from the primary container would be detected through monitoring of the secondary containment pan performed on a weekly basis. Any leakage from the secondary containment would be detected visually during scheduled visual inspections by facility personnel.

Storage drums are elevated on spill pallets and have all sides visible, and any leak would be readily detected by facility personnel before they can cause a discharge to navigable waters or adjoining shorelines. Corrosion poses minimal risk of failure since drums are single-use and remain on site for a relatively short period of time (less than one year). The drum storage area is inspected monthly. This is in accordance with accepted industry practice for drum storage and provides an effective means of verifying container integrity, as noted by EPA in the preamble to the SPCC rule at 67 FR 47120.

4.2 Facility Layout Diagram
(40 CFR 112.7(a)(3))

Appendix A contains a facility diagram to represent topographical information as well as the general arrangement.

Figure A-1 in Appendix A shows the general location of the facility on a U.S. Geological Survey topographic map. Figure A-2 in Appendix A presents a layout of the facility and the location of storage tanks and drums. The diagram also shows the location of storm water drainage and the direction of surface water runoff. As required under 40 CFR 112.7(a)(3), the facility diagram indicates the location and content of petroleum storage containers.

4.3 Discharge Reporting and Notification
(40 CFR 112.7(a)(4))

All discharge incidents and response shall be thoroughly documented using appropriate incident reporting form. CONTRACTOR shall immediately notify FLNG site personnel and FLNG Environmental Services of any oil spill that may occur.

A **Minor Incident** shall be defined as a release of oil to land in a quantity less than 25 gallons.

A **Major Incident** shall be defined as a release of oil in a quantity of 25 gallons or greater and/or a release of oil that reaches waters of the United States is determined to "cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines." (40 CFR 110.3(b)).

All Major Incidents shall immediately reported to Owner upon discovery or occurrence as well as an incident of any quantity that involves property damage as a result of fluid spills.

Major Incidents may require notification to regulatory agencies. Such external notifications shall be coordinated through the Owner and will be performed by appropriate FLNG on-site supervisory personnel. Applicable State and Federal Notification Contacts are provided in Table 3-1.

Table 4-1: Spill Notification Contacts

Project Owner
FLNG Site Contact
Michael Johns – Phone TBD

State
Texas Department of Environmental Quality
Houston Regional Office
5425 Polk St., Ste. H
Houston TX 77023-1452
Spill Reporting
(800) 832-8224 Phone
(713) 767-3799 FAX
Director: Ashley Wadrick

Federal
National Response Center: 1-800-424-8802 (notifying the NRC does not constitute notice to the state)
U.S. Fish and Wildlife: 1-804-693-6694

Additionally, when a discharge and/or subsequent discharges meet the following criteria, the incident must also be reported to the EPA Region 6 - Regional Administrator (RA):

- More than 1,000 U.S. gallons of oil in a single discharge to navigable waters or adjoining shorelines
- More than 42 U.S. gallons of oil in each of two discharges to navigable waters or adjoining shorelines occurring within any twelve-month period

When determining the applicability of this SPCC reporting requirement, the gallon amount(s) specified (either 1,000 or 42) refers to the amount of oil that actually reaches navigable waters or adjoining shorelines, not the total amount of oil spilled. EPA Region 6 – RA contact information has been provided in Table 3-2.

Table 4-2 EPA Region 3 Contact Information

EPA Region 6 Main Office: 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202 800-887-6063 Email: r6public@epa.gov

4.4 Potential Discharge Volumes and Direction of Flow **(40 CFR 112.7(b))**

Table 3-3 presents expected volume, discharge rate, general direction of flow in the event of equipment failure, and means of secondary containment for different parts of the facility where oil is stored, used, or handled.

Table 4-3: Potential Discharge Volumes and Direction of Flow

Source	Product	Capacity (Gallons)	Cause & Rate of Discharge (gallon/min)	Estimated Direction of Flow	Containment and Spill Control Feature
Lube / Fuel Truck	Diesel / Lubricants	1142	Tank Failure – Instantaneous	Toward Offsite Sinkholes to the SW	Passive Spill Response - Secondary Containment w/ 110% minimum containment when parked / Active Spill Response Equipment - Sorbents
Steel Tank	Gasoline	500	Tank Failure – Instantaneous		Passive Spill Response - Secondary Containment w/ 110% minimum containment
55 gallon Drum	Various	55 gallon	Tank Failure – Instantaneous	Toward Offsite Sinkholes to the SW	Passive Spill Response - Secondary Containment w/ 110% minimum containment / Active Spill Response Equipment - Sorbents
Drilling Rig	Hydraulic Oil	166 gallons	Hydraulic Line Rupture	Dependant on work location	Active Spill Response Equipment – Sorbents

4.5 Containment and Diversionary Structures
(40 CFR 112.7(c))

Methods of secondary containment include a combination of structures (e.g., dike, berm, built-in secondary containment), drainage systems (e.g., oil/water separator), and land-based spill response (e.g., drain covers, sorbents) to prevent oil from reaching navigable waters and adjoining shorelines.

4.5.1 For Bulk Storage Containers

- **Spill Pans** The 500-gallon portable storage tank (AST#1) has a secondary steel pan designed to contain a minimum of 110 percent of the tanks capacity. The portable tank is located in the equipment maintenance area. It is used to refuel various small pieces of equipment such as trucks and compressors that may be deployed at different areas on the site.

- **Spill Pallets.** Where appropriate for drum or other containers, spill pallets with a minimum capacity of 110 percent of all drums stored on pallet may be used. Pallets shall either be stored under cover or tarped, if possible, to minimize rainwater accumulation.

- **Diked Area. C**ontractors may establish a drum storage area for petroleum contaminated materials. Storage area has been designed with secondary containment sized to accommodate up to 8 – 55 gallons drums while still meeting the 110% secondary containment requirements associated with the Isopod Plan and permit.

4.5.2 For Lube / Fuel Truck Parking Area

- **Rollover Berm.** Overnight and long term parking of Lube/Fuel truck will occur only within a rollover berm system used to prevent off site discharge during a release. Berm is sized at a minimum of 110% of entire contents of all truck tanks.

- **Sorbent Materials**. Spill cleanup kits that include absorbent material, booms, and other portable barriers are located near the drummed oil storage area. The spill kits are located within close proximity of the oil product storage and handling areas for rapid deployment should a spill occur. Sorbent materials will also be placed on all construction equipment.

4.5.3 In transfer areas and other parts of the facility where a discharge could occur:

- **Drip Pans.** Fill ports for all ASTs are equipped with drip pans to contain small leaks from the piping/hose connections.

- **Sorbent Materials.** Absorbent materials are located on all mobile construction equipment to allow for rapid deployment should a spill occur. Additionally, there are spill kits strategically placed around project location dependant on proximity to oil transfer and/or storage activities.

- **Drainage system.** The facility surface drainage is engineered to direct oil that may be discharged outside of containment structures such as dikes or berms into stormwater ponds prior to release off site.

4.5.4 Oil Filled Operational Equipment

General Secondary containment will be provided for all oil-filled operational equipment.

- Sorbent Materials – Spill cleanup kits that include absorbent material, booms, and other portable barriers shall be located near oil-filled operational equipment.

4.6 Practicability of Secondary Containment
(40 CFR 112.7(d))

CONTRACTOR has determined that secondary containment is practicable at this facility.

4.7 Inspections, Tests, and Records
(40 CFR 112.7(e))

As required by the SPCC rule, CONTRACTOR performs activities listed in Table 4-4, which summarizes the various types of inspections and tests performed at the facility. Details of the inspections and tests are described later in this section, and in the respective sections that describe different parts of the facility (e.g., Section 4.2.6 for portable aboveground storage containers).

Table 4-4: Summary of Inspection and Test Program

Facility Component	Action	Frequency / Circumstances
Portable Aboveground Containers	Visually inspect outside of container for signs of deterioration and discharges. Container integrity testing is not applicable to portable containers.	Following a regular schedule (monthly, annual, and during regular scheduled inspections) and whenever material repairs are made.
Container support and foundations	Inspect container supports and foundations	Following a regular schedule (monthly, annual, and during regular scheduled inspections) and whenever material repairs are made.
Liquid level sensing devices (overfill)	Test for proper operation.	Monthly – If applicable
Diked area	Inspect for signs of deterioration, discharges, or accumulation of oil inside diked areas. Visually inspect content for presence of oil.	Monthly Prior to draining
Lowermost drain and all outlets of tank truck	Visually inspect.	Prior to filling and departure
All aboveground valves, piping, and appurtenances	Assess general conditions of items, such as flanges, expansion joints, valve glands and bodies, pipeline supports, locking of valves, and metal surfaces .	Monthly

4.7.1 Visual Daily Inspection

CONTRACTOR craft employees walk through facility each working day. Craft employees are trained to provide notification to Spill Response Coordinator if any evidence of spill of potential spill is identified during performance of normal work activities. Visual inspections are not documented unless a spill or release incident is discovered as part of it.

4.7.2 Weekly Inspection

CONTRACTOR personnel perform monthly inspections of all petroleum storage containers to address the following:

- Exterior of aboveground storage tanks, pipes, and other equipment for signs of deterioration, leaks, corrosion, and thinning.
- Exterior of portable containers for signs of deterioration or leaks.
- Tank foundations and supports for signs of instability or excessive settlement.
- Tank fill and discharge pipes for signs of poor connection that could cause a discharge, and tank vent for obstructions and proper operation.
- Verifying the proper functioning of overfill prevention systems.
- Checking the inventory of discharge response equipment and restocking as needed.

All problems regarding tanks, piping, containment, or response equipment must immediately be reported to the Spill Response Coordinator. Visible oil leaks from tank walls, piping, or other components must be repaired as soon as possible to prevent a larger spill or a discharge to navigable waters or adjoining shorelines. Pooled oil is removed immediately upon discovery.

Written monthly inspection records are signed by the Spill Response Coordinator and maintained with this SPCC Plan for a period of three years.

4.7.3 Annual Inspection

Facility personnel in conjunction with Spill Response Coordinator perform a more thorough inspection of facility equipment on an annual basis. This annual inspection complements the monthly inspection described above and is performed in March of each year using the checklist provided in Appendix C of this Plan.

The annual inspection is preferably performed after a large storm event in order to verify the imperviousness and/or proper functioning of drainage control systems such as the dike, rollover berm, control valves, and any other controls that may have been installed.

Written annual inspection records are signed by the Spill Response Coordinator and maintained with this SPCC Plan for a period of three years.

Any oil-filled operational equipment, waste or used oil, fuel, or hydraulic fluid containers, and piping problems discovered shall be immediately reported to the Spill Response Coordinator. Equipment oil spills (leaks) that cause a loss of oil from tank walls, piping or other components are repaired or replaced as soon as possible to prevent the potential for a major spill from the source. This is especially important for sources located outside or near drains or catch basins that discharge to the environment.

4.8 Periodic Integrity Testing

All containers expected to be on site will be mobile / portable type and therefore formal integrity testing shall not required to be performed and are stored to that all sides are exposed.

4.9 Personnel Training, and Discharge Prevention Procedures (40 CFR 112.7(f))

The Spill Response Coordinator is the facility designee and is responsible for oil discharge prevention, control, and response preparedness activities at this facility.

CONTRACTOR management shall instruct all oil-handling facility personnel in the operation and maintenance of oil pollution prevention equipment, discharge procedure protocols, applicable pollution control laws, rules and regulations, general facility operations, and the content of this SPCC Plan. Any new personnel with oil-handling responsibilities shall be provided with training prior to performance of any oil-handling activities.

Annual discharge prevention briefings shall be held by the Spill Response Coordinator or his/her appointee for all facility personnel involved in oil operations. The briefings are aimed at ensuring continued understanding and adherence to the discharge prevention procedures presented in the SPCC Plan. The briefings also highlight and describe known discharge events or failures, malfunctioning components, and recently implemented precautionary measures and best practices. Facility operators and other personnel will have the opportunity during the briefings to share recommendations concerning health, safety, and environmental issues encountered during facility operations.

Records of the briefings and discharge prevention training are documented and maintained with this SPCC Plan for a period of three years.

4.10 Security

(40 CFR 112.7(g))

Access to the site shall be restricted by security fencing.

Any drain valves for containment areas will be locked in the closed position to prevent unauthorized opening.

Portable lighting shall be available on site to allow for the discovery of discharges and to deter acts of vandalism.

Where applicable to system, electrical starter controls for the oil pumps, including the fuel dispenser, will be locked when the pumps are not in use.

The facility securely caps or blank-flanges the loading/unloading connections of facility piping when not in service or when in standby service for an extended period of time.

4.11 Facility Tank Truck Loading/Unloading

(40 CFR 112.7(h))

EPA defines “loading/unloading rack” as systems with racks that service tank car and tank trucks, and do not apply to “areas” in which loading or unloading of oil occurs without the use of a rack. By definition, there is no area that qualifies as a loading/unloading rack however, the following measures are implemented to prevent oil discharges during tank truck loading and unloading operations.

4.11.1 Secondary Containment (40 CFR 112.7(h)(1))

Fuel/Lube truck shall be parked on site while potentially full / partially full during overnight/weekend hours. In such cases, when parked for extended period of time, it shall be parked inside the roll over containment berm. The berm shall provide sufficient containment capacity for a minimum 110% of entire truck volume, plus any other containers which may also be stored in the berm.

4.11.2 Transfer Procedures (40 CFR 112.7(h)(2) and (3))

All suppliers shall meet the minimum requirements and regulations for tank truck loading/unloading established by the U.S. Department of Transportation. CONTRACTOR shall ensures that the vendor understands the site layout, knows the protocol for entering the facility and unloading product, and has the necessary equipment to respond to a discharge from the vehicle or fuel delivery hose.

The CONTRACTOR Equipment Superintendent or his/her designee shall escort all oil deliveries vehicles, and perform all vehicle filling operations from supplier vehicle to

CONTRACTOR construction equipment. Personnel performing vehicle filling operations shall be trained in proper discharge prevention procedures. The truck driver and CONTRACTOR personnel shall remain with the vehicle at all times while fuel is being transferred.

Transfer operations shall be performed according to the minimum procedures outlined in Table 4-5.

Table 4-5: Transfer Procedures

Prior to Loading / Unloading	☐	Visually check all hoses for leaks and wet spots.
	☐	Verify that sufficient volume (ullage) is available in the storage tank or truck.
	☐	Lock in the closed position all drainage valves of the secondary containment structure.
	☐	Secure the tank vehicle with wheel chocks and interlocks.
	☐	Ensure that the vehicle's parking brakes are set.
	☐	Verify proper alignment of valves and proper functioning of the pumping system.
	☐	If filling a tank truck, inspect the lowermost drain and all outlets.
	☐	Establish adequate bonding/grounding prior to connecting to the fuel transfer point.
	☐	Turn off cell phone.
	☐	Driver must stay with the vehicle at all times during loading/unloading activities.
	☐	Periodically inspect all systems, hoses and connections.
	☐	When loading, keep internal and external valves on the receiving tank open along with the pressure relief valves.
During Loading / Unloading	☐	When making a connection, shut off the vehicle engine.
	☐	Maintain communication with the pumping and receiving stations.
	☐	Monitor the liquid level in the receiving tank to prevent overflow.
	☐	Monitor flow meters to determine rate of flow.
	☐	When topping off the tank, reduce flow rate to prevent overflow.
	☐	Make sure the transfer operation is completed.
	☐	Close all tank and loading valves before disconnecting.
	☐	Securely close all vehicles internal, external, and dome cover valves before disconnecting.
	☐	Secure all hatches. Disconnect grounding/bonding wires.
After Loading / Unloading	☐	Make sure the hoses are drained to remove the remaining oil before moving them away from the connection. Use a drip pan.
	☐	Cap the end of the hose and other connecting devices before moving them to prevent uncontrolled leakage.
	☐	Remove wheel chocks and interlocks.
	☐	Inspect the lowermost drain and all outlets on tank truck prior to departure. If necessary, tighten, adjust, or replace caps, valves, or other equipment to prevent oil leaking while in transit.

4.12 Brittle Fracture Evaluation
(40 CFR 112.7(i))

If a field-constructed aboveground container undergoes a repair, alteration, reconstruction, or a change in service that might affect the risk of a discharge or failure due to brittle fracture or other catastrophe, or has discharged oil or failed due to brittle fracture failure or other catastrophe, CONTRACTOR shall evaluate the container for risk of discharge or failure due to brittle fracture or other catastrophe, and as necessary, take appropriate action.

However, it is anticipated that all containers to be utilized on site shall be shop built containers and so this section of the rule is not expected to be applicable to this Facility.

4.13 Conformance with State and Local Applicable Requirements (40 CFR 112.7(j))

CONTRACTOR, as the General Contractor, involved with site disturbing activities have implemented storm water pollution control measures identified in the facility construction Storm Water Pollution Prevention Plan.

PART 5.0: DISCHARGE PREVENTION – SPCC PROVISIONS FOR ONSHORE FACILITIES

5.1 Facility Drainage
(40 CFR 112.8(b))

Project drainage is generally toward the Intracoastal Waterway with surface water draining to the north and west.

5.2 Bulk Storage Containers
(40 CFR 112.8(c))

Table 5-1 summarizes the construction, volume, and content of bulk storage containers at facility.

Table 5-1: Tank Summary

Tank	Location	Type (Construction Standard)	Capacity	Content	Discharge Prevention & Containment
AST-1	Mechanic Area	Steel	500	Gasoline	Steel Secondary Containment Pan / Spill Kit
V-1	Mechanic Area / Varies	Vehicle	1,142	Misc. Lubricants / Diesel / Gasoline	Drip Pans / Spill Kit
	Mechanic Area	Steel Drums	55	Motor Oil and Used Oil	Spill Pallets or Roll Up Berm / Spill Kit
	Russo Waste Storage Area	Steel Drums	8 drums X 55 gal/drum	Oil / Oil contaminated materials	Diked Area / Spill Kit

5.2.1 Construction (40 CFR 112.8(c)(1))

All containers used at this facility shall be designed so they are compatible with the characteristics of the product they contain, as well as expected operational temperatures and pressures.

5.2.2 Secondary Containment (40 CFR 112.8(c)(2))

Roll Up Berm is placed in mechanic area to allow for parking of lube/fuel truck during periods of non use. Additionally, drums may be placed in the bermed area as well. Capacity for roll up berm has been determined to be a minimum of 110% capacity of truck and any other drums placed in the area.

No more than 8 – 55 gallons drums will be stored on site at

5.2.3 Drainage of Diked Areas (40 CFR 112.8(c)(3))

The secondary containment areas are drained under direct supervision of Spill Response Coordinator. Prior to release, CONTRACTOR Spill Response Coordinator will observe accumulated water for signs of oil prior to draining. Secondary Containment drainage events are recorded on the form included in Appendix D of this Plan; records are maintained at the facility for at least three years.

5.2.4 Corrosion Protection (40 CFR 112.8(c)(4))

There are no tanks in contact with soil to be located on site, therefore corrosion protection requirements is not applicable to this facility.

5.2.5 Partially Buried and Bunkered Storage Tanks (40 CFR 112.8(c)(5))

There are no partially buried or bunkered storage tanks to be installed on site, therefore this section is not applicable to this facility.

5.2.6 Inspections and Tests (40 CFR 112.8(c)(6))

Visual inspections of ASTs by facility personnel are performed according to the procedure described in this SPCC Plan. Leaks from tank seams, gaskets, rivets, and bolts are promptly corrected. Records of inspections and tests are signed by the inspector and kept at the facility for at least three years.

The scope and schedule of certified inspections and tests performed on the facility's ASTs are specified in STI Standard SP-001. The external inspection includes ultrasonic testing of the shell, as specified in the standard, or if recommended by the certified tank inspector to assess the integrity of the tank for continued oil storage.

Records of certified tank inspections are kept at the facility for at least three years. Shell test comparison records are retained for the life of the tanks.

Table 5-2 summarizes inspections and tests performed on bulk storage containers ("EE" indicates that an environmentally equivalent measure is implemented in place of the inspection/test, as discussed in Section 4.1 of this Plan)

Table 5-2: Inspection Schedule

	Tank ID							
Inspection/ Test	AST-1	V-1	Misc Drum					
Inspection by facility personnel (as per checklist in Appendix C)	M A	N/A	M A					
External Inspector by certified inspector (as per STI Standard SP-001)	EE	N/A	EE					
Tank tightness test meeting requirements of 40 CFR 280	EE	N/A	EE					

Legend:
W: Weekly
A: Annual
EE: Inspection not required given use of environmentally equivalent measure (refer to Section 4.1 of this Plan).

5.2.7 Heating Coils (40 CFR 112.8(c)(7))

This section is not applicable to this facility.

5.2.8 Overfill Prevention Systems (40 CFR 112.8(c)(8))

This section is not applicable to this facility as container types are considered portable.

Facility personnel are present throughout the filling operations to monitor the product level in the tanks.

5.2.9 Effluent Treatment Facilities (40 CFR 112.8(c)(9))

This section is not applicable to this facility.

5.2.10 Visible Discharges (40 CFR 112.8(c)(10))

Visible discharges from any container or appurtenance – including seams, gaskets, piping, pumps, valves, rivets, and bolts – are quickly corrected upon discovery.

Oil is promptly removed from the diked area and disposed of.

5.2.11 Mobile and Portable Containers (40 CFR 112.8(c)(11))

Small portable oil storage containers, such as 55-gallon drums, are stored inside drum storage area where secondary containment is provided by spill pallets and/or perimeter curbing to prevent release. Any discharged material shall be immediately contained and cleaned up using sorbent pads and appropriate cleaning products.

5.3 Transfer Operations, Pumping, and In-Plant Processes (40 CFR 112.8(d))

TANK AND TRUCK DISPENSING

Spill prevention measures that are to be implemented include procedures and personnel training that address the following:

- Personnel that handle and dispense product will be trained in the requirements of this Plan and practices for preventing spills.
- Personnel that handle and dispense product will monitor equipment and the ground in areas of fuel dispensing activities for leaks and spills in their day to day work activities. Immediate action will be taken to report spill conditions, stop leaks, and cleanup ground contamination.
- An attendant will be present at all times during equipment fueling and fuel delivery activities.
- Procedures and practices contained in this Plan will be followed to prevent and cleanup spills
- Equipment drivers will inspect undercarriage for evidence of leaks daily.
- A detailed inspection of the site and equipment will be made weekly for spills. Results will be documented.

DRUM DISPENSING

In the event petroleum products are dispensed from 55 gallon drums, the follow spill prevention measures will be followed:

- Bungs and lids will be kept tightly sealed when material is not being removed.
- The drum will be stored in the upright position when not in use to prevent leakage from bungs and lids.
- Material residues will be cleaned from the drum surfaces to prevent washing by rain.

- Hand pump hoses will be hooked to the pump head after used to prevent drips from getting on the ground and to prevent siphoning which could occur if the hose end is left below the level of liquid in the drum.
- Drip pans will be used under drum spouts if drums are tilted to dispense products.

FUEL AND LUBRICANT DISPENSING

- Make sure all engines and cell phones are turned off before refueling vehicles.
- Care will be taken not to spill product during transfer of the fill nozzle from its hook position to insertion into a fuel tank fill spout. This is achieved by delaying removal of the nozzle from a fuel tank fill spout for a few seconds after fueling is completed, and by holding and moving the nozzle in the vertical position all the way to its replacement in the storage hook position.
- The tank pump will be turned on only after the fuel nozzle is inserted into the equipment tank fill spout, and turned off before the nozzle is removed.
- The tank attendant will keep his/her hand on the fuel nozzle at all times during fueling operations and monitors fuel level in the equipment tank to assure overfill does not occur.
- Equipment fuel tanks will not be filled to full capacity (i.e., fuel level never reaches the neck of the fill spout).
- Fuel pump electrical disconnects/switches will be locked in the off position when fueling operations are not in progress. Similarly, air valves that power pneumatic-driven pumps are locked in the closed position, when fueling operations are not in progress.
- Fuel outlet valves will be locked in the closed position when fueling operations are not in progress.

BULK FUEL DELIVERY

- Make sure all engines and cell phones are turned off before dispensing fuel.
- Before fuel is transferred into the site storage tank, the fuel tank attendant will “strap” the tank and determine that adequate volume is available to accommodate the volume to be delivered and that overfilling the tank will not occur. The attendant must allow a 100 gallon air space for each 1000 gallons of tank capacity for liquid expansion and buffer against overfilling. The level of liquid in the tank that allows for this space requirement can be determined from tank “strapping” charts.
- The tank attendant is present and actively monitors fuel delivery at all times during this activity. The attendant will have constant visual and voice communication with the delivery truck driver.
- Brakes will be set on the delivery truck.

- Transfer hoses will be disconnected and removed only after they have been drained into the receiving tank or back into the delivery truck. Buckets will be used to catch any product that may spill from hose connections and joints when hoses are disconnected and reeled for storage.
- Visual inspection of the underside of the truck for leaks is made before the truck is allowed to depart.

USED OIL TRANSFER

- An attendant will be present at all times when oil is being transferred into or out of the Used Oil Tank.

- The Used Oil Tank will have sized secondary containment.

PART 6.0: SPILL RESPONSE AND COUNTERMEASURES

This section describes the response and cleanup procedures in the event of an oil discharge. The uncontrolled discharge of oil to groundwater, surface water, or soil is prohibited by state and possibly federal laws. Immediate action must be taken to control, contain, and recover discharged product.

In general, the following steps are taken:

- Eliminate potential spark sources;
- If possible and safe to do so, identify and shut down source of the discharge to stop the flow;
- Contain the discharge with sorbents, berms, fences, trenches, sandbags, or other material;
- **Contact the Spill Response Coordinator or appropriate alternate;**
- Contact regulatory authorities and the response organization; and
- Collect and dispose of recovered products according to regulation.

For the purpose of establishing appropriate response procedures, this SPCC Plan classifies discharges as either "minor" or "major," depending on the volume and characteristics of the material released.

A list of Emergency Contacts is provided in Appendix H.

6.1 Documenting and Reporting Spills

Spills to the Ground: In the event that this facility discharges more than 25 gallons of petroleum product to soil or other pervious surfaces, notification to the Texas Department of Environmental Quality is required.

Spills to Navigable Waters: Spills to Waters of the U.S. (Rivers, Drainage Ditches, Etc. regulated by local, state and federal agencies must be reported the National Response Center (NRC), and Texas Department of Environmental Protection if a sheen is detected on the water or if oil residue is detected on shorelines as a result of the spill.

Excessive Spill History: In addition, recent revisions to EPA's SPCC regulations require facilities that discharge more than 1,000 gallons of petroleum product in a single discharge or more than 42 gallons of oil in each of two discharges during any 12-month period to provide information required in 40 CFR 112.4 (a).

Spills to the Ground: In the event that this facility discharges more than 25 gallons of petroleum product to soil or other pervious surfaces, notification to the Texas Department of Environmental Quality is required.

Spills to Jurisdictional Waters: Spills to Waters of the U.S. (Rivers, Drainage Ditches, Etc. regulated by local, state and federal agencies must be reported the National Response Center (NRC), and Texas Department of Environmental Quality if a sheen is detected on the water or if oil residue is detected on shorelines as a result of the spill

All spills should be documented. Blank forms for recording spills is contained in APPENDIX I. Complete the forms and place in this appendix for safekeeping.

6.2 Spills-In-Progress

Individuals who discover a leak or discharge in progress should take immediate action to stop the discharge by closing valves, shutting down pumps or by taking other reasonable and prudent action, AS LONG AS PERSONAL SAFETY AND HEALTH IS NOT JEOPARDIZED.

If site personnel cannot SAFELY contain or control the spill, notification should be made immediately to the Project Manager, Persons Identified in this Plan for Spill Prevention or highest ranking person, if the Project Manager or Persons Identified in this Plan for Spill Prevention are not available.

The Spill Response Coordinator will assess the situation, direct response action. If necessary, a local emergency response agency (fire department or local emergency response commission) or Emergency Response Contractor, who is qualified and has resources to contain and control the released product, will be called for assistance. The Spill Response Coordinator will make all formal notifications to facility Owner and as directed by Owner the state and federal agencies. Contact telephone numbers for emergency response personnel are contained in Appendix H.

6.3 Stagnant Spills

A stagnant spill (a spill area which does not have material continuing to be released) will be immediately reported to the Spill Response Coordinator, assess the conditions, and coordinate immediate cleanup and remediation using site personnel or an approved contractor as may be appropriate.

6.4 Remediation and Waste Disposal

Contaminated soil and waste cleanup material associated with petroleum spill incidents will be excavated, stockpiled so as to be protected from rain leaching and erosion, and disposed of in a manner acceptable by the Texas Department of Environmental Quality.

Excavation will continue until soil tests or other contamination detection methods indicate successful removal of contamination to background levels or levels acceptable to the applicable agency. Over-excavation of the spill area to a degree that assures removal of all contaminated soil will be performed. Spills on land that do not exceed 25

gallons are remediated to extent practical, terminating excavation when all visual signs of contamination have been removed.

All materials used in the cleanup process will be disposed in accordance with applicable agency requirements.

Wastes resulting from a minor discharge response will be containerized in impervious bags, drums, or buckets. The facility manager will characterize the waste for proper disposal and ensure that it is removed from the facility by a licensed waste hauler within two weeks. Wastes resulting from a major discharge response will be removed and disposed of by a cleanup contractor.

6.5 Discharge Notification

Any size discharge (i.e., one that creates a sheen, emulsion, or sludge) that affects or threatens to affect navigable waters or adjoining shorelines must be reported immediately to the National Response Center (1-800-424-8802). The Center is staffed 24 hours a day. A summary sheet is included in Appendix I to facilitate reporting.

Contact information for reporting a discharge to the appropriate authorities is listed in Appendix H.

In addition to the above reporting, 40 CFR 112.4 requires that information be submitted to the United States Environmental Protection Agency (EPA) Regional Administrator and the Texas Department of Environmental Quality (see contact information in Appendix H) whenever the facility discharges (as defined in 40 CFR 112.1(b)) *more than 1,000 gallons of oil in a single event,* or discharges (as defined in 40 CFR 112.1(b)) *more than 42 gallons of oil in each of two discharge incidents within a 12-month period.* The information must be submitted to the EPA Regional Administrator and to VADEQ within 60 days.

A standard report for submitting the information to the regulators is included in Appendix I of this Plan.

6.6 Cleanup Contractors and Equipment Suppliers

Contact information for specialized spill response and cleanup contractors are provided in Appendix H. Emergency Response Contractors have the necessary equipment to respond to a discharge of oil that may affect nearby waterways, including floating booms and oil skimmers.

Spill kits are located at the unloading area and inside the administration building. The inventory of response supplies and equipment is provided in Appendix J of this Plan. Additional supplies and equipment may be ordered from the following sources.

APPENDIX A

FACILITY DIAGRAM

APPENDIX B

SUBSTANTIAL HARM DETERMINATION

SUBSTANTIAL HARM CRITERIA CHECKLIST

(40 CFR 112.20 (e))

CERTIFICATION OF THE APPLICABILITY

This Certification is applicable to petroleum storage on all CONTRACTOR Industrial, Inc. power and industrial projects. CONTRACTOR Industrial, Inc. utilizes portable fuel and petroleum product storage tanks up to a maximum size of 15,000 gallons per tank on its construction sites. Product in the tanks is used to fuel and service construction equipment and to meet general construction needs. At no time will CONTRACTOR construction operations transfer oil over water or meet/exceed quantities specified in the questions below requiring additional regulatory compliance requirements. In most cases, the quantity of product stored on CONTRACTOR Construction Projects will be in the 100 to 30,000 gallon range.

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?
Yes ____ No _X_

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?
Yes ____ No _X_

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?
Yes ____ No _X_

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance such that a discharge from the facility would shut down a public drinking water intake?
Yes ____ No _X_

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?
Yes ____ No _X_

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

John Brawner
Name (please type or print)
Environmental Support Manager
Title

_____
Signature

_____
Date

APPENDIX C

FACILITY INSPECTION CHECKLISTS

ZACHRY

MONTHLY FACILITY INSPECTION CHECKLIST

Date: _____ Time: _____ Inspector: _____	X=Satisfactory NA=Not Applicable 0=Repair or Adjustment Required C=See comment under Remarks/Recommendations

ASTs _____ Tank surfaces checked for signs of leakage. _____ Tank condition good (no rusting, corrosion, pitting). _____ Bolts, rivets, or seams are not damaged. _____ Tank foundation intact and free of rust. _____ Level gauges and alarms working properly. _____ No leakage of fuel into interstitial space of double wall tank. _____ Vents are not obstructed. _____ Valves, flanges, and gaskets are free from leaks. _____ Containment walls are intact.	**Truck Loading/Unloading Area** _____ No standing water on fueling slab. _____ Warning signs posted. _____ No leaks in hoses. _____ Drip pans have been drained into appropriate storage container. _____ Containment curbing intact. _____ Hoses are inside containment areas. _____ Connections are capped or blank flanged.
Pipelines _____ No signs of corrosion damage to pipelines or supports. _____ Out-of-service pipes capped. _____ Signs/barriers to protect pipelines from vehicles are in place. _____ No leaks at valves, flanges, or other fitting.	**Drainage** _____ No standing water in containment area. _____ Containment area drainage valves or plugs are closed and locked. _____ No visible oil sheen in containment area. _____ No visible oil staining on ground surface. _____ Discharges of stormwater from containment have been documented and filed.
Security _____ ASTs locked when not in use. _____ Starter controls for pumps locked when not in use. _____ Lighting is working properly.	**Training** _____ Spill prevention briefing held. _____ Training and inspection records are in order.

Remarks/Recommendations: _____

_____

_____

_____

_____

SPCC Plan

ANNUAL AST INSPECTION REPORT

Date _____ Inspected By_____

Location_____ Liquid Level_____

Tank No._____ Temp._____

Capacity_____ Diameter_____ Height_____

1. Drainage
   a. Perform walk around inspection to ensure proper drainage around tanks. Is there any evidence of settling or puddling of water?_____

2. Hoses & Piping
   a. General appearance of hoses_____
   b. Any leaks?_____ If so, explain_____
   c. Aboveground piping free of leaks?_____

3. Corrosion Control
   a. Note general appearance of paint on shell and structural members:_____
   _____
   b. Is rusting or pitting occurring on any of the above?_____
   If yes, explain where and if repairs are needed immediately._____
   _____
   c. Are all flange washers and sleeves in place?_____
   If missing, cracked, or broken, explain where and repairs needed:
   _____
   d. Are all ground and/or anode straps in place?
   If missing or damaged, indicate location on drawing and explain repairs needed:
   _____

4. Tank Supports and Foundations
   a. Is there any damage or deterioration of tank supports from vehicles, misuse or corrosion?_____
   If yes, explain where and if repairs are needed immediately._____
   _____
   b. Are there any signs of settling, cracking, pitting or spalling on the tank foundations?_____
   If yes, explain where and if repairs are needed immediately._____
   _____
   c. Is there any distortion or cracking of anchor bolts?_____
   If yes, explain where and if repairs are needed immediately._____
   _____

5. Vents and Emergency Vents
   a. Are o-rings/gaskets of vents and emergency vents damaged or deteriorated?
   If yes, explain where and if repairs are needed immediately._____
   _____

6. Are high-level alarms functioning properly?_____ Tested to verify?_____

SPCC Plan

APPENDIX D

RECORD OF SECONDARY CONTAINMENT DRAINAGE

Record of Secondary Containment Drainage

Project:			
Inspected By:	Date:		
Description of Containment:			
Location:			
1. Has water accumulated in the containment area been visually or analytically evaluated for the presence of pollutants? If no, proceed with evaluation before going to #2.		Yes	No
2. Based on visual / analytical (circle one) data collected from water accumulated in the containment area, it has been evaluated as being free of / containing (circle one) pollutants that, if discharged, might pollute waters of the United States.		Yes	No
3. Water accumulated in the containment area has been removed by a). Gravity flow through a valve b). Pumping (circle one) and discharged to the surrounding environment / containers for disposal at an appropriate facility.		Yes	No
Comments:			
Signature:	Time:		

SPCC Plan

APPENDIX E

RECORD OF OIL TRAINING AND DISCHARGE PREVENTION BRIEFINGS

DISCHARGE PREVENTION BRIEFING

Instructor: _____ **Date:** _____

Topics of Discussion: At a minimum, train your oil-handling personnel in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the facility SPCC Plan

Name	Signature

Annual Discharge Prevention Briefing

Instructor: _____ **Date:** _____

Topics of Discussion: In addition to initial training, Schedule and conduct discharge prevention briefings for your oil-handling personnel at least once a year to assure adequate understanding of the SPCC Plan for that facility. Such briefings must highlight and describe known discharges as described in or failures, malfunctioning components, and any recently developed precautionary measures.

Name	Signature

SPCC Plan

APPENDIX F

CALCULATION OF SECONDARY CONTAINMENT CAPACITY

SPCC Plan

APPENDIX G

RECORDS OF TANK INTEGRITY AND PRESSURE TESTS

THIS SECTION NOT APPLICABLE TO THIS PLAN

APPENDIX H

EMERGENCY CONTACTS

EMERGENCY CONTACTS

SPILL RESPONSE COORDINATOR

Tom Tucker – Project HSE Manager

Office ..... TBD

24-hour Contact ..... (254) 896-4002

FACILITY CONTACTS

Michael Johns – Director, Government Affairs

Contact ..... (979) 415-8720

LOCAL CONTACTS

Police 911

Fire Department 911

Hospital ..... TBD

REGULATORY CONTACTS

Texas GLO Hotline ..... (800) 832-8224

National Response Center ..... (800) 424-8802

Environmental Protection Agency Region 6 Office ..... (800) 887 -6063

EMERGENCY RESPONSE CONTRACTOR

Eagle-SWS 877.742.4215

APPENDIX I

DISCHARGE REPORTING AND NOTIFICATION FORMS

MINOR DISCHARGE REPORTING FORM

MINOR DISCHARGE REPORTING FORM

INCIDENT NO.	DATE/ TIME	INCIDENT DESCRIPTION
		Incident Cause: _____ Product Spilled and Quantity: _____ Location of Spill on Project Site (Mark site drawing with Incident Number): Date Cleanup Completed: _____ Contaminated Soil Quantity: _____ cubic yards. Disposal Contractor: _____ Project Cleanup Coordinator: _____
		Incident Cause: _____ Product Spilled and Quantity: _____ Location of Spill on Project Site (Mark site drawing with Incident Number): Date Cleanup Completed: _____ Contaminated Soil Quantity: _____ cubic yards. Disposal Contractor: _____ Project Cleanup Coordinator: _____
		Incident Cause: _____ Product Spilled and Quantity: _____ Location of Spill on Project Site (Mark site drawing with Incident Number): Date Cleanup Completed: _____ Contaminated Soil Quantity: _____ cubic yards.

MINOR DISCHARGE REPORTING FORM

		Disposal Contractor: _____ Project Cleanup Coordinator: _____
		Incident Cause: _____ Product Spilled and Quantity: _____ Location of Spill on Project Site (Mark site drawing with Incident Number): Date Cleanup Completed: _____ Contaminated Soil Quantity: cubic yards. Disposal Contractor: _____ Project Cleanup Coordinator: _____

MAJOR DISCHARGE REPORT FORM

Information contained in this report, and any supporting documentation, must be submitted to the EPA Region 3 Regional Administrator, and to Texas DEQ within 60 days of the qualifying discharge incident(s).

Facility:	
Owner / Operator:	
Name of Person Filing Report:	
Location:	
Maximum Storage Capacity:	
Daily Throughput:	
Nature of Qualifying Incident(s) :	
Description of Facility (attach maps, flow diagrams, and topographic maps):	
Cause of discharge(s), including a failure analysis of the system and subsystems in which failure occurred:	

Corrective actions and countermeasures taken, including a description of equipment repairs and replacements:
Additional Preventive measures taken or contemplated to minimize potential of reoccurrence:
Other pertinent information:

APPENDIX J

DISCHARGE RESPONSE EQUIPMENT INVENTORY

APPENDIX K

CROSS REFERENCE

SPCC PLAN CROSS REFERENCE

SPCC Rule	Description of Section	Page
§ 112.7	General requirements for SPCC Plans for all facilities and all oil types.	iii, 3-2
§ 112.7(a)	General requirements; discussion of facility's conformance with rule requirements; deviations from Plan requirements; facility characteristics that must be described in the Plan; spill reporting information in the Plan; emergency procedures.	3-2
§ 112.7(b)	Fault analysis.	4-3
§ 112.7(c)	Secondary containment.	4-6
§ 112.7(d)	Contingency planning.	4-6, 4-7
§ 112.7(e)	Inspections, tests, and records.	4-7 thru 4-10
§ 112.7(f)	Employee training and discharge prevention procedures.	4-10
§ 112.7(g)	Security (excluding oil production facilities).	4-11
§ 112.7(h)	Loading/unloading (excluding offshore facilities).	4-11
§ 112.7(i)	Brittle fracture evaluation requirements.	4-14
§ 112.7(j)	Conformance with state requirements.	4-15
§ 112.8 § 112.12	Requirements for onshore facilities (excluding production facilities).	5-1
§ 112.8(a) § 112.12(a)	General and specific requirements.	5-1
§ 112.8(b) § 112.12(b)	Facility drainage.	5-1
§ 112.8(c) § 112.12(c)	Bulk storage containers.	5-1
§ 112.8(d) § 112.12(d)	Facility transfer operations, pumping, and facility process.	5-2
§ 112.9 § 112.13	Requirements for onshore production facilities.	N/A

§ 112.9(a) § 112.13(a)	General and specific requirements.	N/A
§ 112.9(b) § 112.13(b)	Oil production facility drainage.	N/A
§ 112.9(c) § 112.13(c)	Oil production facility bulk storage containers.	N/A
§ 112.9(d) § 112.13(d)	Facility transfer operations, oil production facility.	N/A
§ 112.10 § 112.14	Requirements for onshore oil drilling and workover facilities.	N/A
§ 112.10(a) § 112.14(a)	General and specific requirements.	N/A
§ 112.10(b) § 112.14(b)	Mobile facilities.	N/A
§ 112.10(c) § 112.14(c)	Secondary containment - catchment basins or diversion structures.	N/A
§ 112.10(d) § 112.14(d)	Blowout prevention (BOP).	N/A
§ 112.11 § 112.15	Requirements for offshore oil drilling, production, or workover facilities.	N/A
§ 112.11(a) § 112.15(a)	General and specific requirements.	N/A
§ 112.11(b) § 112.15(b)	Facility drainage.	N/A
§ 112.11(c) § 112.15(c)	Sump systems.	N/A
§ 112.11(d) § 112.15(d)	Discharge prevention systems for separators and treaters.	N/A
§ 112.11(e) § 112.15(e)	Atmospheric storage or surge containers; alarms.	N/A
§ 112.11(f) § 112.15(f)	Pressure containers; alarm systems.	N/A
§ 112.11(g) § 112.15(g)	Corrosion protection.	N/A
§ 112.11(h) § 112.15(h)	Pollution prevention system procedures.	N/A

§ 112.11(i) § 112.15(i)	Pollution prevention systems; testing and inspection.	N/A
§ 112.11(j) § 112.15(j)	Surface and subsurface well shut-in valves and devices.	N/A
§ 112.11(k) § 112.15(k)	Blowout prevention.	N/A
§ 112.11(l) § 112.15(l)	Manifolds.	N/A
§ 112.11(m) § 112.15(m)	Flowlines, pressure sensing devices.	N/A
§ 112.11(n) § 112.15(n)	Piping; corrosion protection.	N/A
§ 112.11(o) § 112.15(o)	Sub-marine piping; environmental stresses.	N/A
§ 112.11(p) § 112.15(p)	Inspections of sub-marine piping.	N/A

* Only selected excerpts of relevant rule text are determined applicable to this facility. For a complete list of SPCC requirements, refer to the full text of 40 CFR part 112.

APPENDIX L

SPILL RESPONSE PROCEDURES

SPILL RESPONSE PROCEDURES

MAJOR SPILL EVENT

Assess the hazards of the situation and take action to protect lives and property.

Take action to stop the spill from spreading offsite and cleanup contaminated soil only if safety of employees can be maintained.

Contact the Spill Response Coordinator. Spill Response Coordinator must contact the FLNG environmental counterpart.

If the spill leaves or threatens to leave the project site or cause safety problems for the general public, call for assistance from the emergency response company listed below:

Eagle-SWS

24-Hour Emergency Response: 877.742.4215
E-Mail: info@eaglesws.com

Eagle is set up with affiliate companies to respond to spills anywhere in the U.S. They are a preferred supplier with which ZII has made an agreement to provide services.

If the spill leaves the site, exceeds 25 gallon on land or enters a waterway, the Texas General Land Office Hotline and National Response Center must be contacted. Spill Response Coordinator must coordinate with FLNG prior to notifying outside agencies.

Spills on land must be reported within 24 hours. Texas State Warning Point and National Response Center contact information is provided below:

General Land Office Hotline ..... (800) 832-8224
National Response Center ..... (800) 424-8802

If notification is required, contact an environmental representative of CONTRACTOR Environmental Services per the attached contact list to advise of the situation and to obtain additional guidance. 24 hour contact information is attached.

Environmental Services will notify appropriate CONTRACTOR corporate level management to provide details of the incident and action taken.

Spill Response Coordinator must complete a written report of all details of the incident using the appropriate Discharge Reporting and Notification Form.

Clean up spilled material until complete removal can be confirmed according to the Texas Risk Reduction Program guidelines. Environmental Services will assist with cleanup guidance.

MINOR SPILL EVENT

Spilled material and contaminated soil from spills that meet the "25 gallon or less and water systems not impacted" criteria should be cleaned up until all visual indications have been eliminated. Contaminated soil resulting from the spill should be completely removed.

Document the spill, action taken and cleanup details including volume of waste produced and where material is disposed of.

CONTRACTOR Environmental Services
Contact List

Contact individuals shown on the list below in the order shown to obtain guidance on "Reportable Quantities" and whether or not a spill must be reported to a government agency.

Information or Items needed before making the call areas follows:

1) **Material Safety Sheet on chemical spilled.**
2) **Estimated number of gallons of chemical spilled.**

NAME	WORK NUMBER	EVENING/WEEKEND NUMBER
John Brawner	(210) 588-5172	(512) 828-2832
David Turner	(210) 475-8285	(210) 478-0623

APPENDIX M

AGENCY NOTIFICATION STANDARD REPORT

FREEPORT LNG

LIQUEFACTION PROJECT

APPENDIX 2-D

HDD Monitoring and Contingency Plan (Draft)

Freeport LNG

Liquefaction Project

HDD Monitoring and Contingency Plan

DRAFT

Prepared By

June 2012

TABLE OF CONTENTS

Section **Page**

1.0 PURPOSE AND NEED

Freeport LNG proposes to use the Horizontal Directional Drilling (HDD) method to install pipe across multiple waterbodies and wetlands as part of its Liquefaction Project (Project). Although the HDD method generally avoids or minimizes the environmental impacts on resources, the potential for impacts from an inadvertent release of drilling mud associated with this crossing technique still exists.

The purpose of this document is to establish procedures for addressing potential impacts associated with inadvertent releases or "frac-outs" of drilling mud during the HDD process. In addition, this document establishes the criteria by which Freeport LNG will determine when a proposed HDD is unsuccessful and must be abandoned.

2.0 DRILLING BASICS

The HDD method is a technically advanced process involving specialized equipment and skilled operators. The primary environmental risk associated with this crossing method comes from the potential for inadvertent release of drilling mud. The selection and supervision of the drilling contractor will be the responsibility of Freeport LNG.

Minimal, consistent loss of drilling mud typically occurs during the drilling process when layers of loose sand, gravel, or fractured rock are encountered and drilling mud fills voids in the material. However, a significant loss of returning drilling mud and a concomitant reduction in drilling pressure indicates that seepage is occurring outside of the hole.

3.0 DRILLING MUD AND DRILLING MUD SYSTEM

The directional drilling process uses drilling mud consisting primarily of water and bentonite, a naturally occurring clay. Drilling mud removes the cuttings from the borehole, stabilizes the walls of the borehole and acts as a coolant and lubricant to the drill bit during the drilling process. The drilling mud mixture consists of 1 to 5 percent bentonite clay and from 0 to 40 percent inert solids from the borehole cuttings, with the remainder being water.

The drilling mud is prepared in the mixing tank using both new and clean recycled drilling mud. The mud is pumped at rates of 200 gallons per minute (gpm) to 1,000 gpm through the center of the drill pipe to the drilling tools. Return flow is through the annulus created between the wall of the drilled hole and the drill pipe. During pilot hole drilling, the cuttings are returned to a small excavation at the entry point called the entry pit. From the entry pit, the returned mud is pumped to the mud processing equipment. Typically, shaker screens, desanders, desilters and centrifuges process and remove increasingly finer cuttings from the drilling mud. The cleaned mud is recycled to the mixing tank for reuse in the borehole. The cuttings removed by the cleaning process are disposed of at a site approved to accept this type of material.

4.0 DRILLING MUD RELEASE

4.1 Prevention

HDD is a pipeline installation method typically used to avoid congested areas and/or disturbance of sensitive surface features, including waterbodies and wetlands. HDD does, however, present a remote potential for surface disturbance through inadvertent drilling mud releases. Drilling mud releases are typically caused by blockage of the return flow path around the drill pipe where pressurization of the drilling mud rises above the containment capability of the overburden soil material. Pressurized drilling mud follows the path of least resistance, which may result in the drilling mud flowing to the ground surface should the annulus around the drill pipe become plugged. Releases may follow fractures in bedrock or other voids in the strata that allow the mud to surface.

4.1.1 Suitable Material and Adequate Overburden

Prevention of drilling mud seepage is a major consideration in determining the profile of the HDD crossing. The primary factors in selecting the pipeline crossing profile include the type of soil and rock in the geological material and the depth of cover material. Cohesive soils, such as clays, dense sands and competent rock are considered ideal materials for horizontal drilling. The depth of adequate overburden is also considered. A minimum depth of cover of 25 feet in competent soils is required to provide a margin of safety against drilling mud seepage.

The areas that present the highest potential for drilling mud seepage are the drill entry and exit points where the overburden depth is minimal. At both the entry and exit points, above ground containment pits can be constructed with berms to collect and provide temporary storage for the inadvertently released drilling mud or seepage until it can be pumped back into the drilling system.

4.1.2 Pipeline Geometry

The geometry of the pipeline profile can slightly affect the potential for drilling mud seepage. In a profile that forces the pipe to make compound or excessively tight radius turns, key-seating of the drill pipe may develop, blocking the return flow to surface, allowing downhole pressures to build up, thereby increasing the potential for drilling mud seepage. The profiles for Freeport LNG's pipeline crossings minimize this potential, with a smooth, deep-seated trajectories affording maximum cover.

4.1.3 Responsibility of Drilling Contractor

The drilling contractor is responsible for execution of the HDD, including actions for detecting and controlling drilling mud seepage. Freeport LNG will closely supervise the progress and actions of the drilling contractor.

4.2 Detection and Monitoring Procedures

To determine if an advertent release has occurred, HDD activities will be monitored constantly on this project, either by the Contractor, Construction Inspector, Environmental Inspector (EI), or any combination of the three. Monitoring procedures and associated activities will include:

- Inspection along the drill path;
- Continuous examination of drilling mud pressure gauges and return flows to the surface pits;
- Monitoring of drilling status information regarding drilling conditions and drill profile alignments;
- If a release occurs in a wetland or waterbody:
  - containment of the drilling mud where practicable;
  - continued inspection to determine any potential for movement of released drilling mud within the wetland or waterbody;
  - collection of drilling mud returns at the location for future analysis, as required; and
  - photographic documentation and other documentation of the release by the EI (Freeport LNG will keep photographs of release events on record).

.

5.0 NOTIFICATION PROCEDURES

If monitoring indicates a release is occurring or has occurred, the Contractor will begin containment immediately while the Construction Inspector or EI will notify Freeport LNG's construction management personnel immediately.

Freeport LNG will notify the appropriate agencies immediately upon discovery of an inadvertent wetland or waterbody release, detailing the location and nature of the release, corrective actions being taken, and whether the release poses any threat to public health and safety.

6.0 CORRECTIVE ACTION

The greatest potential for drilling mud seepage is during drill entry and exit, where the overburden is reduced for entry and exit of drilling tools at the low approach angle. Drilling mud seepage containment is incorporated into contingency planning for the pipeline crossings. The proposed entry or exit locations are generally located in upland areas where drilling mud seepage can be readily detected and contained. To isolate and contain potential drilling mud seepage, an aboveground containment pit will be constructed between the entrance and exit points and the feature boundary. Straw bales or silt fencing may also be used to further reinforce the berm.

The Contractor will have equipment and materials available on site to contain and control drilling mud seepage in upland areas. Such equipment and materials will include hand tools, backhoes or small bulldozers, lumber for temporary shoring, portable pumps, sand bags, straw bales, and silt fencing.

Freeport LNG will address an inadvertent release immediately upon discovery. The following measures will be implemented to minimize or prevent further release, contain the release, and clean up the affected area:

Upland Release:

- The Contractor will determine and implement any modifications to the drilling technique or composition of drilling mud (e.g., thickening of mud by increasing bentonite content, temporary lowering of the downhole pressures) to minimize or prevent further releases of drilling mud.
- Freeport LNG will oversee the placement of containment structures at the affected area to prevent migration of the release.
- If the amount of the release is large enough to allow collection, the drilling mud will be collected and returned to either the drilling operations or a disposal site by hose or tanker.
- If the amount of the release is not large enough to allow collection, the released drilling mud will be swept, shoveled, or mixed with sand and temporarily left in place to dry. Steps will be taken to prevent drilling mud or silt-laden water from flowing into a wetland or waterbody.
- If public health and safety are threatened by an inadvertent release, drilling operations will be shut down until the threat is eliminated.

Waterbody or Wetland Release:

- If a release occurs within a waterbody or wetland, Freeport LNG will inform the appropriate agency as soon as possible whether or not the release can be corrected without incurring additional environmental impact. If necessary, drilling operations will be reduced or suspended to assess the extent of the release and to implement corrective actions.
- If the release is a single-point release, accessible with a hose and truck, the Contractor will attempt to 'cap' the release, if possible, by placing a section of pipe over the release to contain the mud within the pipe section. With a larger release, the Contractor may attempt to place a water-filled bladder around the release in order to isolate it from the waterbody or wetland prior to removal. After the release is contained, the mud will be pumped into trucks and reused or disposed of at an appropriate facility.
- If public health and safety are threatened, drilling mud circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- If monitoring indicates that the intake water quality at downstream user locations is impacted to the extent that it is no longer suitable for treatment, alternative water sources (i.e., trucked or bottled water) will be provided to impacted users.
- Freeport LNG will assist agencies with any sampling they may require.

Uncontrollable Release:

- If an inadvertent release of drilling mud exceeds that which can be contained and controlled either because of volume or rate, HDD activities will cease. An evaluation of the probable cause of the release and the stage of the drill will be done. Based on the evaluation, the measures described in the following paragraphs will be implemented.

  Depending on the current stage of the installation, the HDD contractor may choose to plug the hole near the fracture with heavyweight material (i.e., sawdust, nut shells, bentonite pellets, or other commercially available non-toxic product). If the inadvertent release of drilling mud occurs while drilling the pilot hole, the HDD contractor may choose to back out of the hole by a predetermined distance and then create a new hole by drilling out of the original hole. Therefore, Procedures 1 or 2 listed below could occur in either order.

  1. Plug the fissures/fracture.

     a) Pump sealers such as sawdust, nutshells, bentonite pellets, or other commercially available non-toxic products into the drill hole;
     b) Let set for an appropriate period of time (dependent upon sealant used); and
     c) Resume HDD activities.

  2. If a fissure/fracture cannot be plugged, then, if practical:

     a) Remove drill pipe from the existing drill hole to a point where a new drill path can be attempted by drilling out of the existing hole and creating a new hole. The original hole will be abandoned and filled with bentonite and cuttings. The cuttings that are returned to the hole should only be equal to those removed from the hole. The return should not be under high pressure and therefore additional releases would not be anticipated.
     b) Resume HDD activities.

  3. If the original drill path cannot be utilized:

     a) Abandon the original drill hole by pumping bentonite and cuttings downhole, then seal the top 5 vertical feet with grout. Grouting abandoned drill holes is an industry standard practice and serves to prevent the abandoned hole from disrupting groundwater flow.
     b) Move the drill rig to a new, adjacent location.
     c) Verify that the new, adjacent location meets the requirements of all applicable project permits and approvals. If the new, adjacent location does not meet the requirements of all applicable project

permits and approvals, operations will cease until new permits and approvals are received.

d) Design an alternative alignment for the redrill.

e) Begin HDD redrill activities.

- If all HDD attempts fail, then the crossing will be constructed using an alternative method after all necessary permits and approvals have been received. Failure is defined in Section 7.0.

7.0 DEFINITION OF HDD FAILURE AND ABANDONMENT CRITERIA

Freeport LNG considers the failure criteria described below as sufficient reason to abandon the HDD process and install the crossing using an approved alternative method.

Pilot Hole Step Failure

- The HDD installation method will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Hole Opening Step Failure

- The HDD installation method will be considered a failure if there is one unsuccessful attempt at opening the hole to the required diameter, as long as the failure does not include losing parts of the hole opening tool, or loss of the entire hole opening tool downhole. The HDD contractor will then be allowed 7 working days to attempt to retrieve the missing tool or parts from the hole and continue the hole opening process. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Pullback Step Failure

- The HDD installation method will be considered a failure if there is one unsuccessful attempt at completing the pullback, unless the pipe can be removed from the hole. In the latter case, a second attempt will be made after the hole has been reopened and reconditioned with any necessary hole opening passes as determined jointly by the HDD contractor and Freeport LNG. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Mechanical Breakdown Failure

- The HDD installation method will be considered a failure if, at any point during the HDD, the HDD contractor has a major mechanical breakdown and after either repairing or replacing the broken drilling rig or vital ancillary equipment, the drill

pipe, hole opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

8.0 FREEPORT LNG/AGENCY APPROVAL FOR HDD ABANDONMENT

Freeport LNG will provide on-site inspection during the HDD process to keep adequate documentation, daily progress reports, as-built information, etc., and will describe the events leading up to the HDD failure. Freeport LNG will submit this documentation to the appropriate agencies notifying them of the HDD failure and Freeport LNG's schedule for implementing the approved alternate crossing method as described in Section 9.0. The HDD contractor will not demobilize until Freeport LNG's approval has been received. The alternative crossing method will not be implemented until Freeport LNG has received confirmation that the FERC and U.S. Army Corps of Engineers (COE) have received the documentation of HDD failure.

9.0 HDD CONTINGENCY

If HDD failure occurs, Freeport LNG will construct the proposed pipeline facilities across both wetland/waterbody complexes using the open cut trenching method that is described in Freeport LNG's project-specific Wetland and Waterbody Construction and Mitigation Procedures and is the approved method for crossings outside of the designated HDD areas. Push-pull/float installation will be used where hydrological conditions and sufficient pipeline length make this approach feasible.

Freeport LNG will ensure that has obtained the necessary authorizations from the appropriate federal (FERC/COE) and state agencies (Railroad Commission of Texas) prior to the implementation of any alternative crossing methods.

FREEPORT LNG

LIQUEFACTION PROJECT

APPENDIX 2-E

Agency Correspondence

APPENDIX 2-E

AGENCY CORRESPONDENCE

U.S. Army Corps of Engineers (COE). Preliminary Jurisdictional Determination Letter dated August 9, 2012 from C. Cutler (Chief, Policy Analysis Section) to P. Bell (Natural Resource Group, LLC)

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON TX 77553-1229

REPLY TO
ATTENTION OF:

AUG 0 9 2012

Policy Analysis Section

SUBJECT: SWG-2003-02110; Preliminary Determination Jurisdictional, Freeport LNG Pretreatment Site, Sorrell Property, in Brazoria County, Texas

Peter G. Bell, Ph.D.
Senior Project Manager
Natural Resource Group, LLC
520 Post Oak Boulevard, Suite 575
Houston, Texas 77027

Dear Dr. Bell:

Enclosed is a preliminary jurisdictional determination (JD) for an approximate 241-acre tract identified as the Freeport LNG Liquefraction Pretreatment Sorrell Property. The pretreatment facility Sorrell site is located along the west side of County Road 690 (Levee Road) and north of Farm-to-Market 332, in Brazoria County, Texas.

Approximately 58.4 acres of non-tidal emergent wetlands and 6.6 acres of waters of the United States (U.S.) were identified under normal circumstances on this tract. Based on the review of the information associated with this request, we have determined that the enclosed map is a reasonable depiction of the approximate size and locations of the aquatic resources on the site. Computation of impacts made on the basis of this preliminary JD will treat all waters and wetlands that would be affected in any way by any activity on the site as if they are jurisdictional waters of the U.S. As such, these aquatic resources are subject to Section 404 of the Clean Water Act (CWA). If you wish, you may request an approved JD (which may be appealed), by submitting a written request to us within 30 days from the date of this letter. Please note that if you request an approved JD and then decide to appeal it, the appeal will not be accepted if any work has started in waters of the U.S. or that would alter the hydrology of waters of the U.S.

This determination has been conducted to identify the limits of the Corps CWA jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are U.S. Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This preliminary JD is valid for 5 years from the date of this letter, unless new information warrants a revision prior to the expiration date. An approved JD can be requested at any time. If you have any questions concerning this matter, please reference File Number SWG-2003-02110 and contact Mr. Dwayne Johnson at 409-766-6353.

Sincerely,

Casey Cutler
Chief, Policy Analysis Section

Enclosures

JUL 25 2012

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Galveston District | File/ORM #: SWG-2003-02110 | PJD Date: 8-2-12

State: TX | City/County: Brazoria County

Nearest Waterbody: Horseshoe Lake and Oyster Creek

Location: TRS, LatLong or UTM: 28.59'04"N, 95.18'40"W
28.59'16"N, 95.18'06"W

Name/ Address of Person Requesting PJD: Peter G. Bell, Ph.D.
Natural Resource Group, LLC
520 Post Oak Boulevard, Houston, TX 77027.
Agent for: Freeport LNG Development, L.P.,
1500 Lamar Street, Quintana, TX 77541.
Attn. Mike Johns, Director, Regulatory Affairs

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 4,565 linear ft | var width | 6.66 acres | Stream Flow: N/A

Wetlands: 58.40 acre(s) | Cowardin Class: Palustrine, emergent

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: N/A | Non-Tidal: N/A

☐ Office (Desk) Determination
☑ Field Determination: Date of Field Trip: b/w 3/22/12 & 5/25/12

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Figures 1 - 10
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☑ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: Oyster Creek 28095-H3 1977
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: SSURGO Database (Figure 3 - Soil Survey Map)
- ☑ National wetlands inventory map(s). Cite name: www.fws.gov/wetlands/ (Figure 4 - NWI Map)
- ☐ State/Local wetland inventory map(s):
- ☑ FEMA/FIRM maps: Figure 7 - FEMA Map
- ☑ 100-year Floodplain Elevation is: Approximately 5 feet above mean sea level
- ☑ Photographs: ☑ Aerial (Name & Date): Figures 4, 5, and 6
  - ☑ Other (Name & Date): Wetland Delineation Photos March/April/May 2012
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

8-02-12
Signature and Date of Regulatory Project Manager (REQUIRED)

07/25/12
Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

JUL 25 2012

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office: Galveston District | File/ORM #: | PJD Date:

State: TX | City/County: Brazoria County | Person Requesting PJD: Peter G. Bell, Ph.D.

Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
Attached					

Notes:

See attached "Appendix A - Sites" spreadsheet and "Figure 4 - Sorrell Property - Survey Area Field Delineated Wetlands and Waterbodies Map" for aquatic resource information

List of Supporting Material Enclosed:

U.S. Geological Survey Hydrologic Atlas: (Source: http://nhdgeo.usgs.gov/Metadata/NHDStatus.htm)
USGS NHD data: Figure 10 - USGS NHD Data Map
USGS 8 and 12 digit HUC maps: Figure 8 - USGS 8 Digit HUC Map (HUC8-12040205)
Figure 9 - USGS 12 Digit HUC Map (HUC12-120402050400)

U.S. Geological Survey map: Figure 1 - USGS Topo Map (Oyster Creek)

USDA Natural Resources Conservation Service Soil Survey: Figure 3 - Soil Survey Map
(Source: http://soils.usda.gov/survey/geography/ssurgo/)
Soil types include: Surfside clay, Pledger clay, Clemville silty clay loam, & Brazoria clay, 0 to 1 percent slopes

National wetlands inventory map: Figure 2 - NWI Map (Source: www.fws.gov/wetlands/)

FEMA/FIRM map: Figure 7 - FEMA Map (https://msc.fema.gov/)

Aerial Photographs: Figure 4 - Aerial Wetland Map - Field Delineated Wetlands and Waterbodies
Figure 5 - Aerial Wetland Map - Field Survey Transects and Points
Figure 6 - Historical Aerial Map - 1995
Other Photographs: Wetland Delineation Site Photographs - 03/23/12, 03/27/12, 03/28/12, 04/05/12, 05/25/12

JUL 25 2012

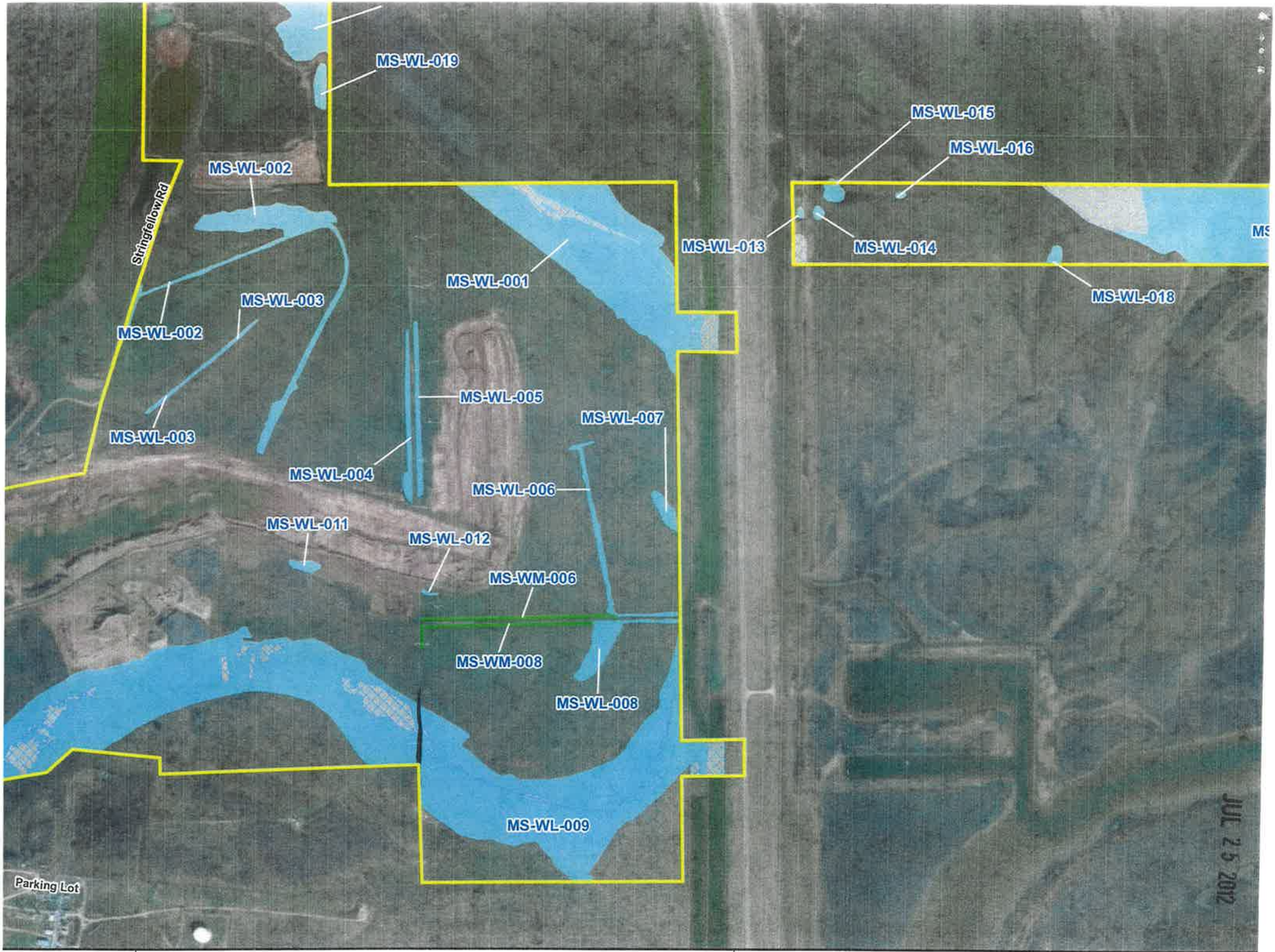
Appendix A - Sites

Site Number	Latitude	Longitude	Cowardin Class	Estimated Amount of Aquatic Resource in Review Area (in acres)	Class of Aquatic Resource
Wetlands					
MS-WL-001	28.59'14"N	95.18'27"W	Palustrine, emergent	9.70	Section 404 Wetland
MS-WL-002	28.59'16"N	95.18'43"W	Palustrine, emergent	2.40	Section 404 Wetland
MS-WL-003	28.59'08"N	95.18'47"W	Palustrine, emergent	0.15	Section 404 Wetland
MS-WL-004	28.59'04"N	95.18'37"W	Palustrine, emergent	0.38	Section 404 Wetland
MS-WL-005	28.59'05"N	95.18'37"W	Palustrine, emergent	0.32	Section 404 Wetland
MS-WL-006	28.58'59"N	95.18'27"W	Palustrine, emergent	0.41	Section 404 Wetland
MS-WL-007	28.59'00"N	95.18'23"W	Palustrine, emergent	0.25	Section 404 Wetland
MS-WL-008	28.58'52"N	95.18'27"W	Palustrine, emergent	0.76	Section 404 Wetland
MS-WL-009	28.58'51"N	95.18'42"W	Palustrine, emergent	29.04	Section 404 Wetland
MS-WL-011	28.58'57"N	95.18'43"W	Palustrine, emergent	0.13	Section 404 Wetland
MS-WL-012	28.58'55"N	95.18'36"W	Palustrine, emergent	0.02	Section 404 Wetland
MS-WL-013	28.59'16"N	95.18'16"W	Estuarine, emergent	0.03	Section 404 Wetland
MS-WL-014	28.59'16"N	95.18'15"W	Palustrine, scrub-shrub	0.05	Section 404 Wetland
MS-WL-015	28.59'17"N	95.18'14"W	Palustrine, emergent	0.19	Section 404 Wetland
MS-WL-016	28.59'17"N	95.18'11"W	Palustrine, scrub-shrub	0.02	Section 404 Wetland
MS-WL-017	28.59'16"N	95.17'52"W	Estuarine, emergent	11.58	Section 404 Wetland
MS-WL-018	28.59'14"N	95.18'03"W	Palustrine, scrub-shrub	0.12	Section 404 Wetland
MS-WL-019	28.59'23"N	95.18'42"W	Palustrine, scrub-shrub	0.24	Section 404 Wetland
MS-WL-020	28.59'27"N	95.18'43"W	Palustrine, emergent	2.48	Section 404 Wetland
MS-WM-006	28.58'54"N	95.18'31"W	Palustrine, emergent	0.04	Section 404 Wetland
MS-WM-008	28.58'54"N	95.18'33"W	Palustrine, emergent	0.09	Section 404 Wetland
WETLAND TOTAL				**58.40**	

JUL 25 2012

Appendix A - Sites

Site Number	Latitude	Longitude	Cowardin Class	Estimated Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
Open Water					
Open Water within MS-WL-001	28.59'13"N	95.18'23"W	Palustrine, open water	0.84 acre/ 1,200 linear feet	Section 404 Open Water
Open Water within MS-WL-009	28.58'49"N	95.18'38"W	Palustrine, open water	2.73 acres/ 2,400 linear feet	Section 404 Open Water
Open Water within MS-WL-017	28.59'16"N	95.17'59"W	Estuarine, open water	2.07 acres/ 380 linear feet	Section 404 Open Water
Western Velasco Ditch	28.58'46"N	95.18'20"W	Palustrine, open water	0.39 acre/ 225 linear feet	Section 404 Open Water
Western Velasco Ditch	28.59'10"N	95.18'21"W	Palustrine, open water	0.38 acre/ 200 linear feet	Section 404 Open Water
Eastern Velasco Ditch	28.59'14"N	95.18'16"W	Estuarine, open water	0.25 acre/ 160 linear feet	Section 404 Open Water
OPEN WATER TOTAL				**6.66 acres/ 4,565 linear feet**	
TOTAL AQUATIC RESOURCES ASSUMED JURISDICTIONAL				**65.06 acres**	


MS-WL-019
MS-WL-015
MS-WL-016
MS-WL-002
Stringfellow Rd
MS-WL-013
MS-WL-014
MS-WL-001
MS-WL-018
MS-WL-003
MS-WL-002
MS-WL-005
MS-WL-007
MS-WL-003
MS-WL-004
MS-WL-006
MS-WL-011
MS-WL-012
MS-WM-006
MS-WM-008
MS-WL-008
MS-WL-009
Parking Lot
JUL 25 2012