OxyChem Fractionation Facility and San Patricio Pipeline Project

Biological Assessment

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June 24, 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

AMS	Advanced Monitoring Systems
ANSI	American National Standards Institute
ANWR	Aransas National Wildlife Refuge
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATWS	Additional Temporary Work Space
AWBNP	Aransas-Wood Buffalo National Park
BA	Biological Assessment
BACT	Best Available Control Technology
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
BPD	Barrels Per Day
BPIP	Building Profile Input Program
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CR	County Road
DCS	Distributed Control System
DDT	Dichlorodiphenyltrichloroethane
DOT	Department of Transportation
EFH	Essential Fish Habitat
EPN	Emission Point Numbers
ESA	Endangered Species Act
ESD	Emergency Shut-down
ESL	Effects Screening Levels
EW	Extinct in the Wild
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
GHG	Greenhouse Gas(es)
GIS	Geographic Information System
GPM	Gallons per Minute
HDD	Horizontal Directional Drill
LAER	Lowest Achievable Emission Rate
LANWR	Laguna Acosta National Wildlife Refuge
Lbs/Hr	Pounds per Hour
Lb/MMBtu	Pound per Million British thermal unit
LEL	Lower Explosive Limit
LPG	Liquefied Petroleum Gases
M&R	Measurement and Regulation
MAOP	Maximum Allowable Operating Pressure
MBTA	Migratory Bird Treaty Act
MG/L	Milligrams per Liter
MHW	Mean High Water
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MMBtu/Hr	Million British thermal units per Hour
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSS	Maintenance, Start-up and Shutdown
MPH	Miles per Hour
NAAQS	National Ambient Air Quality Standards
NDE	Nondestructive Examination
NEPA	National Environmental Policy Act

LIST OF ACRONYMS AND ABBREVIATIONS

(Continued)

NFPA	National Fire Protection Act
NGL	Natural Gas Liquids
NGT	Natural Gasoline Tanks
NMFS	National Marine Fisheries Service
NMFS–HCD	National Marine Fisheries Service Habitat Conservation Division
NMFS–PRD	National Marine Fisheries Service Protected Resource Division
NNSR	Nonattainment New Source Review
NSPS	New Source Performance Standards
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxides
NSR	New Source Review
NWP	Nationwide Permit
OD	Outside Diameter
OxyChem	Occidental Chemical Corporation
PI	Points of Intersection
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in diameter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter
PSD	Prevention of Significant Deterioration
PSIG	Pounds per Square Inch Gauge
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SH	State Highway
SIL	Significant Impact Levels
SIS	Safety Instrumented System
SO_2	Sulfur Dioxide
SPP	San Patricio Pipeline
T&E	Threatened and Endangered
TAC	Texas Administrative Code
TAAQS	Texas Ambient Air Quality Standards
TCEQ	Texas Commission on Environmental Quality
TEG	Triethylene glycol
TXNDD	Texas Natural Diversity Database
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TPY	Tons per Year
$\mu g/m^3$	One Millionth of a Gram per Cubic Meter
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USDA/NRCS	US Department of Agriculture Natural Resources Conservation Service
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
VCM	Vinyl Chloride Monomer
VOC	Volatile Organic Compounds
WMA	Wildlife Management Area
WUS	Waters of the US

Executive Summary

Pursuant to the Federal Clean Air Act (CAA) (42 United States Code [U.S.C.] §§ 7401 et seq.), Occidental Chemical Corporation (OxyChem) is seeking a permit under the United States Environmental Protection Agency's (USEPA) Prevention of Significant Deterioration (PSD) Program to construct and operate: a new natural gas liquids (NGL) fractionation plant (Fractionation Facility), including NGL fractionation facilities, a control building, an electrical switch yard, pipe racks, an on-site ethane connection to a pipeline, two thermal oxidizers, an emergency enclosed ground flare, aboveground non-refrigerated product storage facilities, aboveground contaminated water and water stripping tanks, aboveground chemical tanks, rail siding/rail car loading inclusive of one culverted crossing of a non-jurisdictional man-made drainage ditch, a truck loading facility, and temporary construction staging areas on an approximately 504-acre site, hereafter referred to as the Fractionation Facility Site; modifications to existing barge docks on the adjacent (to the southeast) OxyChem property shoreline to facilitate barge transportation of products, inclusive of extending pipe racks on the docks, retrofitting the docks' loading arms, and installing two monopiles (one at each barge dock), hereafter referred to as the Barge Dock Modifications; and four new pipelines, including one NGL feedstock and three fractionated hydrocarbon product send-out pipelines (Pipeline Facilities), in an approximately 18.5-mile-long, 100-foot-wide (50-foot-wide permanent and 50-foot-wide temporary construction) right-of-way (ROW), hereafter referred to as the San Patricio Pipeline (SPP) Corridor. Taken collectively, these actions and facilities comprise the Proposed Action, which is referred to in this Biological Assessment (BA) as the Project. The Project is located approximately two miles west of the City of Ingleside, San Patricio County, Texas.

The Project is subject to PSD review for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and greenhouse gases (GHGs). The Texas Commission on Environmental Quality (TCEQ) is responsible for issuance of the PSD permit for all pollutants except GHG. The USEPA is responsible for the GHG PSD permit and is the Federal Lead Agency regarding the Proposed Action (Project). As the Federal Lead Agency, USEPA has the regulatory responsibility to ensure that the issuance of the PSD Permit (here, the Proposed Action) complies with the Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531-1544), as amended. Specifically, Section 7 of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any endangered or threatened species or listed species habitat, or result in the destruction or adverse modification of designated critical habitat. Consultation or informal consultation with the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) is required to ensure actions do not adversely affect federally-listed threatened and endangered (T&E) species.

The BA is an analysis of the potential effects the Project might have on federally-listed T&E species and/or their habitat. Protected species evaluated in this document include T&E species promulgated/protected by the USFWS under the ESA, the Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA) and NMFS Protected Resources Division (NMFS-PRD) regarding species protected under the ESA and Marine Mammal Protection Act (MMPA) (NMFS 2013a). NMFS also oversees the protection of Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). A separate report documenting the Project will not affect EFH has been provided to USEPA for coordination with NMFS Habitat Conservation Division (NMFS-HCD).

The BA includes the results of the pedestrian T&E species survey and habitat evaluation in the area identified as the Project Action Area. A Project Action Area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the "action" (50 Code of Federal Regulations [CFR] § 402.02). The Action Area is defined as the areas within the boundaries of the approximately 504.11-acre Fractionation Facility Site (inclusive of Fractionator Facility and Temporary Impact/construction areas), the approximately 226.51-acre SPP Corridor, and the approximately 4.98-acre pipe laydown area. The Action Area also includes an approximately 8.04-acre area within which modifications will be made (adding new pipe racks, extending pipe racks on the barge docks, retrofitting the docks' loading arms, and installing two monopiles, one at each barge dock) to two existing barge docks to accommodate barge transport of Fractionation Facility products. The SPP Corridor is comprised of an 18.5-mile-long 100-foot-wide ROW (50-feet-wide permanent corridor, 50-feet-wide temporary construction corridor) with additional temporary work space (ATWS) of up to approximately 100-feet by 100-feet at crossings and at Horizontal Directional Drill (HDD) and conventional bore locations, ATWS necessary for construction staging areas/pipe yards/any new access roads, and Measurement and Regulation (M&R) Stations (one at the Fractionation Facility Site and three along the SPP Corridor).

The BA also provides an evaluation of potential direct and indirect impacts to federally-listed species from air emissions, water discharge, construction activities, operation and maintenance, construction noise levels, increased barge traffic, and conversion of habitats associated with the Project. Air Quality Modeling for the Fractionation Facility demonstrated that all concentrations of pollutants from the Fractionation Facility are below the Significant Impact Levels (SIL) at ground level at all points along the Fractionation Facility Site boundary; therefore, the Project Action Area at the Fractionation Facility is limited to the boundaries of the Fractionation Facility Site.

This BA is based on the best science available, review of the proposed Project, review of pertinent literature, and pre-application meetings with USFWS and NMFS, along with biological field investigations to determine the presence or absence of suitable habitat for protected species within the Project Action Area. Based on the review of the USFWS (USFWS 2013a), Texas Parks and Wildlife Department's (TPWD 2013b), and NMFS (NMFS 2013b) current lists of T&E species (internet web sites last accessed March 2013), habitat types found in the Project and surrounding area, and the February 2012 meeting with USFWS and NMFS (see Appendix A), specific animal species and plant species, listed as endangered (LE), threatened (LT), or candidate (C) were considered to potentially occur in the Project Action Area.

The federally-listed (endangered, threatened, and candidate) species under the promulgation of USFWS and NMFS-PRD that might occur in the Project Action Area are listed below. Based on the information gathered for this BA, Tetra Tech, Inc. (Tetra Tech), on behalf of OxyChem, recommends the following effect determinations for these listed species.

Common Name	Scientific Name	Federal Status[1]	Determination of Effect
Mammals			
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	LE	May affect, not likely to adversely affect
Ocelot	*Leopardus pardalis*	LE	May affect, not likely to adversely affect
Red wolf	*Canis rufus*	LE	No Effect
West Indian manatee	*Trichechus manatus*	LE	May affect, not likely to adversely affect
Birds			
Northern aplomado falcon	*Falco femoralis septentrionalis*	LE	May affect, not likely to adversely affect
Piping plover	*Charadrius melodus*	LT	May affect, not likely to adversely affect
Whooping crane	*Grus americana*	LE	May affect, not likely to adversely affect
Reptiles			
Green sea turtle	*Chelonia mydas*	LT	May affect, not likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricata*	LE	May affect, not likely to adversely affect
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	May affect, not likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	LE	May affect, not likely to adversely affect
Loggerhead sea turtle	*Caretta caretta*	LT	May affect, not likely to adversely affect
Fish			
Smalltooth sawfish	*Pristis pectinata*	LE	May affect, not likely to adversely affect
Plants			
Slender rush-pea	*Hoffmannseggia tenella*	LE	No Effect
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	No Effect
Mollusks			
Golden Orb	*Quadrula aurea*	C	No Effect

[1] LE = Endangered, LT = Threatened, C = Candidate

In addition, the Project is not anticipated to result in a take of the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos canadensis*). Additionally, the take of migratory birds and marine mammals is not anticipated. Note: The term "take" represents the more specific language of the BGEPA, MBTA, and the MMPA as described in Section 1.3 of this BA.

The conclusion of this BA addresses the Conservation Measures OxyChem will implement during construction/operation/maintenance of the Project to further ensure the Proposed Action does not have direct or indirect effects on federally-listed species or their habitat.

1.0 INTRODUCTION

On May 18, 2012, Occidental Chemical Corporation (OxyChem) submitted a federal Prevention of Significant Deterioration (PSD) permit application to the United States Environmental Protection Agency (USEPA) in accordance with the Clean Air Act (CAA) for authorization to construct, own, and operate a natural gas liquids (NGL) Fractionation Facility and associated transport facilities. Under the CAA, the USEPA is the PSD permitting authority for greenhouse gas (GHG) emitting sources in the state of Texas. PSD permitting requirements apply to new major sources or major modifications at existing major sources for pollutants where the source is located in an attainment or unclassifiable area with regard to the National Ambient Air Quality Standards (NAAQS). A major source with regard to PSD is defined with respect to criteria pollutants as: (1) a source included in the 28 categories listed in 40 Code of Federal Regulations (CFR) §52.21(b)(1) with the potential to emit (PTE) greater than 100 tons per year (TPY), or (2) a source that is not included in the 28 categories with a PTE greater than 250 TPY. A new major source for GHG emissions is a source with a PTE at least 100,000 TPY carbon dioxide equivalent, per 40 CFR § 52.21(b)(49)(v).

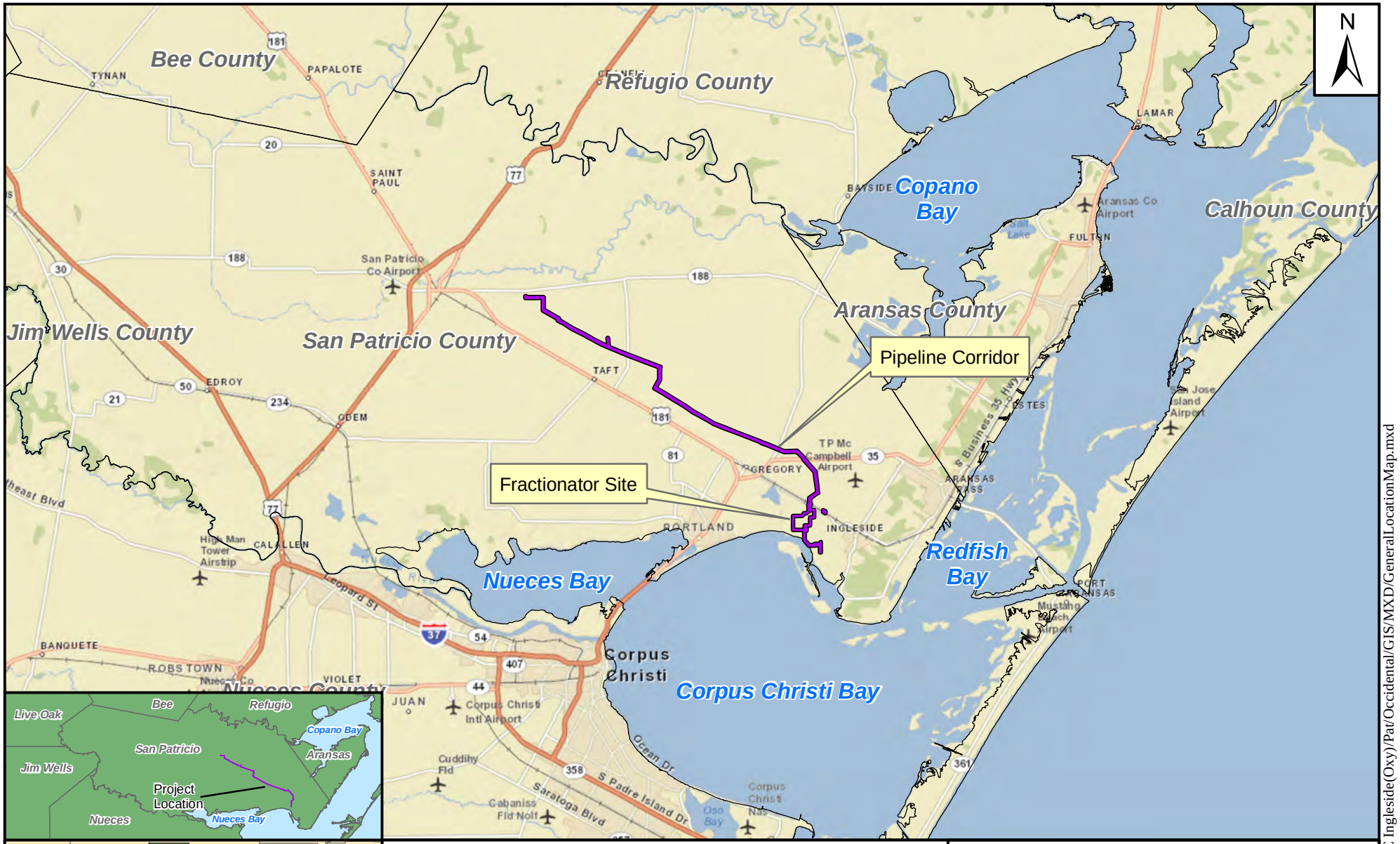
The Project will involve the construction and operation of the following facilities:

- Fractionation Facility: A new NGL fractionation facility, with an associated control building, an electrical switch yard, pipe racks, an on-site ethane connection to a pipeline, two thermal oxidizers, an emergency enclosed ground flare, aboveground non-refrigerated product storage facilities, aboveground contaminated water and water stripping tanks, aboveground chemical tanks, rail siding/rail car loading inclusive of one culverted crossing of a non-jurisdictional man-made drainage ditch, a truck loading facility, and temporary construction staging areas, substantially all within an approximately 504-acre site, referred to as the Fractionation Facility Site;
- Barge Dock Modifications: Modifications to existing barge docks located along the shoreline of the adjacent (to the southeast) OxyChem chemical manufacturing facility by adding new pipe racks, extending pipe racks on the barge docks, retrofitting the docks' loading arms, and installing two monopiles, one at each barge dock; and
- Pipeline Facilities: Four new pipelines, including one NGL feedstock and three fractionated hydrocarbon product send-out pipelines, in an approximately 18.5-mile-long 100-foot-wide (50-foot-wide permanent and 50-foot-wide temporary construction) right-of-way (ROW), referred to as the San Patricio Pipeline (SPP) Corridor.

Taken collectively, (as more fully described in Section 2.0), these facilities are all part of the proposed Project and are potentially relevant in considering the potential impact of the Proposed Action. The new Fractionation Facility will be located within an existing industrial complex owned and operated by OxyChem (hereafter referred to as the OxyChem Facility). Also situated within the OxyChem Facility and near the Project are certain industrial operations owned and operated by E.I. du Pont de Nemours and Company. The OxyChem Facility is located approximately two miles west of the City of Ingleside, in San Patricio County, Texas. The property is bound to the south by the La Quinta Channel which adjoins Corpus Christi Bay; to the north by Sherwin Alumina Company, San Patricio Municipal Water District, and State Highway (SH) 361 (primary access route to site); to the west by Sherwin Alumina Company; and to the east by the existing OxyChem and DuPont Facilities.

The SPP Corridor will begin at the Fractionation Facility Site and generally traverse northwest parallel and northeast of United States (US) Highway 181. The SPP Corridor terminates approximately four miles east of the City of Sinton, Texas, approximately one-quarter of a mile

south of SH 188, and two miles east of US Highway 181 (see Figure 1-1 for location of Project). The SPP Corridor primarily traverses agricultural lands.



Source: World Street Map and County Boundaries from ESRI online mapping services. Available at http://services.arcgisonline.com/arcgis/services

LEGEND

Project Facilities

County Boundary

0 5 10 15 20 Miles

Scale = 1:375,000

Sheet 1 of 1

Figure 1-1. General Location Map for the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/GeneralLocationMap.mxd

1.1 Project Purpose and Need

The primary purpose of the Project is to construct and operate a Fractionation Facility and transport facilities for the creation, storage, and transport of commercial grade ethane, propane, butanes, and natural gasoline. The Fractionation Facility will receive NGLs via one feedstock pipeline and fractionate these liquids into commercial grade ethane, propane, butanes, and natural gasoline. Ethane will be directly transported to market via pipeline. Propane and butane will be temporarily stored on-site in tanks, and transported to market via pipeline, rail, truck, and barge. Natural gasoline will be temporarily stored on-site in tanks, and transported to market via barge.

The need for the Project is based on the volume of new NGL product destined for delivery to Ingleside from the various natural gas shale production areas. The fractionation of these NGLs and the resulting need for additional storage and distribution capabilities necessitates additional receipt, storage, and delivery capabilities. The additional production capacity of natural gas in Texas and surrounding states is resulting in an increase in associated NGL production. The increase of such production can only be accommodated by increased natural gas processing facilities, such as the Project. The location of this Project is ideal because of its close proximity to existing infrastructure in the NGL hub of the US. The Project will provide an incremental source of NGL supply, further diversifying the US supply portfolio, and increasing the nation's domestic capacity to meet future NGL product consumption needs.

1.2 Purpose and Objective of Biological Assessment

The purpose of this Biological Assessment (BA) is to research, evaluate, and document the potential for direct and indirect effects of the Project/USEPA's issuance of the GHG PSD permit on: federally-listed threatened and endangered (T&E) species listed under the Endangered Species Act (ESA); migratory birds protected under the Migratory Bird Treaty Act (MBTA); bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos canadensis*) protected by the Bald and Golden Eagle Protection Act (BGEPA); and marine mammals protected under the Marine Mammal Protection Act (MMPA). This BA includes protected species assessments for those species for which the US Fish and Wildlife Service (USFWS) has jurisdiction as well as the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS).

In addition to those species protected under the ESA, NMFS is promulgated to protect marine mammals listed as T&E or protected under the MMPA. Protected marine mammals were also evaluated in this BA. NMFS Habitat Conservation Division (NMFS-HCD) oversees the protection of Essential Fish Habitat (EFH) as designated per the MSFCMA. A separate report regarding EFH has been provided to USEPA, as requested, for USEPA's coordination with NMFS-HCD.

The objective of this BA is to: analyze the effects of implementation of the Project and Proposed Action on federally-listed T&E species; ensure the Project and Proposed Action do not jeopardize or adversely modify critical habitat for federally-listed T&E species; and recommend voluntary conservation measures, as necessary, for federally-listed T&E species.

1.3 Permits and Regulatory Requirements

The Project is subject to PSD review for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) less than 10

microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and GHG. The Texas Commission on Environmental Quality (TCEQ) is responsible for issuance of the PSD permit for all pollutants except GHG. The USEPA is responsible for the GHG PSD permit and is the Federal Lead Agency for the Project. CAA authorizations are not discretionary and therefore are Categorical Exclusions under the National Environmental Policy Act (NEPA) (Subpart D of 10 CFR 1021). However, USEPA still has the regulatory responsibility to ensure that issuance of the PSD Permit will be in compliance with the ESA, MBTA, BGEPA, MMPA, and MSFCMA. Specifically under Section 7 of the ESA, federal agencies, through consultation, must ensure that any action authorized or carried out by the agency is not likely to jeopardize the continued existence of any T&E species, protected species habitat, or result in the destruction or adverse modification of designated critical habitat. These statutes have been taken into account in preparation of this BA and through prior coordination with the involved regulatory agencies.

In addition to the federal permit requirements and consultations, the Project also is subject to state of Texas agency permitting requirements. The major permits, approvals, and consultations required for the Project are identified in Table 1-1. The remainder of this section provides a discussion regarding the federal permitting requirements, regulatory requirements and consultations necessary for the Project.

1.3.1 Clean Air Act

Through the CAA, USEPA has promulgated NAAQS to protect human health and welfare. The NAAQS include primary standards, which are designed to protect human health, including the health of sensitive subpopulations such as children and those with chronic respiratory problems. The NAAQS also include secondary standards designed to protect public welfare, including economic interests, visibility, vegetation, animal species, and other concerns not related to human health.

NAAQS currently apply to the following criteria pollutants: PM_{10}; $PM_{2.5}$; SO_2; NO_x; CO; and VOC. Each NAAQS is expressed in terms of a concentration level and an associated averaging period.

In addition to the NAAQS, Project emissions and equipment might be subject to various other federal and state air quality regulations. Federal air quality requirements are set forth in 40 CFR Parts 50 through 99.

New Source Review (NSR) requires the owners or operators of stationary sources of air pollution to obtain permits before they start construction. NSR is also referred to as preconstruction permitting. There are three primary NSR permitting programs: two for major source and one for minor sources. A source might have to meet one or more of these permitting requirements depending on its size, in terms of emissions and geographic location.

Table 1-1 Major Permits, Approvals, and Consultations

Agency	Permit/Approval/Consultation
Federal	
US Environmental Protection Agency (USEPA), Region VI	• Clean Air Act (CAA) Green House Gas (GHG) Prevention of Significant Deterioration (PSD) permit for new major sources located in an area designated as attainment or unclassifiable. • Short Form C for Hydrostatic Test Water Discharge Notification.
US Army Corps of Engineers (USACE), Galveston District, Corpus Christi Regulatory Office	• Authorizations to discharge dredged or fill material into waters of the US (WUS) under Section 404 of the Clean Water Act (Nationwide Permit – NWP 25, Structural Discharge). • Coastal Zone Management Act (CZMA) Consistency Determination.
US Department of Interior, US Fish and Wildlife Service (USFWS)	• Consultation regarding compliance with Section 7 of the Endangered Species Act (ESA); the Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA).
US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	• Consultation with NOAA NMFS Protected Resources Division (NMFS-PRD) regarding compliance with Section 7 of the ESA and the Marine Mammal Protection Act (MMPA). • Consultation with NOAA NMFS Habitat Conservation Division (NMFS-HCD) regarding compliance with Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).
Advisory Council on Historic Preservation (ACHP)	• Consultation regarding compliance with Section 106 of the National Historic Preservation Act (NHPA)
State	
Texas Historical Commission (THC)	• Section 106 of the NHPA, Cultural Resources Consultation.
Texas Railroad Commission (TRRC)	• Minor Permit for the discharge of hydrostatic test water.
Texas Commission on Environmental Quality (TCEQ)	• CAA National Ambient Air Quality Standards (NAAQS) PSD permit for new major sources located in an area designated as attainment or unclassifiable. • Modification to Texas Pollutant Discharge Elimination System Permit No. WQ0003083000 (at adjacent OxyChem Facility) to accept discharge of process wastewater from the new Fractionation Facility. • Modification to TPDES Permit No. WQ0001651000 (at DuPont Facility) to accept non-contact stormwater runoff from the new Fractionation Facility.
Texas General Land Office (TGLO)	• If on state-owned submerged lands, a commercial lease per Texas Natural Resource Code (TNRC §33) might be required for the barge docks if not already under lease. If under lease, a modification to the commercial lease might be necessary if the monopiles result in an increase in lease area.
Texas Parks & Wildlife Department (TPWD)	• Consultation and clearance regarding state-listed threatened and endangered (T&E) species.
Texas Department of Transportation (TDOT)	• Road Opening/Access Permit.

PSD permits are required for new major sources or major modifications of existing major sources located in an area designated as attainment or unclassifiable. Nonattainment New Source Review (NNSR) permits are required for new major sources or major modifications to existing major sources located in areas designated as nonattainment. The Project will be located in an area designated as attainment or unclassifiable for all criteria pollutants; therefore, NNSR permitting does not apply to the emissions source to be constructed and operated as part of the Project. However, PSD permitting is required.

The 1977 amendments to the CAA established the PSD program. The PSD program was designed to protect air quality in areas in which existing air quality was better than the NAAQS (i.e., attainment or unclassifiable areas). The program established increases in concentrations of certain pollutants that are allowed to occur above a baseline before significant deterioration of air quality would be determined to have occurred.

PSD applies to new major sources or major modifications at existing major sources for pollutants where the area in which the source is located is in attainment or is unclassifiable with regard to the NAAQS. A major source with regard to PSD is defined as: (1) a source included in the 28 categories listed in 40 CFR §52.21(b)(1) with the PTE greater than 100 TPY, or (2) a source that is not included in the 28 categories with a PTE greater than 250 TPY. Fractionators are not listed in the 28 categories, and therefore, the 250 TPY threshold applies for federal PSD review.

Additionally, on May 13, 2010, the USEPA issued a final rule that establishes an emissions threshold for addressing GHG emissions from stationary sources under the CAA permitting programs. The final rule sets thresholds for GHG emissions that define when a permit under the NSR PSD program is required for new and existing industrial facilities. Beginning July 1, 2011, the PSD permitting requirement covers new construction projects that emit GHG emissions of at least 100,000 TPY, even if they do not exceed the permitting threshold for any other pollutant.

The Fractionation Facility will be constructed at an existing major stationary source. As Project-related emissions of NO_x, CO, PM_{10} and $PM_{2.5}$ will exceed the PSD significant emissions increase threshold, it constitutes a major modification of an existing major stationary source. Further, the Project will emit in excess of 100,000 TPY of CO_2 and therefore will be subject to PSD review for GHGs. In the state of Texas, USEPA is the permitting authority for GHG, whereas TCEQ is the permitting authority for all other criteria pollutants.

1.3.2 Endangered Species Act

The purpose of the ESA (16 United States Code [USC] §§ 1531-1544, 87 Stat. 884) is to protect and recover imperiled species and the ecosystems upon which they depend (USFWS 2011a). USFWS and NMFS-PRD are responsible for administering the ESA. Under the ESA, species might be listed as either threatened or endangered. A “threatened species” is defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An “endangered species” is defined as any species which is in danger of extinction throughout all or a significant portion of its range. The ESA protects T&E species and their habitats by prohibiting the “take” of listed animals. “Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. A “candidate species”, also included in this BA, is identified as a plant or animal species for which the USFWS or NMFS has sufficient information on their biological status and threats to propose them as endangered or threatened under the

Endangered Species Act (ESA), but for which development of a proposed listing regulation has not yet occurred.

1.3.3 Migratory Bird Treaty Act

The MBTA of 1918 (16 USC §§ 703-712) protects migratory bird species through the implementation of various treaties and conventions between the US and Canada, Japan, Mexico, and the former Soviet Union. A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle (MBTA 1918 and as amended). The USFWS is responsible for administering the MBTA (USFWS 2010a). The MBTA makes it unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof" (16 USC § 703(a)). There are currently 1,007 species included on the list of migratory birds that are protected under the MBTA.

1.3.4 Bald and Golden Eagle Protection Act

The BGEPA (16 USC 668-668d, 54 Stat. 250 and as amended) of 1940 protects the bald eagle and golden eagle and is administered by the USFWS (16 USC §§ 1801-1884 and 668-668c). The BGEPA makes it unlawful to, without a permit, "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import… any bald eagle… or any golden eagle, alive or dead, or any part, nest, or egg thereof" (16 USC § 668(a)). "Take" is defined as: ''pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb.'' ''Disturb'' is defined as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior'' (USFWS 2011b).

1.3.5 Marine Mammal Protection Act

The MMPA of 1972 establishes a national policy to prevent marine mammal species and population stocks from declining beyond the point where they cease to be significant functioning elements of their respective ecosystems (16 USC §§ 1361-1407). The MMPA prohibits the taking of marine mammals in US waters. The term "take" means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal (16 USC §1362(13)). NOAA NMFS-PRD oversees the implementation of the MMPA.

1.3.6 Magnuson-Stevens Fishery Conservation and Management Act

The MSFCMA (16 USC §§ 1801-1884; 90 Stat. 331), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan. The MSFCMA requires federal agencies to consult with NOAA NMFS-HCD on all actions or proposed actions authorized, funded, or undertaken by the agency that might adversely affect EFH (USC §305(b)(2)). Although absolute criteria have not been established for conducting EFH consultations, NMFS-HCD recommends consolidating EFH consultations with interagency

coordination procedures required by other statutes, such as NEPA, the Fish and Wildlife Coordination Act, or the ESA (50 CFR 600.920(e)), to reduce duplication and improve efficiency. A separate report regarding EFH has been provided to USEPA, as requested, for USEPA's coordination with NMFS-HCD.

2.0 PROJECT DESCRIPTION

This Section of the BA provides a description of the Project components as well as a discussion of the direct (impacts expected within the Project footprint) and indirect (impacts in and potentially outside the Project footprint) impacts to the environment. This project description will be used to determine the Action Area in which potential effects to T&E species will be evaluated.

2.1 Project Facilities

OxyChem proposes to construct and operate a new NGL Fractionation Facility, Barge Dock Modifications, and Pipeline Facilities, as detailed in Sections 2.1.1 – 2.1.3.

2.1.1 Fractionation Facility

The planned Fractionation Facility will include: the new NGL Fractionator; a control building; an electrical switch yard; pipe racks; an on-site ethane connection to a pipeline; use of the adjacent OxyChem wastewater treatment unit; use of the adjacent DuPont stormwater discharge system; two thermal oxidizers; an emergency enclosed ground flare; aboveground non-refrigerated product storage facilities to support barge, rail, and truck loading; aboveground contaminated water and water stripping tanks and chemical tanks; rail siding and rail car loading inclusive of one culverted crossing of a non-jurisdictional man-made drainage ditch; a truck loading facility; barge loading areas at the existing adjacent (to the southeast) OxyChem barge docks; and construction lay-down areas.

2.1.1.1 NGL Fractionator

The Fractionation Facility will receive NGLs from a 16" diameter Y-Grade feedstock pipeline and will be designed to process 8,000 barrels per day (BPD) of NGL. The facility will include equipment needed to separate and process the pipeline quality NGLs into commercial grade ethane, propane, butanes, and natural gasoline. Storage facilities will provide temporary storage of propane, butane, and natural gasoline until these products can be sent-out via pipeline, road tanker, railcar, and barge to various markets. Ethane will be directly transported to market via pipeline.

The distillation processes will separate the NGL into various product streams for further processing, storage, and transport, as specified below.

- Ethane fractionated from the NGL feed will be treated to remove carbon dioxide and water; it will be compressed and discharged directly into a new pipeline to be installed as part of the Project;

- Propane fractionated from the NGL feed will be pumped to on-site storage from which it can be pumped to various loading facilities for send-out via pipeline, road, rail, or marine transport;

- Mixed butanes fractionated from the NGL feed will be treated to remove reduced sulfur compounds; the treated product will be pumped to on-site storage from which it can be transferred to various loading facilities for pipeline, road, rail, or marine transport; and

- Natural gasoline will be treated to convert reduced sulfur compounds to commercially acceptable levels; the treated hydrocarbons will be pumped to on-site storage from which they can be transferred to barge loading facilities for marine transport.

Each distillation process operates under pressure and includes a fractionation column, a reboiler to provide heat for the distillation of liquids, and means to condense the vaporized fraction (condensers and reflux accumulators). Steam, supplied both from an adjacent existing natural gas fired cogeneration unit and from new steam generation facilities installed with the NGL plant, will be supplied to these reboilers. Cooling and condensing for the fractionation columns will be supplied from recirculating propane refrigerant and recirculating cooling water, both supplied from new facilities and an NGL cooling tower installed at site.

Pumps and compressors in the NGL facilities will be driven by electric motors for which the electricity is produced in adjacent off-site facilities. An onsite diesel driven emergency generator will be provided for backup to critical operating equipment. The facility will include systems for the removal of water, CO_2, H_2S, and sulfur. Vapor emissions from process units and from the product storage and transfer equipment will be collected and transferred to two thermal oxidizers for control of hydrocarbon emissions.

The Fractionation Facility will also include a dedicated firewater system as well as a process equipment cooling tower. The firewater system will be designed to comply with relevant standards. Make-up water for both the firewater system and cooling tower will be supplied directly from the utility water supply line (from San Patricio Water District). The cooling tower will be equipped with drift eliminators to reduce emissions of particulates.

2.1.1.2 Wastewater Management

The NGL fractionation process area will be concrete paved to prevent soil contamination from potential spills. The process area will sheet flow away from the center pipe rack area and equipment towards the outside perimeter of the process area where it will be directed towards separate NGL Process Area Sumps. Open trenches might be used near the perimeter to direct the run-off into the sumps. Stormwater from the process area will not be allowed to overflow into the non-contaminated stormwater system.

Contaminated water from the process, wastewater, utilities, liquefied petroleum gases (LPG) and gasoline storage pump pads, and barge loading will be routed to two contaminated water storage tanks to capture the stormwater from a 25-year 24-hour rainfall or a four hour fire-fighting event. The tanks will be vented to the thermal oxidizer low pressure header with nitrogen make-up for blanketing. The water from the lower portion of the tanks will be fed to the contaminated water stripper by contaminated water stripper feed pumps. The contaminated water stripper will remove volatile hydrocarbons prior to discharge to the existing adjacent OxyChem Facility wastewater treatment unit.

After exiting the stripper, the contaminated wastewater will be cooled using cooling water. The cooled contaminated water will be transferred to the OxyChem Facility wastewater treatment unit (Texas Pollutant Discharge Elimination System [TPDES] Permit No. WQ0003083000). The adjacent OxyChem Facility currently operates a wastewater treatment unit which treats water from the Vinyl Chloride Monomer (VCM) Facility, stormwater that contacts process equipment and process areas, steam stripper water, wash-down water, laboratory wastewater, and Resource Conservation and Recovery Act (RCRA) closure water. Fractionation Facility

wastewater will subsequently be discharged to an outfall diffuser (Outfall 001) as required by the TPDES permit (see Figure 2-1 on Page 16 for location).

The TPDES wastewater permit requires chronic and acute marine biomonitoring on a quarterly basis. OxyChem conducts this monitoring in accordance with the permit which establishes effluent limitation criteria considered protective of the environment. Based on this monitoring, the discharge meets and will continue to meet the effluent limitation criteria.

2.1.1.3 Stormwater Management

Non-contact stormwater runoff (water falling on the roads and other non-process areas) will be routed to the existing DuPont stormwater outfall (Outfall 002) and discharged into a drainage canal with a manually operated gate as required in the DuPont TPDES Permit (Permit No. WQ0001651000) (see Figure 2-1 on Page 16 for location). Water discharges are monitored for several water quality parameters and outfall discharges into La Quinta Channel will meet state water quality standards, thereby avoiding degradation of water quality in waters potentially used by T&E and protected species. The use of the existing outfall structures also eliminates the need for new outfall structures along the Fractionation Facility Site shoreline, thereby avoiding impacts to EFH and marine species habitat.

2.1.1.4 Thermal Oxidizers

The vent gases from the NGL fractionation process, contaminated water treatment, storage and loading will be collected in a vent system and directed to two thermal oxidizers. Vent gases will be divided into a low pressure and high pressure system and fed separately into each thermal oxidizer. Each thermal oxidizer will be rated for 60 Million British thermal units per hour (MMBtu/hr) total heat release at 1800º Fahrenheit (F). Emission and stack parameters will comply with those specified in PSD the air permit application. The flame management system for the thermal oxidizers will comply with National Fire Protection Act (NFPA) 85, Boiler and Combustion Systems Hazards Code. Vent gases will not be introduced unless the firebox temperature is sufficiently high to assure combustion.

Vent gasses can be diverted to the Emergency Enclosed Ground Flare if needed. The flare will be a totally enclosed ground flare rated for at least 120 MMBtu/hr.

2.1.1.5 Emergency Enclosed Ground Flare

In the event of a shutdown of both thermal oxidizers, the Project will have one enclosed ground flare to combust process vents. The flare provides pressure relief flow and emergency depressurization by receiving vent gases from high and low pressure vent knock-out drums. Natural gas will be added to fuel the flare to assure adequate heating for vent gases.

2.1.1.6 Storage

Product Storage – Product storage will be comprised of: two pressurized propane storage tanks; two pressurized butane tanks; two gasoline storage tanks; and possibly one gasoline slops tank.

The propane and butane tanks will have control valves to vent gases to the thermal oxidizers. The gasoline tanks will have a separate vent to the thermal oxidizers. The tanks will be monitored by independent level devices to prevent overflow. Fill of the propane and butane tanks will be from the top. Fill for the gasoline tanks will be from the bottom. Fill can be product

from the unit, recycle material directly from the pump discharge, recycle from the loading header, or recycle from the pipeline send-out.

The pressurized propane, butane, and refrigerant (if required) tanks will be located in a common tank farm with a remote impoundment area. Drainage will be away from the tanks toward the containment wall and to a remote impoundment basin. The pumps and filters associated with the propane and butane products will be located outside the tank containment area; however, a curbed concrete pad containment area will be provided under and around all the equipment so water can be transferred to the contaminated water storage for wastewater treatment processing.

The gasoline tanks will be contained in a separate containment area. Containment will be at least 110% of the largest tank. The gasoline transfer pumps and filters will be located outside of the tank containment area; however, a curbed concrete pad containment area will be provided under and around all the equipment.

A gasoline slops tank might be included in the Project. This tank will receive potentially off-speculation gasoline or gasoline with potential free phase water. If constructed, it is intended to store decommissioning material and allow phase separation. Gasoline will be transferred back to storage or to the De-Butanizer and the water phase will be transferred to contaminated water storage.

Chemical Storage – A front-end amine regenerator for caustic material might be used to remove CO_2 and H_2S from the hydrocarbon stream brought to the NGL fractionator, specifically the butane and gasoline. Fresh amine and make-up caustic will be brought to the site by truck and stored in a storage tank. Triethylene glycol (TEG) and caustic storage, if used in the process, will be brought to the site by truck and stored in American Petroleum Institute (API)-650 storage tanks. The storage tanks will be in the NGL process area containment system and will drain to contaminated water sumps for wastewater treatment.

Spent caustic from both the butane and gasoline treatment systems will be directed to spent caustic storage. Spent caustic will be transferred to a truck loading station for off-site disposal.

Contaminated Water Storage – Storage on the site also includes the contaminated water storage tanks, which will consist of two carbon steel tanks. Contaminated water will be collected from process, storage, storage pump pads, loading areas, utilities, and firewater areas. The water will be fed to the contaminated water stripper to remove volatile hydrocarbons prior to discharge to the existing OxyChem Facility wastewater treatment unit.

2.1.1.7 Product Shipping

Pipeline – Ethane will be treated on-site; however it will not be stored on-site and will be transferred to market by send-out pipeline. The ethane send-out system will use either pumps or compressors. Propane and butane will be treated and stored on-site and then transported to market via send-out pipeline. Section 2.1.3.1 provides details regarding the send-out pipelines.

Rail Car Loading – Propane and butane will be transported to market via rail. The rail car loading will be located south of the existing VCM Facility rail car loading rack. A rail turnout will extend from the spur feeding the VCM racks, and will split into two separate rails with a center rack and platform. A total of eight rail car loading sites will be provided (four on each side) for loading rail cars. All eight sites will have propane loading capability and four on the south side

will have both propane and butane loading capability. A two-inch liquid loading arm will be provided for each site and propane and butane will share loading arms.

The loading arm manifold will have a blowdown line and a nitrogen connection for de-pressuring and purging the material in the arm and the manifold. A shut-down system to automatically block the fill and vapor return lines will be provided. It will include lower explosive limit (LEL) detectors in the area and manual push buttons.

The new rail spur will necessitate a culverted crossing of a US Army Corps of Engineers (USACE) non-jurisdictional man-made drainage ditch in the southeast portion of the Fractionation Facility Site. The culverted crossing will provide a level crossing of the ditch for rail transport of NGL products.

Truck Loading – Propane and butane truck loading racks will be placed south of the existing VCM facility rail car loading rack. The truck loading area will be comprised of a central island and two truck bays. Both bays will have propane and butane loading capabilities. The truck loading will have a two-inch liquid loading arm shared by propane and butane. Similar to the rail car loading, the truck loading will have a blowdown line and a nitrogen connection for de-pressuring and purging the material in the arm and the manifold to a blowdown drum. A shut-down system to automatically block the fill and vapor return lines will be provided. It will include LEL detectors in the area and manual push buttons.

Barge Docks – Propane, butane, and gasoline will be shipped by barge to markets. The product will be transported from storage tanks via pipes on racks to the OxyChem barge docks. Vapors will be returned to storage tanks in separate dedicated headers. The headers will serve the barge dock and rail and truck loading areas. A low pressure blowdown line will be provided from the loading areas directly to the thermal oxidizer vent header for clearing hoses and loading arms. Stormwater and gasoline drips will be collected from the barge dock and directed to the contaminated water storage tanks for wastewater processing.

2.1.1.8 Staging Areas

The remainder of the Fractionation Facility Site will be used as temporary staging areas during construction. These areas are primarily located on lands disturbed by previous human uses (agriculture croplands) and will be used for storage of construction or component equipment and/or materials, pipeline storage yards, for construction of components necessary for the NGL Fractionator, and contractor or warehouse sites.

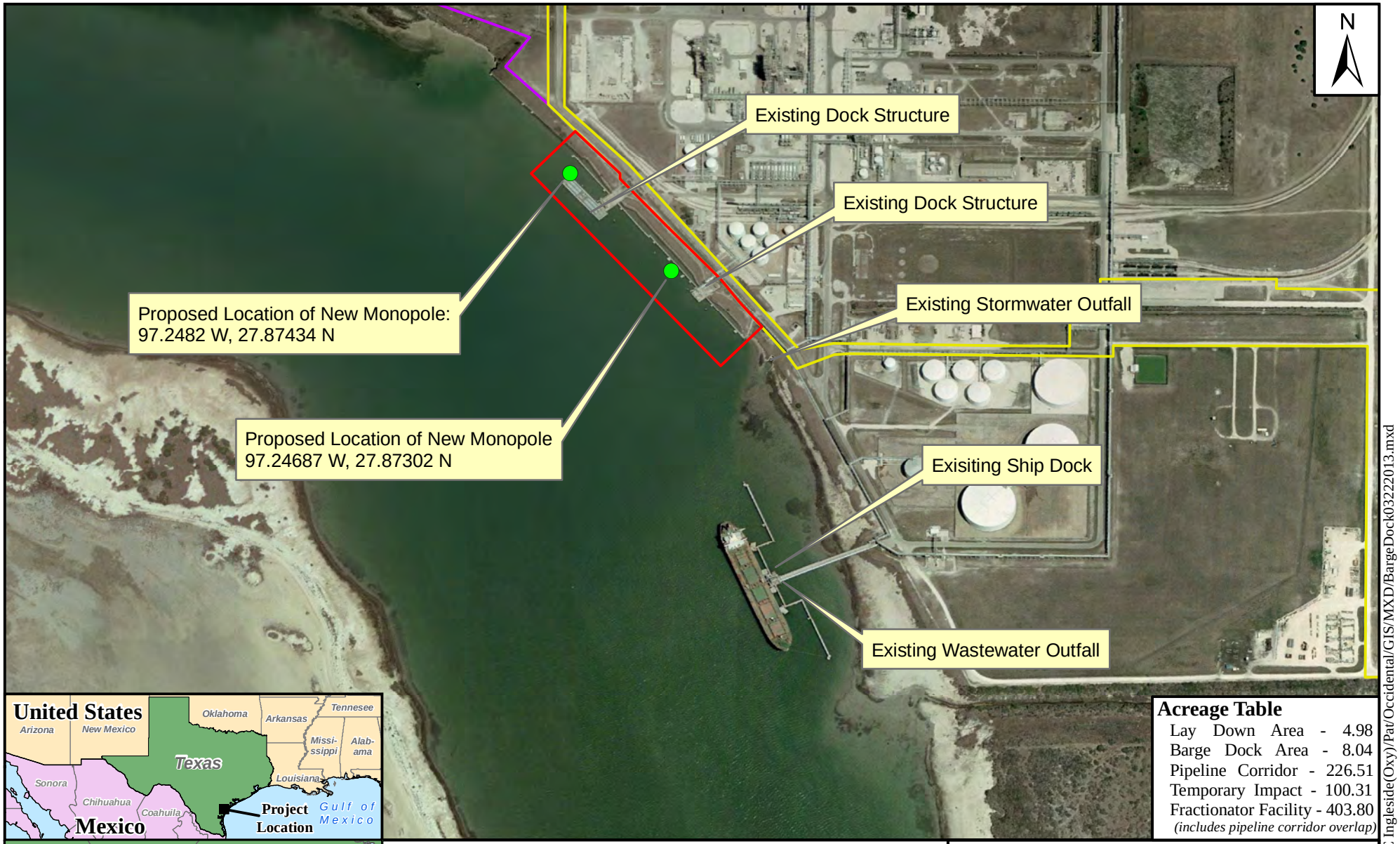
2.1.2 Barge Dock Modifications

Barge Dock Modifications are proposed to accommodate barge transport of the fractionated hydrocarbon products from the new Fractionation Facility. The installation of two monopiles (one at each existing dock) is the only Project component within WUS/Section 10 Navigable waters.

The existing OxyChem barge docks located southeast of the new Fractionation Facility Site will be used. Specifically, Barge Dock One (the most westerly dock) and Barge Dock Two (most easterly dock), approximately 790 linear feet and 1,400 linear feet southeast from the southeast waterside Fractionation Facility property corner, respectively, will be modified. The modifications to the existing barge docks include: retrofitting the existing above-water docks with new fuel loading arms; enlargement of existing pipe racks in the uplands and on the docks to

transport the fractionated products to barges for loading; and additional monopiles, one at each dock, for the safe mooring of the Fractionation Facility barges (see Figure 2-1).

New pipelines will be extended on pipe racks in the uplands from storage facilities to the existing barge docks. The pipe racks will likely need to be enlarged to accommodate the new pipelines. A contaminated water line will extend from the docks to the contaminated storage or to the thermal oxidizers. A nitrogen pipeline will also be supplied to the barge docks. The barge dock loading arms will be retrofitted (enlarged as necessary) to accommodate the new pipelines.



Acreage Table

Lay Down Area	4.98
Barge Dock Area	8.04
Pipeline Corridor	226.51
Temporary Impact	100.31
Fractionator Facility	403.80

(includes pipeline corridor overlap)

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12. Construction Data, Oxy, 2012.

LEGEND

- Monopole Locations
- Barge Dock Area
- Temporary Impact
- Fractionator Facility

0 500 1,000 1,500 2,000 Feet

Scale = 1:8,000

Sheet 1 of 1

Figure 2-1. Exisiting and Proposed Facilities at the Oxy Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 5/13

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2.1.3 Pipelines

2.1.3.1 Pipelines

The Project involves the construction of four pipelines of various lengths and diameters for feedstock of pipeline quality NGLs and send-out of fractionated hydrocarbons. The proposed pipelines will be located within a single 18.5-mile-long 100-foot-wide (50-foot-wide permanent and 50-foot-wide temporary construction SPP Corridor). The new pipelines will tie-in with existing transmission lines located in San Patricio County for transport to other markets as indicated in Table 2-1 below.

Table 2-1 Types and Sizes of Transmission Lines for the OxyChem Fractionation Facility Project

Name	Length (Miles)	Diameter (Inches)	Transported Liquid
1	11.5	16	Y-Grade NGL Mixture
2	11.6	6	Butane
3	14.6	12	Ethane
4	18.9	8	Propane

2.1.3.2 Measurement and Regulation Stations

Measurement and Regulation (M&R) Stations will be located where the proposed pipelines will tie-in with existing transmission lines located in San Patricio County for transport to markets. M&R stations will be located at (i) the pipelines' commencement (southeast corner of Fractionation Facility Site), (ii) the pipeline connection to the existing Enterprise pipeline (at approximately milepost 11.75), (iii) at the end of the branch of the corridor that parallels County Road (CR) 73, and (iv) at the terminus of the SPP Corridor (approximately four miles east of the City of Sinton, Texas, approximately one-quarter of a mile south of SH 188, and two miles east of US Highway 181). The M&R Station in the southeast corner of the Fractionation Facility Site will be 200-feet by 100-feet in size. The three other M&R Stations will be 100-feet by 100-feet. The locations of the proposed M&R Stations are shown on Appendix B.

2.1.3.3 Additional Temporary Work Space and Storage Areas

Additional Temporary Work Space (ATWS) locations are those areas of additional workspace (i.e., in addition to the standard construction ROW width) that are needed to safely construct project facilities. ATWS will be needed at locations requiring additional excavation, soil placement requirements, or staging of additional equipment and/or materials. Examples include:

- areas for mobilization and demobilization at each end of the each construction spread;
- for pipe stringing truck turnaround areas;
- on both sides of roads and railroad crossings;
- on both sides of wetland and waterbody crossings;
- areas with steep slopes (> 25 percent) and side hills to allow for grading to level the working ROW;
- areas requiring topsoil segregation;
- areas with potential trench slumping;

- equipment turnarounds and spread move-arounds;
- hydrotest fill and dewatering locations and test locations;
- pipeline crossovers where the pipeline crosses under buried features such as foreign pipelines, utility lines, drain tiles, irrigation systems, etc.; and
- equipment and material staging areas.

The size and configuration of these features are dependent upon their purpose as well as the existing site conditions (e.g., available and/or accessible space, nearby resources) at each proposed work location. The locations of the proposed ATWS are shown in Appendix B.

2.1.3.4 Access Roads

OxyChem proposes to use existing roads to provide access to the construction ROW for construction materials and equipment. No temporary access roads, either new or modifications to existing are anticipated for Project construction.

2.2 Construction

2.2.1 Construction Schedule

Construction of the pipeline portion of the Project is planned to begin in June 2014 and be completed by December 2014. Construction of the Fractionation Facility was originally planned to begin in the spring of 2013 with an in-service date of December 31, 2014, however, this schedule is currently under review.

2.2.2 Fractionation Facility

2.2.2.1 Construction Elements

The proposed elements of construction at the Fractionation Facility include:

- the new NGL Fractionator;
- aboveground non-refrigerated storage facilities to support barge, rail, and truck loading;
- aboveground storage facilities for chemicals used in the feed treatment and wastewater;
- rail siding and loading facilities inclusive of one culverted rail crossing of an USACE non-jurisdictional man-made drainage ditch for the rail spur;
- truck loading facilities;
- construction lay-down areas;
- a control building;
- an electrical switch yard;
- pipe racks on the Fractionation Facility Site and adjacent OxyChem Facility (to and on the barge docks); and
- an on-site ethane connection to pipelines for supply to other markets.

No new outfall structures will be required for this project. See Sections 2.1.1.2 and 2.1.1.3 of this report for further detail regarding use of outfalls permitted by TCEQ at the adjacent OxyChem and DuPont facilities.

2.2.2.2 Fractionation Facility Construction Sequencing

Construction of the Fractionation Facility buildings, installation of major mechanical equipment, process and utility piping, electrical and instrument facilities, and NGL storage tanks will consist of the following steps:

- Construction of foundations for buildings, major equipment, and pipe racks;
- Building construction;
- Major equipment delivered to the site and set on their foundations;
- Installation of piping would commence as soon as the majority of the mechanical equipment is received; and
- Installation of electrical and instrumentation systems.

Final grading and landscaping will be done thereafter. Clean fill required for work in the NGL tank and process areas might be imported from off-site sources. Disturbed ground would be fine graded to the proper elevations required to ensure adequate drainage. Disturbed areas would be reseeded to establish a grass cover to stabilize and prevent erosion of sediments.

2.2.2.3 Fractionation Facility Best Available Control Technology

Per 30 Texas Administrative Code (TAC) §116.111(a)(2)(c), new facilities must utilize Best Available Control Technology (BACT), with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility. BACT will be used to construct the Project and ensure emissions are reduced or eliminated to the greatest extent practicable.

NO_x - NO_x emissions from natural gas-fired combustion sources, including thermal oxidizers and the emergency enclosed ground flare, will result from the combination of nitrogen with oxygen in the combustion air and within the combustion device (thermal NO_x). Combustion air flow and supplemental natural gas firing will be used to control the firebox temperature of the thermal oxidizers. Natural gas will also be used by the emergency enclosed ground flare to assure adequate heating value for the vent gas. Natural gas does not contain fuel bound nitrogen; therefore, the NO_x emissions are considered thermal NO_x. BACT guidance on the TCEQ website states that BACT for NO_x from thermal oxidizers less than 0.06 pounds per million British thermal unit (Lb/MMBtu) are the best available NO_x performance for this technology application. OxyChem proposes to use ultra-low NO_x burners that will limit annual average NO_x emissions to less than or equal to 0.06 Lb/MMBtu per oxidizer.

SO_2 - Emissions of SO_2 from the thermal oxidizers and emergency flare will be controlled by burning natural gas with minimal sulfur content. The thermal oxidizers and emergency flare will convert sulfur compounds in the waste gas streams to SO_2. The destruction efficiency will be met by operating emergency flare in accordance with the specifications in New Source Performance Standards (NSPS), Subpart A, 60.18. These design and operating methods satisfy BACT for SO_2.

CO and VOC - CO and VOC emissions from thermal oxidizers are the result of incomplete combustion of the primary fuel and vent gases. Such emissions can increase due to improper combustion temperature, insufficient residence time, or insufficient oxygen in the combustion zone. Proper fuel-to-air ratio and a design that provides the necessary residence time, temperature, and turbulence within the combustion zone ensure good combustion to minimize the emission of CO and VOC.

With proper combustion technology and design, generation of CO will be minimized by maintaining good combustion efficiency. Combustion efficiency in heaters is a function of both design and operation. Proper fuel-to-air ratio and a design that provides the necessary residence time, temperature, and turbulence within the combustion zone ensure good combustion.

CO will be the primary pollutant emitted by the flare as CO is produced from incomplete combustion of carbon compounds. OxyChem proposes to minimize CO emissions through the use of a well-designed enclosed ground flare capable of achieving a high VOC destruction efficiency to also ensure that CO production is minimized. The Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database search results indicate no control strategies for minimizing CO from flares other than proper flare design and operation in accordance with Section 60.18 of Subpart A of NSPS.

OxyChem will maintain the flame integrity through the implementation of good combustion practices and flame detection monitoring with an automatic re-ignition. Since the combustion efficiency (i.e., destruction/removal efficiency) of a flare is primarily influenced by temperature, residence time, and the mixing of air and process gases in the combustion zone, implementation of these design considerations and use of a natural gas-fired pilot flame will support a flare design that maximizes efficiency and minimizes incomplete combustion. These design requirements satisfy BACT.

PM/PM_{10}/$PM_{2.5}$ – Emissions of PM, which include PM_{10} and $PM_{2.5}$, from thermal oxidizers result from inert solids in the fuel and combustion air and from unburned fuel hydrocarbons that agglomerate to form particles that are emitted in the exhaust. PM/PM_{10}/ $PM_{2.5}$ emissions from thermal oxidizers are inherently low because they achieve high combustion efficiencies.

The proposed cooling tower is a source of PM/PM_{10}/ $PM_{2.5}$ from drift sources. The cooling tower will be equipped with drift eliminators to reduce emissions of particulates.

2.2.3 Barge Dock Modifications

The existing barge docks were reviewed by structural engineers. Based on their review, it was determined one monopile at each existing barge dock was necessary for safe mooring of proposed Fractionation Facility barges. The monopiles will be comprised of steel and will be driven into place from a crane mounted on a barge. Although installation of the two monopiles involves in-water work, pile driving (instead of dredging/filling or jetting construction techniques) will minimize the area of disturbance to the submerged bottom, minimize turbidity generated from installation, and subsequently minimize degradation of water quality during construction.

The barge dock loading arms will be retrofitted as necessary to accommodate the new pipelines on the barge dock. This work will occur over and be contained on the existing barge docks.

2.2.4 Pipeline Construction

The pipeline will be constructed in compliance with applicable federal regulations and guidelines and the specific requirements of any applicable permits and approvals. Construction methods will be those that are consistent with industry-recognized practices, company polices, and best management practices (BMPs). OxyChem will implement practices that are consistent with guidelines and recommendations from the USACE, the US Department of Agriculture Natural Resources Conservation Service (USDA/NRCS), the TCEQ, the Federal Energy Regulatory Commission's (FERC) *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC

2003a) and FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (FERC 2003b). For areas in which waterbody crossings will occur via Horizontal Directional Drilling (HDD), OxyChem will prepare a Frac-Out Contingency Plan in the event of an inadvertent frac-out during HDD construction. A frac-out is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface. The risk of a frac-out during construction will be avoided through proper geotechnical assessments prior to drilling. In the event that a frac-out occurs, impacts from it will be minimized through the Frac-Out Contingency Plan which will include monitoring and having appropriate equipment and response plans ready.

Construction and restoration in upland areas will make use of typical pipeline construction techniques which are discussed in detail below. These procedures are designed to accommodate varying field conditions while maintaining standards for the protection of environmentally sensitive area.

OxyChem will implement dust control measures during construction as necessary. Dust control measures will primarily involve use of water trucks to dampen the ROW under dry dusty conditions.

Additionally, OxyChem will implement preventive and response procedures to minimize the potential for and impact of uncontrolled releases of petroleum products and other hazardous materials to the environment.

Pipeline construction is typically performed with the use of numerous crews working together along the ROW. The crews will perform tasks in an assembly line fashion following relatively close behind the preceding crew to minimize the size of the active construction zone and complete restoration as soon as possible.

2.2.4.1 Construction and Sequencing of Soil Disturbing Activities

Typical operations (in sequence) of pipeline construction include the following activities:

- Mobilize and set up pipe storage/contractor yard, including installation of erosion/sedimentation controls, road entrance pads, and proper hazardous material storage;
- Survey and mark the route and approved workspace areas(s);
- Clear the construction ROW;
- Install erosion and sediment controls;
- Grade the construction ROW, including topsoil segregation in active agriculture (cultivated and pasture), residential and wetland areas (note: wetland areas not traversed by the proposed pipelines);
- Excavate a new trench to proper depth for the new pipeline(s);
- Place the new pipe joints along the ditch line within the ROW;
- Bend the new pipe joints, as needed, to follow the pipeline route and contours of the terrain;
- Weld the pipe together;
- Visually and radiographically inspect and test the weld area to verify the integrity of the weld;
- Coat the weld area with an approved coating to provide corrosion protection;

- Place the new pipe section in the trench, tie into previously laid section(s), and backfill;
- Restore the grade of the work area to previous contours;
- Hydrostatic or nitrogen test the pipeline segments to ensure no leaks are present; and
- Conduct final cleanup, restoration, and revegetation of the ROW.

2.2.4.2 Surveying and Staking

Surveys and field staking/flagging will be completed to locate the proposed pipeline centerline, access roads, staging areas, exterior construction ROW limits, and ATWS areas. In addition to centerline and limit surveys, other resources will be flagged and signed along the route. These will include any environmental and archaeological resources; geologic and topographic features; land types and uses; other utility crossings (e.g., pipelines, power lines, railroads, and other wires/cables); waterbodies; drainages; and roads.

2.2.4.3 Clearing and Grading

The pipeline construction ROW will be cleared of vegetation. Heavy equipment will be used to remove large trees (if present), heavy brush, and small trees; ground cover (e.g., bushes) might remain until grading is required. Grading creates a safe working platform to construct Project facilities. Marketable timber cleared will be managed in accordance with the landowners' agreements and other timber might be given back to the landowner or properly disposed of as construction debris (e.g., stacked off the edge of the limits of disturbance, chipped, or hauled to an approved disposal site). Displaced soils are normally stockpiled along the construction ROW to minimize the need and potential impact of additional haul vehicles. However, in locations where the construction ROW is restricted, these soils might be stockpiled at a different location. In areas where topsoil segregation requirements exist, topsoil will be segregated and stockpiled in such a manner that it is conserved and can be returned to the construction ROW.

To manage stormwater surface flow, regular breaks (gaps) in windrowed spoil piles and diversion structures will be used to manage cross drainage needs. Gaps in windrowed spoil and topsoil piles will allow surface water to migrate across the construction ROW in such a way as to minimize up-gradient flooding and downstream sedimentation. Gaps will be located at regular intervals and/or where appropriate due to site conditions (e.g., depressions in terrain where water would likely concentrate).

2.2.4.4 Temporary Environmental Controls

In tandem with or immediately following ground-disturbing activities (which might include clearing activities) temporary environmental controls (e.g., erosion and sediment controls) will be installed where necessary and in accordance with an approved construction stormwater permit. Temporary environmental controls primarily consist of installing barriers (e.g., silt fencing, hay bale structures) or diversion structures (e.g., temporary slope breakers) to prevent sediment-laden waters from migrating off approved work areas. Once installed, these controls will be monitored and maintained so they function as intended until the area has been stabilized or permanent environmental controls are installed.

2.2.4.5 Topsoiling

Topsoiling is the segregation of topsoils (including sensitive soils) from subsoils to protect the quality and quantity of topsoil present. In designated areas (e.g., non-saturated wetlands), topsoils are segregated from subsoils during grading activities with heavy equipment.

OxyChem will conduct topsoiling in all agricultural areas and wetlands. All topsoiling will be performed as stated in OxyChem's BMPs and in accordance with FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* and *Wetland and Waterbody Construction and Mitigation Procedures* .

2.2.4.6 Trenching

Trenching will be accomplished with backhoes and/or mechanical trenching machines. Trench width will vary based on site conditions (e.g., soil types, bedrock, and presence of groundwater). Under typical conditions, the average trench depth will be no less than four feet to accommodate the 16-inch outside diameter (OD) pipeline and 36 inches of cover. Pipeline cover will be a minimum of four feet in pasture lands. In areas where shallow bedrock and/or large boulders are present, specialized construction techniques (e.g. blasting) to remove the rock might be necessary.

Similar to grading activities, considerations for cross drainage will be made while trenching and where stormwater or existing runoff flows are a concern. Flume pipe (e.g., appropriately sized polyvinyl chloride, or steel piping) or diversion berms/ditches might be used where needed to direct stormwater across the trench and away from the construction ROW. Inlet and outlet structures might also be necessary to prevent erosion and scouring. Additionally, on sloping terrain, a combination of trench plugs might be used to prevent water from scouring the bottom of the trench line. Earthen material trench plugs can be characterized as soft or hard. Soft plugs have been excavated and the spoil re-compacted in the trench. Hard plugs have not been excavated. Foam trench plugs can also be used. Foam plugs are typically mechanically blown in, and are environmentally compatible.

2.2.4.7 Pipe Stringing and Bending

Sections of line pipe (joints) are strung along the construction ROW and adjacent to the trench, set on wooden supports (skids), and arranged so they are safely accessible to construction personnel. Joints vary in length and can be individual (i.e., a single length of pipe) or double-jointed (i.e., two lengths of pipe pre-welded offsite). Pipe joints from the mill can vary up to 60 feet in length and can be cut as needed in the field. Depending on construction ROW requirements and restrictions, some pipe bends might be pre-manufactured at the pipe mill (factory bends). For all other bends (field bends), a mechanical pipe-bending machine will bend joints to the desired angle at locations where there are changes in the natural ground contours and at centerline points of intersection (PI).

2.2.4.8 Pipe Assembly and Field Welding

After the stringing and bending are complete, pipe sections are aligned and welded together. All welding shall be performed in accordance with the Project's Welding Procedure Specification (to be developed during design of the Project) and by qualified welders who have passed specified qualifying tests. Welders and welding procedures will be qualified according to applicable American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), and API standards.

2.2.4.9 Nondestructive Examination, Inspection, and Weld Repair

One hundred percent of welds will be inspected, both visually and by nondestructive examination (NDE). Visual inspection shall be carried out on all welds to check for

imperfection(s) that can be seen with the naked eye. Weld imperfections shall be rejected and repaired upon identification (i.e., before NDE). Welds then go through the NDE process (i.e., x-ray examination) for imperfections that are not visible with the naked eye. The NDE acceptance criteria will be API 1104.

Detailed records of all welds, including successful welds, welds that are repaired and those that are cut-out, shall be maintained for each weld as it is completed. The records will include an identification serial number, the location of the weld, the date it was produced, qualified procedure reference number, and welders' names and reference numbers. These records shall be maintained in the Project's permanent files.

2.2.4.10 Pipe Coating, Inspection, and Repair

Line pipe will be coated to protect it from the environment and accelerated degradation. Line pipe is normally mill-coated or yard-coated prior to stringing. However, line pipe also requires a coating at the field-welded joints where bare metal is exposed. Prior to lowering the pipeline segment into the trench, the pipeline coating is visually and electronically inspected to locate and repair coating faults or voids (this is commonly referred to as "jeeping" the pipe).

2.2.4.11 Lowering-In, Padding, and Rough Backfill

Once the welds and coating have passed inspection, and just prior to lowering-in, the trench will be checked for sharp edges that could damage the pipe and/or its coating during installation (i.e., "crumbing" the line). In areas where the backfill has the potential to damage the coating, the pipe will be wrapped with rock shield material to provide additional protection.

The welded pipe section to be lowered-in will be typically placed into the trench with pipe slings and side-boom tractors. Once the pipe is lowered-in, trench breakers will be installed on sloping terrain and/or at sensitive environmental crossings to prevent the subsurface piping of water, which could create void space and subsidence or drain environmental features. Clean fill (e.g., soil, sand) will be used where needed as padding material to provide protection to the pipe and coating. The material used for padding will be selected in accordance with permit conditions and Project engineering specifications, and under no circumstances shall topsoil be used as padding or backfill material. The trench will then be rough backfilled using backfilling equipment (e.g., bulldozers, track hoes) to protect the pipe until final restoration can be completed. No foreign materials (e.g., construction debris) will be permitted to be used as backfill material. If allowed by permit conditions and landowner agreements, excess rock might be buried onsite within the construction ROW. Excess rock and/or woody debris (e.g. stumps and brush) can be windrowed along the edge of the construction ROW. Otherwise these materials will be properly disposed of off-site as construction debris.

2.2.4.12 Pressure Testing and Final Tie-ins

Prior to commissioning the pipeline, the pipeline will be pressure tested in accordance with engineering specifications and regulatory approvals. The test can be performed with an inert gas or liquid, with water being the standard. OxyChem will use existing local municipal water sources (not surface waters) or nitrogen to conduct the testing. The pipe will be tested in sections to a pressure in excess of the maximum allowable operating pressure (MAOP) for a specified period of time. Test sections will be determined by pipe wall thickness and elevation changes. Once the test of a section is successfully completed, water will be re-used to the

extent possible. The test water will be discharged in accordance with regulatory and permitted requirements.

2.2.4.13 Cleanup, Restoration, and Revegetation

Cleanup of Project activities includes removing construction debris (including un-used and surplus materials), temporary construction structures, and equipment. Restoration consists of returning the construction ROW and areas disturbed by construction activities to pre-existing contours and hydraulic regimes. Final restoration occurs within 10 to 20 days of rough backfilling, conditions permitting. Permanent erosion and sediment controls will be installed and the construction ROW will be re-seeded and/or mulched per permit requirements and landowner agreements. Pipeline markers will be installed. Soil adjuncts and fertilizers might be added where necessary. Temporary erosion controls will be removed once the area has been stabilized in accordance with Project requirements. The revegetation will be monitored for at least two growing seasons following final restoration.

Temporary construction facilities will include staging areas, ATWS, and temporary access roads. Upon completion of construction activities, areas used for temporary construction facilities will be restored to pre-existing conditions.

2.2.4.14 Specialized Pipeline Crossings and Methods

The OxyChem pipeline route was selected to avoid or minimize impacts to wetland/waterbodies and road/railroad crossings. However, although these features were found to be non-jurisdictional by the USACE, these features could not be avoided. HDD will be used to avoid these features. Tie-in crews might likely be used to perform these specialized crossings. Tie-in crews are normally self-sufficient crews that work in tandem with the construction spread. They have equipment, welders, and labor to perform a specialized task (e.g., waterbody/wetland crossings, road/railroad crossings). Additionally, tie-in crews will be used in areas that might normally slow-down the main spread or in locations that have been skipped for lack of access.

Wetland/Waterbody – Construction of the pipeline across USACE non-jurisdictional wetlands or waterbodies will be performed in accordance with the FERC's *Wetland and Waterbody Construction and Mitigation Procedures* and applicable permit conditions, unless more stringent regulatory requirements apply. Trenchless construction techniques, such as HDD, will likely be used for wetland and waterbody crossings to avoid complete impacts to these areas. Trenchless methods allow the installation of the pipeline with minimal impacts or disturbance to surficial features. HDD might be used when re-routing alternatives are limited and other trenching and trenchless techniques are not feasible. For areas in which HDD will occur, OxyChem will have a Frac-Out Contingency Plan to be prepared in the event of an inadvertent frac-out during this type of construction.

Road/Railroad Crossings – OxyChem anticipates using boring techniques for road and railroad crossings when these features cannot be disrupted. If open-cut crossing is determined feasible, it will be used in lieu of boring.

Dewatering – Dewatering activities might be necessary to remove excess water from the trench line during periods of excessive precipitation or high water table. Dewatering activities will be performed in accordance with OxyChem's BMPs. Under no circumstances shall heavily silt-laden waters be directly discharged into wetlands or waterbodies. To the maximum extent possible, discharges will occur in well-vegetated upland areas on stable, non-erosive surfaces.

If dewatering locations are selected that are not within or immediately adjacent to the construction ROW, they will be sited to minimize off-ROW impacts. If dewatering locations must occur within sensitive areas (e.g., designated wetland areas), multiple sediment controls will be used (e.g., straw-bale structure/silt fencing surrounding a silt bag, turbidity barriers, reduced pumping rates) to prevent adverse impacts.

2.2.4.15 Environmental Training

To address USFWS's concerns regarding potential adverse impacts to sensitive snakes during construction, OxyChem will provide environmental training to all on-site construction personnel in accordance with the *Sensitive Snake Education and Management Plan*, as further discussed in Section 6.2.1.

2.2.5 Construction Noise Levels

The Project is located in an industrial area and is situated between Sherwin Alumina Company to the east and by the existing OxyChem Facility and DuPont facility to the west. Noise levels during construction should be comparable to noise levels from the adjacent Facilities. The best available technology will be used to maintain noise levels as minimal as practicable. The construction contractor will implement a Hearing Protection Procedure to protect employees and the surrounding environment from noise pollution to the maximum extent practical. Risk assessments will be performed during the planning stages of construction to identify activities where high and prolonged noise levels can be expected and minimized.

2.3 Operation and Maintenance Information

2.3.1 Fractionation Facility

OxyChem operates its facilities under a maintenance regime that includes monitoring, corrective, and preventative maintenance plans. The plans set out written procedures consistent with corporate policy, procedures and federal standards, including Department of Transportation (DOT) regulations at 18 CFR Part 127.401 and subpart 193(G) of CFR Title 49. The new Fractionation Facility will be owned, operated, and maintained under the same industry standards, applicable federal and state regulations, and will be integrated with the existing adjacent OxyChem Facility.

2.3.2 Barge Dock Modifications

The barge docks will be operated and maintained by appropriately trained and licensed OxyChem employees in accordance with regulatory permit conditions and authorizations, engineering design specifications, recommended manufacturer maintenance practices, and OxyChem's operating policies and procedures.

2.3.3 Pipelines

The Project will be operated and maintained by appropriately trained and licensed OxyChem employees and/or contracted entities, in accordance with regulatory permit conditions and authorizations, engineering design specifications, recommended manufacturer maintenance practices, and OxyChem's operating policies and procedures. Periodic clearing of trees and shrubs over the 50-foot-wide permanent ROW will occur as necessary.

2.4 Safety Controls

2.4.1 Fractionation Facility

2.4.1.1 Spill Containment

Concrete containment will be provided around the NGL Fractionation Facility area to direct any spill material to the contaminated water storage tank for treatment.

All product and waste storage tanks will be surrounded by a containment area to contain 110% of a single tank. This design will ensure spill containment, even in the unlikely event the tank fails and spills its entire contents into the secondary containment.

A containment area will surround the product loading areas (rail, truck, and barge) to ensure drip containment at loading areas. Shut-off valves/switches will be available to immediately shutdown flow at the loading area to avoid a spill.

A stainless steel oil reservoir/containment area will be included with electric oil heaters of the process refrigeration compressor oil system.

2.4.1.2 Hazard Detection System

The Fractionation Facility will be equipped with a hazard detection system consisting of separate LEL meters.

2.4.1.3 Fire Protection System

The Fractionation Facility will include a dedicated firewater system. The firewater system will be designed for not less than 9000 gallons per minute (GPM) at 150 pounds per square inch gauge (PSIG) of total delivery and will comply with NFPA standards. Make-up water for the firewater system will be supplied directly from the utility water supply line (from San Patricio Water District).

Safety Instrumented System (SIS) remote isolation valves provided between reflux accumulator and reflux pumps and the column bottoms outlets (De-Ethanizer, De-Propanizer, and De-Butanizer) will contain shut-off mechanisms during emergency situations such as fire.

2.4.2 Barge Dock Modifications

Vapors from barge loading will be returned to storage tanks or the thermal oxidizers in dedicated headers. A multi-fiber optic communication system will be provided to the barge loading area and it will carry communications with the Distributed Control System (DCS) and alarm system. The barge dock will have a remote control system that will communicate with the DCS.

Stormwater and gasoline drips will be collected from the barge docks and returned to the contaminated water storage tanks. Firewater from the NGL firewater system will be provided to the dock in an underground 16” header.

In order to properly manage an unlikely event of a spill at the barge docks, OxyChem barge attendants will be trained in proper spill prevention and containment procedures. Containment is the immediate priority in the case of a spill. The barge dock attendant will deploy sorbent

pads and barrier materials to contain the spill, turn off electrical power to the nearest areas, shut off the flow of product, and restrict the area from use until the proper clean-up is completed. Clean-up procedures will begin immediately after a spill is contained and will comply with applicable state and federal spill clean-up rules and regulations.

2.4.3 Pipeline Facilities

2.4.3.1 Training and Licensing

The Project will be operated and maintained by appropriately trained and licensed OxyChem employees and/or contracted entities, in accordance with regulatory permit conditions and authorizations, engineering design specifications, recommended manufacturer maintenance practices, and OxyChem's operating policies and procedures.

2.4.3.2 Corrosion Protection and Detection Systems

During construction of the proposed pipelines, OxyChem will install a cathodic protection system to prevent or minimize corrosion of the buried pipeline and aboveground facilities. The cathodic protection system impresses a low-voltage current on the pipeline to offset natural soil and groundwater corrosion potential. The condition of the pipe coating and the effectiveness of the cathodic protection system will be monitored during regularly scheduled cathodic protection surveys in accordance with federal standards and regulations. Cathodic protection surveys usually require walking the pipeline ROW with monitoring instruments. Repairs to the pipe, the pipe coating, or the cathodic protection system will be made as appropriate.

2.4.4 Emergency Response Procedures

The proposed pipelines and aboveground facilities will be designed, constructed, operated, and maintained in accordance with 49 CFR Part 192. The DOT regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies: material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion. Part 192 also prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under Section 192.615, each pipeline operator will establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- making personnel, equipment, tools, and materials available at the scene of an emergency;
- protecting people first and then property, and making them safe from actual or potential hazards; and
- emergency shut-down (ESD) of the system and safe restoration of service.

Part 192 also requires that each operator establishes and maintains a liaison with appropriate fire, police, regulatory, and public officials to learn the resources and responsibilities of each organization that might respond to a natural gas pipeline emergency, and to coordinate mutual assistance.

3.0 ACTION AREA, SPECIES LIST, AND HABITAT, AIR, AND WATER QUALITY ANALYSES

3.1 Action Area

The Project Action Area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the 'action'" (50 CFR 402.02). In determining what constitutes the Area for the proposed Project for purposes of assessing potential impacts to T&E species, direct and indirect effects of the proposed Project were considered.

Potential direct and indirect impacts to the environment associated with the Project as described in greater detail in Section 2.0 include: air emissions, water discharge, construction activities, operation and maintenance, construction noise levels, increased barge traffic, and conversion of habitats associated with the Project. With implementation of avoidance, minimization, and BMPs also described in Section 2.0, indirect impacts associated with the construction, operation, and maintenance are not expected.

Given that the Project involves a Fractionation Facility, NAAQS criteria pollutant emissions and their effect on air quality were given special consideration in determining the Project Action Area. An Air Quality Analysis (see Section 3.4) was conducted for the Project to determine if air emissions would result in indirect effects outside the Fractionation Facility Site boundary. The results of the modeling/analysis demonstrated all concentrations of pollutants from the Fractionation Facility Site are below SILs at ground level at all points along the Fractionation Facility Site boundary. Because emissions are below Significant Impact Levels (SIL) at boundaries of the Fractionation Facility Site, no indirect off-site impacts to surface waters, soils, or vegetation are expected from the Project emissions.

The Action Area is defined as the areas within the boundaries of the approximately 504.11-acre Fractionation Facility Site (inclusive of Fractionator Facility and Temporary Impact/construction areas), the approximately 226.51-acre SPP Corridor, and the approximately 4.98-acre pipe laydown area. The Action Area also includes an approximately 8.04-acre area within which modifications will be made (adding new pipe racks, extending pipe racks on the barge docks, retrofitting the docks' loading arms, and installing two monopiles, one at each barge dock) to two existing barge docks to accommodate barge transport of Fractionation Facility products. Accordingly, this BA focuses on potential effects of the implementation of the proposed Project on T&E species within this defined Action Area, including potential effects associated with operation of an increased number of barges (e.g., barge size, barge speed, and barge traffic). Figure 3-1 shows the limits of the Project Action Area.

3.2 Species List

The list of federally-listed T&E species having the potential to occur in the vicinity of the Project was developed via review of online and hard copy resources, agency database requests, and agency consultation. Initially, the Texas Parks and Wildlife Department (TPWD) Geographic Information System (GIS) Endangered Species Mapper by County (TPWD 2013a) and the TPWD-internet based service (TPWD 2013b) were reviewed for federally- and state-listed T&E species by county. Similarly, the USFWS county-based internet search engine (USFWS 2013a) and the NMFS internet search engine (NMFS 2013a and 2013b) was reviewed for species with

Acreage Table

Lay Down Area	4.98
Barge Dock Area	8.04
Pipeline Corridor	226.51
Temporary Impact	100.31
Fractionator Facility	403.80

(includes pipeline corridor overlap)

Source: World Street Map and County Boundaries from ESRI online mapping services. Available at http://services.arcgisonline.com/arcgis/services

LEGEND

- Monopole Locations
- Project Action Area (743.6 acres)

0 2 4 6 8 Miles

Scale = 1:150,000

Sheet 1 of 1

Figure 3-1. Project Action Area for the OxyChem Fractionation Facility Project, San Patricio County, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 3/13

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ESA designations. To further investigate the availability of more site-specific data, a formal request was made to the Texas Natural Diversity Database (TXNDD) for geospatial, tabular, and non-tabular data regarding existing records of federally- and state-listed T&E species in the vicinity of the Project.

On February 14, 2012 OxyChem and Tetra Tech, Inc. (Tetra Tech) also held a pre-application meeting with the USFWS and NMFS-HCD to discuss the Project components, environmental impacts, avoidance and minimization measures, listed species, and the consultation process. As a result of the February 14, 2012 pre-application meeting with USFWS and NMFS, and the T&E list developed through the internet database research (USFWS 2013a, TPWD 2013b, and NMFS 2013b), a list of 14 animal and two plant species that warranted further assessment (Table 3-1).

Table 3-1 Federally-listed Threatened, Endangered, and Candidate Species with Potential to Occur in the Project Action Area as Identified by Review of USFWS, NMFS, and TPWD lists for San Patricio County, Texas

Common Name	Scientific Name	Federal Status
Mammals		
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	LE
Ocelot	*Leopardus pardalis*	LE
Red wolf	*Canis rufus*	LE
West Indian manatee	*Trichechus manatus*	LE
Birds		
Northern aplomado falcon	*Falco femoralis septentrionalis*	LE
Piping plover	*Charadrius melodus*	LT
Whooping crane	*Grus americana*	LE
Reptiles		
Green sea turtle	*Chelonia mydas*	LT
Hawksbill sea turtle	*Eretmochelys imbricata*	LE
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE
Leatherback sea turtle	*Dermochelys coriacea*	LE
Loggerhead sea turtle	*Caretta caretta*	LT
Fish		
Smalltooth sawfish	*Pristis pectinata*	LE
Plants		
Slender rush-pea	*Hoffmannseggia tenella*	LE
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE
Mollusks		
Golden Orb	*Quadrula aurea*	C

[1] LE = Endangered, LT = Threatened, C = Candidate

Although further assessment was requested, the USFWS indicated they did not anticipate any of the listed species to be negatively impacted, with the possible exception of the whooping crane (*Grus americana*) (see Appendix A). The whooping crane was mentioned as the Project is located on the edge of the USFWS-identified whooping crane migration corridor (USFWS 2013k).

Of the 14 animal species identified, seven species are estuarine/coastal, including five sea turtles, the West Indian manatee, and the smalltooth sawfish. Habitat for the five sea turtles, smalltooth sawfish, and manatee is not located at the Fractionation Facility Site or within the SPP Corridor, but might occur adjacent to the OxyChem Facility barge docks.

3.3 Habitat Analysis

On February 21–25, 2012 and April 30, 2012, field survey work was conducted on the 504-acre Fractionation Facility Site and the 18.5-mile-long SPP Corridor (survey area included a 200-foot wide corridor encompassing all potential construction workspace). The field survey focused on the identification and characterization of potential habitat for each of the species identified through the internet database search and the February 14, 2012 agency coordination meeting (as listed in Table 3-1).

The general habitat requirements, characteristics, and field signs of the identified T&E species (Table 3-2) were known and if encountered were documented. All habitats encountered were also characterized in regards to land use and vegetation cover for follow-up desktop analysis. The habitat characterizations and quantifications were used to further assess the potential for the Project's habitats to support identified T&E species (Table 3-2). ArcGIS was used in conjunction with georeferenced aerial photographs and results of the field survey to digitize the habitat/land use and calculate the acreages of each (see Appendix C). Appendix D shows the locations of the various habitat/land use types surrounding the Project Action Area.

Habitat/land uses observed during the field assessments within the Project areas, in order from greatest area to least area were: cropland, maintained (commercial or residential lands), shrubland, grassland, and pastureland (Table 3-3). The majority of the Project areas comprised of lands previously altered by human uses. Table 3-3 presents the acreage of permanent and temporary impact by each habitat/land use type. The USACE determined no jurisdictional wetlands or waters were located within the Fractionation Facility Site or the SPP Corridor.

Table 3-2 Preliminary Federally-listed Threatened and Endangered Species for the OxyChem Fractionation Facility Project.

Common Name	Scientific Name	Federal Status[1]	TXNDD Records[2]	Habitat and Life History Requirements[3]	Habitat Present	Impact Potential	Comment
Mammals							
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	LE	4	Thick brushlands, near water favored; 60 to 75 day gestation, young born sometimes twice per year in March and August, elsewhere the beginning of the rainy season and end of the dry season	Yes	None	Size and quality of shrub habitat not suitable to support this species
Ocelot	*Leopardus pardalis*	LE	0	Dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November	Yes	None	Size and quality of shrub habitat not suitable to support this species
Red wolf	*Canis rufus*	LE	0	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	No	None	No prairie or forested lands in survey area
West Indian manatee	*Trichechus manatus*	LE	1	Gulf and bay system; opportunistic, aquatic herbivore	Yes	None	For the Barge Dock Modifications, BMPs will be implemented to avoid impacts to this species
Birds							
Northern aplomado falcon	*Falco femoralis septentrionalis*	LE	0	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats	No	None	Adults are mobile enough to flee if necessary
Piping plover	*Charadrius melodus*	LT	28	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats	No	None	No sand, mudflats, or beaches present to support this species

Common Name	Scientific Name	Federal Status[1]	TXNDD Records[2]	Habitat and Life History Requirements[3]	Habitat Present	Impact Potential	Comment
Whooping crane	*Grus americana*	LE	2	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	No	None	Within USFWS whooping crane migration corridor. Ensure lighting of facility to make structures visible during low-light conditions (dawn, dusk, and nighttime hours)
Reptiles							
Green sea turtle	*Chelonia mydas*	LT	3	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on seagrass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on seagrasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June.	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.
Hawksbill sea turtle	*Eretmochelys imbricata*	LE	3	Gulf and bay system, warm shallow waters especially in rocky marine environments, such as coral reefs and jetties, juveniles found in floating mats of sea plants; feed on sponges, jellyfish, sea urchins, mollusks, and crustaceans, nests April through November	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	5	Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs, but also other crustaceans, snails, clams and plants, juveniles feed on sargassum and its associated fauna; nests April through August.	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.

Common Name	Scientific Name	Federal Status[1]	TXNDD Records[2]	Habitat and Life History Requirements[3]	Habitat Present	Impact Potential	Comment
Leatherback sea turtle	*Dermochelys coriacea*	LE	0	Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the US portion of their western Atlantic nesting territories, nesting season ranges from March to August	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.
Loggerhead sea turtle	*Caretta caretta*	LT	2	Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November.	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.
Fish							
Smalltooth sawfish	*Pristis pectinata*	LE	0	Different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 feet (10 meters); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass beds, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans.	Yes	None	Habitat will be avoided by use of HDD technology. BMPs will be implemented to avoid impacts to this species.

Common Name	Scientific Name	Federal Status[1]	TXNDD Records[2]	Habitat and Life History Requirements[3]	Habitat Present	Impact Potential	Comment
Plants							
Slender rush-pea	*Hoffmannseggia tenella*	LE	3	Slender rush-pea grows on clayey soil of blackland prairies and creek banks in association with short and midgrasses such as buffalograss, Texas wintergrass, and Texas grama. Woody plants such as mesquite, huisache, huisachillo, spiny hackberry, brasil, retama, lotebush, tasajillo, and prickly pear are also common at the known sites. The plant is threatened by encroachment of exotic grasses.	No	None	No blackland prairie present in Project Action Area. Plant unlikely to occur in Project Action Area due to presence of exotic grasses and agriculture throughout Project Action Area.
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	5	South Texas ambrosia occurs in open grasslands or savannas on soils varying from open clay loams to sandy loams. Easily outcompeted by non-native grasses such as buffelgrass.	No	None	No native open grasslands or savannas present in Project Action Area. Soils predominantly disturbed.
Mollusks							
Golden orb	*Quadrula aurea*	C	N	Sand and gravel in some locations and mud at others; found in lentic and lotic systems; Guadalupe, San Antonio, Lower San Marcos, and Nueces River basins.	No	None	No habitat present.

[1] LE – Endangered, LT – Threatened, C - Candidate (TPWD 2013, USFWS 2013, NMFS 2013b).
http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/ Accessed 3/2013, USFWS Endangered Species Program
http://www.fws.gov/endangered/ Accessed 3,2013, NMFS Marine Mammal Species under the Endangered Species Act
http://www.nmfs.noaa.gov/pr/species/esa/mammals.htm Accessed 3/2013.

[2] TXNDD data request (1/2012), number of records for particular species.

[3] TPWD. 2013a. Endangered Species Mapper by County. http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/. Accessed 3/2013.

N = No information received.

Table 3-3 Acres of Habitat/Land Use Types Affected by Construction and Operation of the Fractionation Facility Site and SPP Corridor

Habitat /Land Use Type[1]	Description	Permanent[3] (acres)	Temporary[4] (acres)
Cropland	Fields used annually for crop growing. Most are very large areas with no medians or boundaries, except for intersecting roads. Only cotton (*Gossypium hirsutum*) fields were observed.	198.50	275.97
Maintained[2]	This includes residential properties, industrial areas, and maintained commercial grass areas.	94.32	82.37
Shrubland	Shrublands not exceedingly dense, are dominated by honey mesquite (*Prosopis glandulosa*), and are very isolated or fragmented by roads, maintained utility line rights-of-way, or maintained lands.	5.19	66.83
Grassland	These are isolated and small areas that have been impacted previously and are mowed occasionally. They are currently used for storing equipment and materials.	3.20	4.96
Pastureland	Cattle-grazed land enclosed by an electric fence.	1.65	2.61
	Totals:	**302.86**	**432.74**

[1] Does not include 8.04 acres of Project Action Area surrounding existing barge docks which will be modified. Due to the small size and USACE non-jurisdictional determination of streams/ditches, these aquatic features are included in the overall land use in which they are located. The aquatic features included: four small ditch-form wetlands; two intermittent drainage canals; and 36 drainage ditches (seven intermittent and 29 ephemeral). Water depths in aquatic habitat were no greater than 1 foot with the exception of the man-made drainage canals on the Fractionation Facility Site that were greater in depth and showed signs of flow.

[2] Due to the small size of roads, commercial buildings, and grassy road boundaries, these land uses are included in the overall land use in which they are located.

[3] Permanent acreage includes those areas located within the Project permanent operational area of the Fractionation Facility Site and SPP Corridor permanent maintained ROW.

[4] Temporary acreage includes those areas temporarily used during Project construction of the Fractionation Facility Site (e.g., construction staging areas, parking areas) and SPP Corridor (e.g., temporary construction ROW and ATWS), and would be returned to pre-construction habitat/land use.

A brief description of the habitat/land use categories in the Fractionation Facility Site and SPP Corridor is provided below.

Cropland: This land use is the most prevalent type in the Fractionation Facility Site and SPP Corridor, comprising a total of approximately 474.47 acres. The cropland exhibited signs of remnant cotton production. Soils identified were primarily a clay or silty clay texture with dark colors. Little to no topographic relief was observed in the area. Man-made drainage ditches or canals showed the greatest changes in topography. No live vegetation was observed within a majority of cropland areas at the time of field review. Only the edges of the fields exhibited maintained grasses and forbs forming sparse herbaceous cover. Typical plants in these areas were Kleberg's bluestem (*Dichantium annulatum*) and bur clover (*Medicago polymorpha*).

Maintained: This land use is the second most common category occupying approximately 176.69 acres of the Fractionation Facility Site and SPP Corridor. The land use includes: grassy road and field boundaries; and maintained grasses in commercial areas. Common plant species identified in these habitats were Kleberg's bluestem, bur clover, bermuda grass (*Cynodon dactylon*), and Carolina geranium (*Geranium carolinianum*).

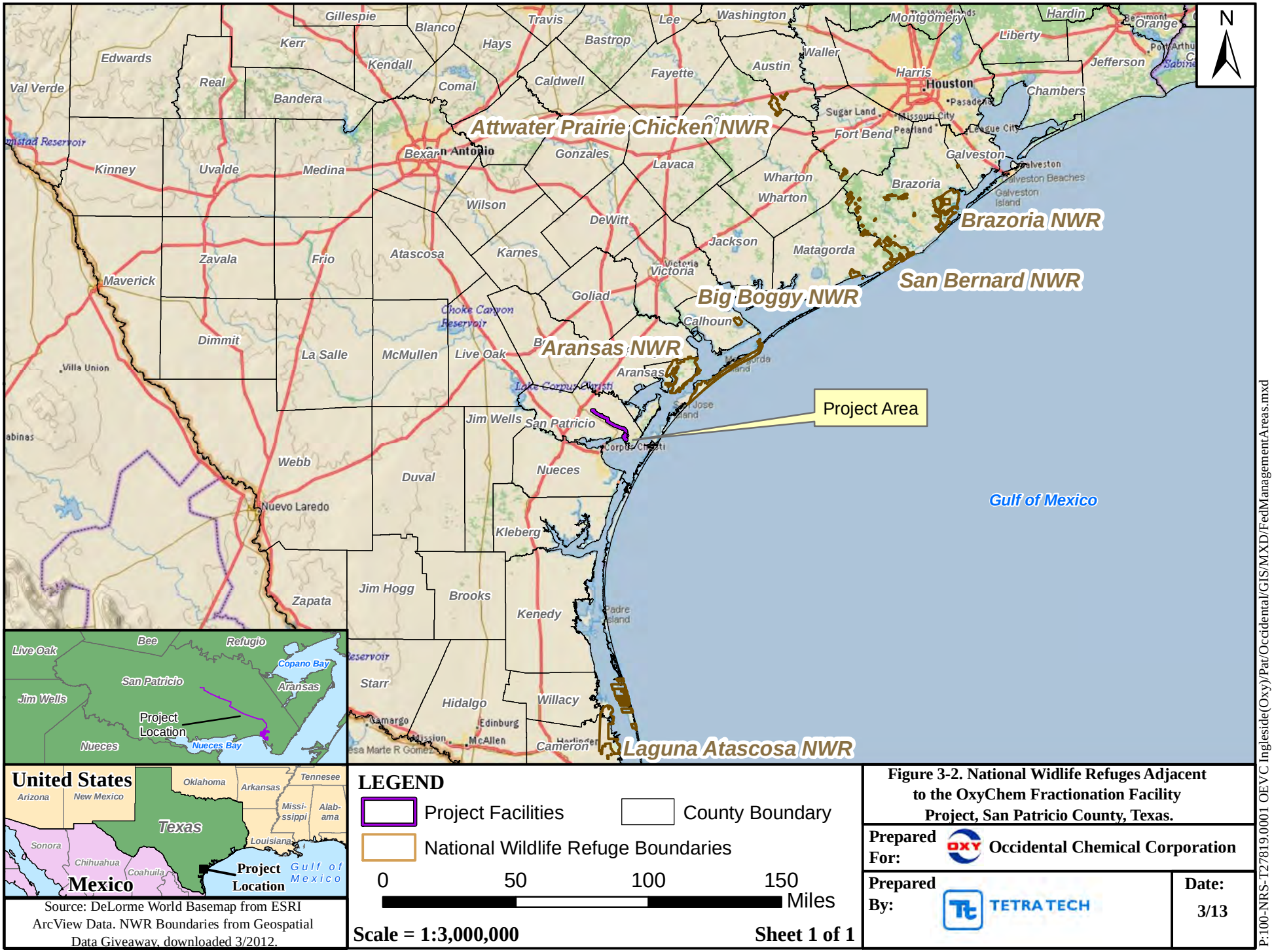
Shrubland: A total of approximately 72.02 acres of the Fractionation Facility Site and SPP Corridor is comprised of this habitat. Two isolated and small shrubland areas were delineated west of milepost 0.50 along the northern boundary of the Fractionation Facility Site. These shrubland areas appeared to provide a vegetated buffer between a large area of cropland to the south and an industrial/commercial area to the north. Shrubland habitat was also located in the

SPP Corridor between mileposts 1.75 and 2.50. This shrubland is on the outer edge of a larger shrubland that extends to the east and south/southeast of the SPP Corridor. The shrubland habitat is isolated within the boundaries formed by CR 93, SH 35, and SH 361. It is also fragmented with roads, power line crossings, residential land, and maintained grass areas. One narrow (less than 10 feet in width) shrubland was also observed at milepost 8.75 in the SPP Corridor. The most common shrubs in the surveyed shrubland area were honey mesquite (*Prosopis glandulosa*) and blackbrush (*Acacia rigidula*).

Grassland: Two areas are comprised of grassland and total approximately 8.16 acres. Both areas were on the eastern side of the SPP Corridor at mileposts 0.75 and 4.50. The larger of the two grassland areas was bordered by two sets of train tracks and SH 361 to the south and extensive cropland to the east, west, and north. This grassland appeared semi-maintained due to its use as a storage area for agricultural equipment. Grasses in this area were approximately 1-foot in height at the time of the survey. Sparsely scattered salt-water false willow (*Baccharis angustifolia*) shrubs were present in the grassland areas.

Pastureland: Only one area located near milepost 8.25 was occupied by pastureland and totals approximately 4.26 acres. The area is grazed by domestic cattle, and therefore the vegetation is stunted and composed of a variety of forbs and grasses. It was not contiguous to a larger grazing area and was surrounded by well pads and cropland.

State and federally owned lands can provide important habitats for T&E species. An analysis of nearby public lands and records of T&E occurrence were investigated to further assist with the impact assessment (Figures 3-1 and 3-2). Maps of these lands are provided for reference as they are discussed in Section 4.0 below.



Source: DeLorme World Basemap from ESRI ArcView Data. NWR Boundaries from Geospatial Data Giveaway, downloaded 3/2012.

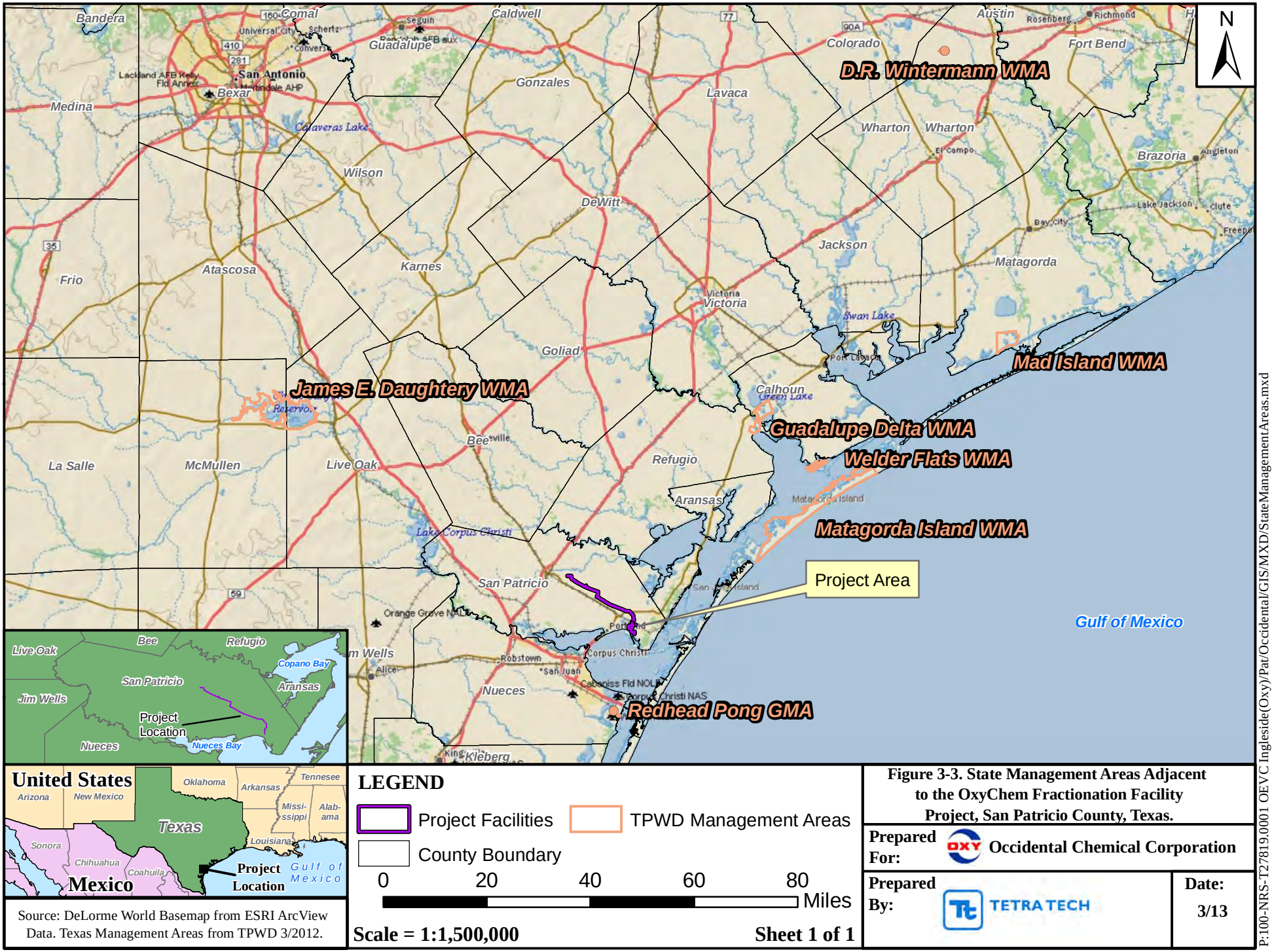
Figure 3-2. National Widlife Refuges Adjacent to the OxyChem Fractionation Facility Project, San Patricio County, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 3/13

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/FedManagementAreas.mxd



LEGEND

Project Facilities

TPWD Management Areas

County Boundary

0 20 40 60 80 Miles

Scale = 1:1,500,000

Sheet 1 of 1

Source: DeLorme World Basemap from ESRI ArcView Data. Texas Management Areas from TPWD 3/2012.

Figure 3-3. State Management Areas Adjacent to the OxyChem Fractionation Facility Project, San Patricio County, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 3/13

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/StateManagementAreas.mxd

3.4 Air Quality Analysis and Results

An Air Quality Analysis of project emissions associated with the Project was conducted to determine if air emissions would result in extending the Action Area beyond the boundaries of the Fractionation Facility Site. Results of the Air Quality Analysis are detailed below.

3.4.1 Estimated Total Annual Emission Rate

During the preparation of the pre-construction air permit applications for the Project, Keil Environmental, Inc. developed a set of detailed emissions calculations for the sources associated with the proposed Project. These data were processed using USEPA and TCEQ approved dispersion models to evaluate the potential off-site impact that would result. The emission sources to be constructed as part of the proposed Project and addressed in the air dispersion analysis (modeling) included four continuous point sources, five area sources, and five emergency engines.

Each of the planned emission sources and their proposed emission rates used for modeling are shown in Table 3-4. Table 3-5 provides the emission rates for non-criteria pollutants that were reviewed for compliance with state standards and Effects Screening Levels (ESL). ESLs are not ambient air standards, but instead are screening concentrations used by TCEQ to assess the potential for impacts to public health and welfare.

In addition to the proposed Project, the existing cogeneration units at the project site were recently authorized for Maintenance, Start-up and Shutdown (MSS) emissions. As these MSS emissions had not been reviewed previously they were included in modeling to establish compliance with the NAAQS.

Table 3-6 provides the NAAQS, PSD Increments and Significant Impact Levels (SILs) which will be used in the evaluation of Project impacts. Table 3-7 similarly identifies air contaminants that will be emitted by the Project for which Texas has set state standards or compounds which are subject to ESL review.

3.4.2 Area of Impact Dispersion Modeling Methodology

Air quality dispersion analysis of the proposed Project's emissions is required to meet both the requirements of EPA (40 CFR § 52.21) and the TCEQ (30 TAC § 116). According to the USEPA, "Dispersion modeling uses mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source." This section provides an overview of the methods used for dispersion modeling.

An air dispersion modeling protocol was prepared by Air Pollution Control Consulting (APCC), Austin, Texas, after consultations with the USEPA and the TCEQ. The primary points of that protocol are summarized below.

3.4.3 Dispersion Modeling

The specific modeling parameters applicable to the geographic location in which the Project site is located, such as meteorological data, rural versus urban dispersion coefficients, and receptor grid are discussed in the following section. The modeling parameters were defined primarily by the USEPA-recommended "regulatory default option" which includes the use of stack-tip downwash, the effects of elevated terrain, and calms and missing data processing routines.

Table 3-4 Criteria Pollutant Emissions

Emission Point Numbers (EPN)	Description	NO_x		CO		SO_2		$PM_{2.5}$		PM_{10}	
		(lbs/hr[1])	(TPY)	(lbs/hr[1])	(TPY)	(lbs/hr[1])	(TPY)	(lbs/hr[1])	(TPY)	(lbs/hr[1])	(TPY)
NGL-1	NGL Thermal Oxidizer No. 1	3.60	15.77	2.40	10.51	3.00	13.14	0.00	0.00	0.60	2.63
NGL-2	NGL Thermal Oxidizer No. 2	3.60	15.77	2.40	10.51	3.00	13.14	0.00	0.00	0.60	2.63
NGL-3	NGL Emergency Flare	0.04	0.19	0.09	0.39	0.01	0.01	0.00	0.00	0.00	0.00
NGL-4	NGL Cooling Tower	0.00	0.00	0.00	0.00	0.00	0.00	0.001	0.005	0.13	0.57
NGL-5	NGL Process Area Fugitives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-6	Gasoline Storage Area Fugitives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-7	LPG Storage Area Fugitives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-8	NGL Barge Dock Loading Area Fugitives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-9	NGL Rail Car/Truck Loading Area Fugitives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-10	NGL Emergency Generator Diesel Engine	12.69	0.33	6.87	0.18	0.02	0.01	0.00	0.00	0.40	0.01
NGL-11	NGL Firewater Pump Diesel Engine	5.29	0.14	2.86	0.07	0.01	0.01	0.00	0.00	0.17	0.01
NGL-12	NGL Firewater Pump Diesel Engine	5.29	0.14	2.86	0.07	0.01	0.01	0.00	0.00	0.17	0.01
NGL-13	NGL Firewater Pump Diesel Engine	5.29	0.14	2.86	0.07	0.01	0.01	0.00	0.00	0.17	0.01
NGL-14	NGL Firewater Pump Diesel Engine	5.29	0.14	2.86	0.07	0.01	0.01	0.00	0.00	0.17	0.01

[1] lbs/hr = pounds per hour

Table 3-5 Non-Criteria Pollutant Emissions

EPN	VOC (lbs/hr)	VOC (TPY)	H_2SO_4 (lbs/hr)	H_2SO_4 (TPY)	H_2S (lbs/hr)	H_2S (TPY)	Cl_2 (lbs/hr)	Cl_2 (TPY)
NGL-1	2.22	9.72	0.23	1.01	0.01	0.05	0.00	0.00
NGL-2	2.22	9.72	0.23	1.01	0.01	0.05	0.00	0.00
NGL-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NGL-4	1.80	7.89	0.00	0.00	0.00	0.00	0.01	0.01
NGL-5	0.89	3.90	0.00	0.00	0.00	0.00	0.00	0.00
NGL-6	0.23	1.01	0.00	0.00	0.00	0.00	0.00	0.00
NGL-7	0.18	0.77	0.00	0.00	0.00	0.00	0.00	0.00
NGL-8	0.08	0.37	0.00	0.00	0.00	0.00	0.00	0.00
NGL-9	0.11	0.49	0.00	0.00	0.00	0.00	0.00	0.00
NGL-10	0.85	0.02	0.00	0.00	0.00	0.00	0.00	0.00
NGL-11	1.24	0.03	0.00	0.00	0.00	0.00	0.00	0.00
NGL-12	1.24	0.03	0.00	0.00	0.00	0.00	0.00	0.00
NGL-13	1.24	0.03	0.00	0.00	0.00	0.00	0.00	0.00
NGL-14	1.24	0.03	0.00	0.00	0.00	0.00	0.00	0.00

Table 3-6 NAAQS, PSD Increments and Significant Impact Levels in One Millionth of a Gram per Cubic Meter ($\mu g/m^3$)

Pollutant	Average Periods				
	1-Hour	3-Hour	8-Hour	24-Hour	Annual
NAAQS					
NO_x	188	--	--	--	100
CO	40,000	--	10,000	--	--
SO_2	196	1,300	--	365	80
PM_{10}	--	--	--	150	--
$PM_{2.5}$	--	--	--	35	15
PSD Increments					
NO_x	--	--	--	--	25
SO_2	--	512	--	91	20
PM_{10}	--	--	--	30	17
$PM_{2.5}$	--	--	--	9	4
Significant Impact Level					
NO_x	7.5	--	--	--	1
CO	2,000	--	500	--	--
SO_2	7.8	25	--	5	1
PM_{10}	--	--	--	5	1
$PM_{2.5}$	--	--	--	1.2	0.3

Table 3-7 State Standards and Effects Screening Levels (µg/m^3)

Compounds Subject to State Standards		
Pollutant	Average Periods	
	1-Hour	24-Hour
H_2SO_4	50	15
H_2S	108	--
Diesel VOC	90	9.0
Diesel PM	1.5	0.15
Cl_2	15	1.5
Isobutane	4,800	1,900
Normal Butane	23,750	2,375
Isopentane	3,800*	7,200
Normal Pentane	4,100*	7,200
Normal Hexane	5,300*	200
Heptanes	3,500	350
Octanes	3,500	350
Benzene	170	4.5
Toluene	640*	1,200
Xylene	350*	180
Carbonyl Sulfide	1,330	2.6
Methyl Mercaptane	2*	1
Ethyl Mercaptane	0.8*	1.3
Isopropyl Mercaptan	0.8	0.08
Methyl Isopropyl Mercaptan	2	1.8
Dimethyl Sulfide	7.6*	25
Dimethyl Disulfide	20	2
Diethyl Disulfide	20	14
Triethylene Glycol	10000	1,000
Diethanolamine	10	1

* Identifies the ESLs that are set at an odor threshold rather than being a health based value

3.4.4 AERMOD

Modeling was performed using the Advanced Monitoring Systems (AMS)/USEPA Regulatory Model (AERMOD). The AERMOD model was chosen because it is approved by the USEPA as a preferred/recommended model and is approved by the TCEQ modeling staff.

AERMOD is a steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD determines concentrations from multiple point, area, and/or volume sources based on an up-to-date characterization of the atmospheric boundary layer.

The model applies hourly sequential preprocessed (AERMET) meteorological data to estimate air contaminant concentrations at specified location defined by a three-dimensional coordinate system. The AERMOD model is applicable to receptors on all types of terrain, including flat terrain, simple elevated terrain (below height of stack), intermediate terrain (between height of stack and plume height), and complex terrain (above plume height). The AERMOD model also includes analyses across differing terrain conditions. As indicated in the USEPA guidance documents, the AERMOD model is the most applicable to the condition existing near the proposed project site.

The following model options were selected for the analysis of project emissions:

- Due to the location of the proposed Project site along the coastal plain of the Texas Gulf Coast, terrain elevations were not included in the analysis;
- For NAAQS/PSD analysis, pollutants were modeled over five consecutive years of meteorological data. At each receptor, the analysis was performed to predict the highest concentrations for each year reviewed;
- For Texas Ambient Air Quality Standards (TAAQS) an ESL analysis modeling was performed for each compound listed in Table 3-7 as applicable. Short- and long-term impacts were determined for a single year of meteorological data as directed by the TCEQ. The highest concentrations predicted for the receptor grid was compared to the specified standard or ESL to assess impacts;
- The averaging periods noted on Tables 3-6 and 3-7 were modeled as appropriate for each pollutant;
- For emission points with a horizontal discharge, modeling was performed assuming a temperature of 0.0° Kelvin, 0.001 meter/second velocity and a 0.001 meter diameter;
- The five emergency diesel engines were modeled according to the following procedures:
  - Annual modeling of each pollutant having an annual standard was conducted using the maximum allowable emission rates presented in the permit application;
  - Short-term modeling of each pollutant was conducted by taking the ratio of 52 hours of operation per year divided by 8,760 hours per year and multiplying that result by the pollutants Table 1(a) short-term emission rate. For the NO_x models, the NO_2/ NO_x conversion factor of 0.8 was used for the short-term model and 0.75 for the annual model; and
- Ozone Modeling:
  - The requirements of 40 CFR 52.21(k) prevent a proposed source or modification from causing or contributing to a violation of a NAAQS or an applicable maximum allowable increase over the baseline concentration in any area. Because NAAQS and baseline concentrations have not been established for VOC and NO_x contributions to the ozone standard, these requirements will need to be satisfied using a qualitative ozone analysis; and
  - The proposed new emissions from the NGL facilities include new NO_x and VOC contributions from two thermal oxidizers, a flare, a cooling tower, five fugitive areas and five emergency engines. Also, worst-case emission increases are estimated for two cogeneration units that are affected by the new facilities.

3.4.5 Building Wake Effects

Building wake effects occur when air flows around or over a building or other structure, influencing the dispersion of a plume emanating from an emission source. This is commonly referred to as building downwash, and is incorporated into the analysis. As there are several structures near the proposed Project point sources, sufficient in size to cause a downwash effect, the USEPA Building Profile Input Program (BPIP) structure downwash model was used to determine the downwash parameters to include in each model analysis. Table 3-8 shows the height of each structure.

Table 3-8 Building Heights for Structures with Potential to Generate Building Downwash

Structure	Height (meters)
MCC Bldg.	5.5
Maintenance Bldg.	13.7
Emergency Generator	7.3
Cooling Tower	12.2
Gasoline Tanks	18.3
Storage Spheres	23.2
Slops Tank	11.0
FW Pump House	4.3
Substation	5.5
Utilities Bldg.	8.5
Control Room	7.3
Thermal Oxidizers	6.1
Stormwater Tanks	18.3

3.4.6 Terrain

The terrain height between the base of a modeled source and each receptor can vary, potentially affecting the impact analysis. As the terrain within the coastal area surrounding the propose Fractionation Facility Site has no significant variation, terrain elevations were not included in the dispersion analysis.

3.4.7 Receptor Grid

Receptors are the points at which the air dispersion model predicts concentrations of air contaminants emitted from the Project and/or adjacent sources. Receptor grids are defined by the spacing between points to be reviewed. The receptor grids employed in the analysis were constructed following guidance provided by the TCEQ. The following receptor grids were analyzed:

<u>NAAQS/PSD and State Analysis</u>

- Receptors were place along the property boundary at 25 meter intervals;
- A medium density receptor grid using a spacing of 100-meter extended from the proposed Project area out to a distance of approximately one kilometer;
- A final coarse 500-meter receptor grid, extended from the end of the 100-meter grid to a distance of approximately six kilometers; and
- A final grid, with one kilometer spacing was extended far enough, in each direction from the Project site, to ensure that the maximum ground-level impacts have been located.

Additional PSD Grid

- A 25-meter grid was place over the property owned on the DuPont property and along the water edge to the southwest of the Project site; and

- A 25-meter grid was place over the channel easement rather than the water edge property owned on the DuPont property and along the water edge to the southwest of the Project site.

TAAQS and ESL Analysis

- The distance from the emission sources modeled to the nearest property line is approximately 150 meters. Therefore, receptors spaced at 50-meter intervals will also be placed upon the entire state modeling grid; and

- For TAAQS and ESL threshold modeling, the DuPont property does not contain receptors, and thus the facilities are treated as a single site by the TCEQ.

Sensitive Receptors

In addition to the standard grids outlined above, 12 non-industrial receptors, classified as sensitive receptors, were included in the analysis. As the impacts at these locations were well below the maximums summarized in the following, they have not been included in this discussion. The location of these receptors and the impacts at these locations might be reviewed in the final modeling reports submitted for the permit applications.

3.4.8 Meteorological Data

The basic meteorological data used in the modeling analysis was developed and provided by the TCEQ. These data include observed hourly wind speed, wind direction, temperature and numerous other atmospheric parameters. These data are used, along with other emission source specific inputs, by the models to determine the dispersion characteristics of the emissions point to be constructed as part of this Project.

The most recent five years of TCEQ-approved meteorological data includes surface observations collected at the Corpus Christi, Texas airport during the years 1983, 1984, 1986, 1987 and 1988, and upper air data collected at Victoria, Texas during the same time period. These data were used in the analysis of impacts for both NAAQS and PSD increment.

The USEPA program AERMET was used to determine the albedo, Bowen ratio and surface roughness parameters for the area around the proposed Project site. These values were calculated as 0.15, 0.34 and 0.108, respectively. According to TCEQ guidance, a roughness length that falls within the range of 0.1 to 0.7 should use Category 2, or the medium meteorological data set. Therefore, Category 2 meteorological data were used in the analysis.

Modeling to determine compliance with TAAQS and ESL thresholds was conducted using only the 1988 meteorological data, per agency guidance. These data consisted of preprocessed Corpus Christi, Texas surface data and Victoria, Texas upper air data.

3.4.9 Background Sources

Background air quality was not required for the modeling analysis as the maximum off-property impacts for all pollutants reviewed did not exceed their respective SIL's.

3.4.10 Dispersion Modeling Results

A comparison of the modeled concentrations of the Project's criteria and non-criteria pollutant emissions is shown in Tables 3-9 and 3-10, respectively. Table 3-11 presents the speciated VOC impacts in comparison to TCEQ designated ESLs.

As shown by the Table 3-10, off-site impacts resulting from the proposed Action Area are less than the SIL for all criteria pollutants. A SIL is the level set by the USEPA, below which, modeled source impacts would be considered insignificant. Because emissions are below SIL at boundaries of the Fractionation Facility Site, no indirect off-site impacts to soils or vegetation are expected. Additionally, with all criteria pollutants less than SIL, no indirect effects on federally-listed species are expected.

Table 3-9 Predicted Criteria Pollutant Impacts (µg/m^3)

Pollutant	Averaging Period	Predicted Impacts						SIL	NAAQS
		1983	1984	1986	1987	1988	Five-Year Avg.		
NO_2	1-Hour	6.4	6.4	6.4	6.4	6.4	6.4	7.5	188
	Annual	0.79	0.97	0.96	0.85	0.82	0.88	1.0	100
CO	1-Hour	5.4	5.4	5.4	5.4	5.4	5.4	2,000	40,000
	8-Hour	4.0	4.3	3.9	4.2	4.2	4.1	500	10,000
SO_2	1-Hour	6.6	6.6	6.6	6.6	6.6	6.6	7.8	196
	3-Hour	6.3	6.3	6.0	6.2	6.2	6.2	25	1,300
	24-Hour	2.8	3.3	3.0	3.0	3.0	3.0	5	365
	Annual	0.78	0.97	0.96	0.84	0.79	0.87	1	80
PM_{10}	24-Hour	0.57	0.68	0.62	0.63	0.64	0.63	5	150
$PM_{2.5}$	24-Hour	0.56	0.66	0.60	0.61	0.60	0.61	1.2	35
	Annual	0.16	0.19	0.19	0.17	0.16	0.17	0.3	15

Table 3-10 Predicted Impacts for Non-Criteria Pollutants Compared to ESLs (µg/m^3)

Pollutant	1-Hour Averaging Period		Annual Averaging Period		Comment
	Maximum Impact	ESL	Maximum Impact	ESL	
Diesel VOC	1.85	90	0.02	9	Impact < ESL for MSS
Diesel $PM_{10}/PM_{2.5}$	0.26	1.5	0.00	0.15	Impact < ESL for MSS
CL_2	0.02	15	0.00	1.5	Impact <10% of ESL
Isobutane	13.20	4,800	0.09	1900	Impact <10% of ESL
Normal Butane	14.18	23,750	0.11	2375	Impact <10% of ESL
Isopentane	21.42	3,800	0.21	7200	Impact <10% of ESL
Normal Pentane	16.68	4,100	0.16	7200	Impact <10% of ESL
Normal Hexane	11.12	5,300	0.10	200	Impact <10% of ESL
Heptanes	7.00	3,500	0.06	350	Impact <10% of ESL
Octanes	6.81	3,500	0.06	350	Impact <10% of ESL
Benzene	6.32	170	0.05	4.5	Impact <10% of ESL
Toluene	5.42	640	0.05	1200	Impact <10% of ESL

Pollutant	1-Hour Averaging Period		Annual Averaging Period		Comment
	Maximum Impact	ESL	Maximum Impact	ESL	
Xylene	5.22	350	0.05	180	Impact <10% of ESL
Carbonyl Sulfide	0.00	1,330	0.00	2.6	Impact <10% of ESL
Methyl Mercaptan	0.00	2	0.00	1	Impact <10% of ESL
Ethyl Mercaptan	0.01	0.8	0.00	1.3	Impact <10% of ESL
Isopropyl Mercaptan	0.01	0.8	0.00	0.08	Impact <10% of ESL
Methyl Isopropyl Mercaptan	0.00	2	0.00	1.8	Impact <10% of ESL
Dimethyl Sulfide	0.00	7.6	0.00	25	Impact <10% of ESL
Dimethyl Disulfide	0.10	20	0.00	2	Impact <10% of ESL
Diethyl Disulfide	6.86	20	0.06	14	Impact <10% of ESL
Triethylene Glycol	7.09	10,000	0.06	1000	Impact <10% of ESL
Diethanolamine	7.14	10	0.06	1	Impact <10% of ESL
According to current TCEQ guidance: impacts <10% of the ESL satisfy the state level health effects review, impacts of MSS emissions <100% of the ESL satisfy health effects review and impact <2% of state standard satisfactorily demonstrate compliance.					

Table 3-11 Predicted Impacts for Compounds Subject to TCEQ Standards (µg/m^3)

Pollutant	Averaging Period	1988 Maximum Impact	TAAQS	Comments
H_2S	1-Hour	0.02	108	Impact <2% of Standard
H_2SO_4	1-Hour	0.51	50	Impact <2% of Standard
	24-Hour	0.23	15	Impact <2% of Standard

3.5 Water Quality Analysis

3.5.1 Chemical Discharge

As indicated in Section 2.1.1.2 of the BA, the contaminated water from the process, wastewater, utilities, liquefied petroleum gases (LPG) and gasoline storage pump pads, and barge loading will be routed to two contaminated water storage tanks. The Fractionation Facility process unit will generate approximately 50 gallons per minute (gpm) of process waste water which will be directed to the contaminated water stripper *where volatile hydrocarbons will be removed prior to discharge to the existing adjacent OxyChem Facility wastewater treatment unit*. Additionally, approximately 100 gpm of cooling tower and boiler blow down will be discharged from the NGL process to the VCM wastewater discharge. The VCM wastewater treatment system currently utilizes an activated sludge process with clarifiers and filters to remove organics and particulates from the wastewater. The water is then discharged to an outfall diffuser (Outfall 001) and into La Quinta Channel.

The current average flow of the existing wastewater discharge is approximately 830 gpm. The combined flow of the existing wastewater (830 gpm) plus the NGL blow down streams (100 gpm) plus the treated process wastewater (50 gpm) will be approximately 980 gpm. The cooling tower and boiler blow downstream contains no contaminants that require treatment in the wastewater system and this stream is added directly to the discharge. The worst case contaminant expected to be in the process wastewater is benzene. The highest concentration of benzene expected after treatment in the activated sludge process is 0.1 mg/l. Because other wastewater streams are combined with the process wastewater containing benzene, the

resulting concentration of benzene in the wastewater stream is approximately 0.005 mg/l. The current VCM wastewater permit establishes a discharge concentration limit for benzene of 0.136 mg/l which is considered to be protective of marine organisms in accordance with Texas Surface Water Quality Standards for Marine Aquatic Life (30 TAC 307). The discharge associated with the Fractionation Facility is well below (27 times) this threshold. As such, the discharge associated with the Fractionation Facility will not result in impacts to marine organisms.

The existing discharge of process wastewater is subject to federal effluent limitation guidelines per 40 CFR- 414, (Organic Chemicals, Plastics, and Synthetic Fibers). This guideline establishes effluent concentration and loading limits for the following chemicals: Copper; Benzene; Chloroform; Chloroethane; 1,2-Dichloroethane; Acenaphthene; Acrylonitrile; Carbon Tetrachloride; Chlorobenzene; 1,2,4-Trichlorobenzene; Hexachlorobenzene; 1,1,1-Trichloroethane; Chloroethane; 1,1-Dichloroethane; 1,1,2-Trichloroethane; 2-Chlorophenol; 1,2-Dichlorobenzene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 1,1-Dichloroethylene; 1,2-Trans Dichloroethylene, 2,4-Dichlorophenol; 1,2-Dichloropropane; 1,3-Dichloropropylene; 2,4-Dimethylphenol; 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; Ethylbenzene; Fluoranthene; Methylene Chloride; Methyl Chloride; Hexachlorobutadiene; Naphthalene; Nitrobenzene; 2-Nitrophenol; 4-Nitrophenol; 2,4-Dinitrophenol; 4,6-Dinitro-o-cresol; Phenol; Bis(2-ethylhexyl)phthalate; Di-n-butyl phthalate; Dimethyl phthalate; Benzo(a)anthracene; Benzo(a)pyrene; 3,4-Benzofluoranthene; Benzo(k)fluorathene; Chrysene; Acenaphthylene; Anthracene; Fluorene; Phenanthrene; Pyrene; Tetrachloroethylene; Toluene; Trichloroethylene; and Vinyl Chloride. Periodic analysis is conducted to demonstrate compliance with these effluent limits. The 2012 analytical data indicates that average copper concentration in the effluent was 0.019 mg/l compared to an effluent limitation of 0.652 mg/l and all other analytical data was non-detectable for all the chemicals listed above with one acceptation where 0.012 mg/l of 1,2,Dichloroethane was detected in one sample compared to an effluent limitation of 0.21 mg/l. The NGL wastewater will be subject to these same effluent guidelines and analytical requirements. Similar performance is anticipated for the wastewater treatment system with the additional effluent added from the NGL process.

Additionally, the wastewater is discharged to the LaQuinta Channel through a six port diffuser that is designed to rapidly mix the wastewater with receiving water. Modeling has been conducted to predict the effluent concentration at 50-feet from the discharge location. Modeling revealed the diffuser reduces the effluent concentration to 5.55% of the initial discharge concentration. Given the low concentrations of contaminants in the combined wastewater outfall which is well below the effluent limits (considered to be protective of marine organisms), the additional wastewater discharge is expected to have no effect on marine species such as sea turtles, smalltooth sawfish, and the West Indian manatee.

The effluent limits for the existing wastewater discharge establish a requirement to maintain the pH of the effluent between 6.0 and 9.0 and these pH limits will apply to the combined effluents with the NGL plant effluent included. The 2012 analytical data indicates that the average pH values range between 6.8 and 7.2. Similar performance is anticipated for the wastewater treatment system with the additional effluent added from the NGL process.

3.5.2 Thermal Discharge

There is no thermal water discharge associated with the Project. Therefore, there will be no impacts to sea turtles, smalltooth sawfish, or the West Indian manatee from thermal water discharges.

4.0 EFFECTS OF ACTION

4.1 Gulf Coast jaguarundi (*Herpailurus yagouaroundi cacomitli*)

The Gulf Coast jaguarundi (*Herpailurus yagouaroundi cacomitli*), referred to as jaguarundi, is a medium to small sized member of the Felidae family. The jaguarundi is often a dark greyish color, but some individuals have a reddish hue. This carnivore is often confused with members of the weasel (Mustelidae) family due to their elongated body, short limbs, coloration, and rounded ears. It is slightly similar in size to a bobcat (*Lynx rufus*). The jaguarundi was first listed as endangered in 1976 under the protection of the ESA (USFWS 2013b) and remains listed as endangered under the ESA (USFWS 2013a).

4.1.1 Distribution

In the US, the jaguarundi is only known to occur in Texas and Arizona. Due to a paucity of documentation, the range and distribution of the jaguarundi is not well known (Rick 2004). The last documented record of this species in Texas was three individuals in the Aransas National Wildlife Refuge (ANWR) in 1992 (Aransas County). Prior to the 1992 sighting, the species was recorded in 1969 in Willacy County (TPWD 2013c).

4.1.2 Endangerment Factors

The primary limiting factors for jaguarundi populations are current low population levels, habitat loss, habitat conversion, and habitat fragmentation (USFWS 1990a).

4.1.3 Life History Requirements

Little data is available detailing the life history of the jaguarundi. The gestation period is approximately 2.5 months. In Texas, jaguarundi can have two litters per year, one in March and one in August (TPWD 2013c). It is unknown how long kittens stay with the mother, but likely much of jaguarundi life history is somewhat analogous to ocelots. Females reach sexual maturity at age two or three. No conclusive home range size has been identified, but ranges of 2.5 to 40 square miles (1,600 to 26,000 acres) have been observed (Rick 2004).

The jaguarundi uses a variety of habitats in their entire range and is known to inhabit deciduous forests, rainforests, chaparral, thickets, and shrublands. In Texas, the preferred habitat is thick brushlands, typically near water sources (TPWD 2013c). Typical prey species include lizards, birds, and small mammals (Rick 2004).

4.1.4 Field Survey Results

Field surveys revealed the presence of honey mesquite shrubland in the Project Action Area. The first area (located between mileposts 1.75 and 2.50) of shrubland appears to have undergone recent succession from grassy open grazing land to a sparse, early successional scrub-shrub habitat. Herbaceous groundcover is short, indicating the recent presence of cattle grazing. The shrubland habitat within the SPP Corridor permanent impact areas is approximately 5.19 acres. An additional 66.83 acres of shrubland habitat exists in temporary impact areas (temporary construction ROW which will be allowed to revegetate to pre-construction conditions). The shrubland in the SPP Corridor is contiguous with approximately 280 acres of off-site shrubland habitat that extends outside the Project Action Area to the east and southeast. The majority of the 280-acre off-site shrubland habitat is within the boundaries

formed by CR 93, SH 35, and SH 361. It is isolated from other shrubland habitat by these main roads and the surrounding agricultural lands, industrial lands, a small airport, and residential areas (the City of Ingleside). This off-site habitat is also extensively fragmented by existing roads, power line crossings, residential land, and maintained grass areas.

Shrubland is also located along the north boundary of the Fractionation Facility Site (west of milepost 0.50). It is part of a small early successional property buffer of an active crop field. The habitat totals approximately 6.5 acres and is isolated by commercial/industrial lands to the north and active cropland to the south. Other shrubland habitat is crossed by the SPP Corridor at milepost 8.50, but consists of a narrow strip (less than 10 feet wide) of scrub-shrub land.

4.1.5 Impact Analysis

An endangered species data request to the TXNDD in January 2012 revealed four records of jaguarundi in the vicinity of the Project. The most recent record was in 1992 and was of three jaguarundis in the ANWR, approximately 30 miles north of the Project Action Area.

Jaguarundis prefer deciduous forests, rainforests, chaparral, thickets, and shrubland habitats, none of which are present within the Project Action Area. In Texas, the preferred habitat is thick brushlands, typically near water sources (TPWD 2013c). The Project Action Area contains limited patches of low density shrubland (honey mesquite shrubs), which is suboptimal compared to the thick brushlands preferred by the jaguarundi.

Shrubland habitat along the northern boundary of the Fractionation Facility Site is nominal in size and isolated by surrounding industrial and active cropland. The shrubland at milepost 8.75 is nominal and size and at most, 10 feet in width. These isolated patches of shrubland in the Project Action Area are too small to support the jaguarundi which requires home ranges from 1,600 to 26,000 acres. This species is vulnerable due to its sensitivity from disturbance by human activities. These patchy shrubland areas within the Project Action Area are isolated by commercial/industrial and agricultural lands and do not have the extent of habitat necessary to support jaguarundi.

Although the shrubland habitat within the SPP Corridor between mileposts 1.75 and 2.50 is contiguous with off-site shrubland habitat (approximately 280 acres), the habitat is surrounded by roads (CR 93, SH 35, and SH 361) and its interior is fragmented by existing roads, power line crossings, residential land, and maintained grass areas. This shrubland is suboptimal habitat as it does not comprise the density of shrubs preferred by jaguarundi. However, OxyChem avoided the larger more contiguous shrubland to the greatest extent practical, and further minimized impacts to this habitat by aligning the pipeline along the edge of this habitat. As such, the Project will not result in further fragmentation of shrubland habitat.

Given the last documented observations of this species in Texas are limited to three individuals in the ANWR in 1992 (Aransas County) and one record in Willacy County in 1969 (TPWD 2013b), it is highly unlikely jaguarundis occur in the Project area (San Patricio County). Additionally, it is highly unlikely jaguarundis would use the small and isolated patches of shrubland habitat located within the Project Action Area. The largest patch of shrubland habitat adjacent to the Project Action Area is approximately 280-acres in size with no other surrounding suitable habitat for this species, and is not large enough to support the home range needs of an individual jaguarundi (1,600 to 26,000 acres).

Personal communication with Dawn Whitehead of USFWS on March 20, 2013 (USFWS 2013d – see contact report in Appendix E) confirmed the low quality shrub habitat in the Project Action Area is considered isolated, not part of a habitat corridor, and is of such a distance from the last known record occurrence of jaguarundi (30 miles to the north at ANWR), that it is highly unlikely jaguarundi would take advantage of such suboptimal habitat. However, in the rare likelihood that this species would use such suboptimal shrub habitat, OxyChem will direct construction lighting downward and away from brushy areas with the potential to be used by this species to ensure it is not adversely affected.

4.1.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **Gulf Coast jaguarundi**.

4.2 Ocelot (*Leopardus pardalis*)

The ocelot (*Leopardus pardalis*) is a medium sized member of the Felidae (cat) family. Ocelots are typically yellow to brown in color with black spots on their body and two black stripes on each cheek. These carnivores are distinctly characterized by rounded ears and a banded tail (Kittel 2011). The ocelot, which includes the subspecies *Leopardus pardalis albescens* and *Leopardus pardalis sonoriensis*, was first listed as endangered in 1972 under the protection of the ESA (USFWS 2013c). The ocelot remains listed as endangered under the ESA (USFWS 2013a).

4.2.1 Distribution

The Project Action Area is located within the range of the *Leopardus pardalis albescens* subspecies (USFWS 2013c). However, in Texas, the ocelot is only known to occur in Laguna Acosta National Wildlife Refuge (LANWR), Cameron County and on some private lands in Willacy and Kenedy Counties. The LANWR and Willacy/Kenedy County populations are two distinct subpopulations that are separated by more than 15 miles. These populations are primarily restricted to the remnant fragments of thornscrub habitats. There is no new evidence suggesting there are breeding populations of ocelot anywhere else in Texas (TPWD 2013d).

4.2.2 Endangerment Factors

The primary limiting factors for ocelot populations are current low population levels, as well as habitat loss, conversion of habitat, and fragmentation. In this region of Texas, conversion of scrublands to agriculture has forced the ocelot into small, compartmentalized habitats of scrubland, which resulted in a loss of genetic diversity and poses a serious threat to this species (USFWS 2010b).

4.2.3 Life History Requirements

As a fairly unstudied animal, little data is available detailing the life history of wild ocelots. Most data is from captive members of the species. Breeding season in Texas is in late summer and autumn, and gestation is approximately two and one half months and typically results in one or two kittens. Kittens will often disperse after their first year, but have been known to stay with their mother for their first three years (USFWS 2010b). The ocelot reaches sexual maturity in their second year in most cases (USFWS 2010b). Home range depends on habitat quality, but is estimated to be between 0.75 and 12 square miles (480 and 7,680 acres) (Kittel 2011).

The ocelot will use a variety of habitats, however in coastal Texas there is evidence of a preference for thornscrub communities. These thornscrub communities often have a dense canopy (greater than 75%) and a very thick shrub layer (approaching 100% coverage) (USFWS 2010b), and are characterized by many plant species. Such plant species include: creosote bush (*Larrea tridentate*), lechuguilla (*Agave lechuguilla*), Wright's beebrush (*Aloysia wrightii*), yerba de pasmo (*Baccharis pteronioides*), green sotol (*Dasylirion leiophyllum*), American tarwort (*Flourensia cernua*), ocotillo (*Fouquieria splendens*), crown of thorns (*Koeberlinia spinosa*), littleleaf ratany (*Krameria erecta*), Big Bend barometerbush (*Leucophyllum minus*), catclaw mimosa (*Mimosa aculeaticarpa var. biuncifera*), Rio Grande saddlebush (*Mortonia scabrella* = *sempervirens ssp. scabrella*), cactus apple (*Opuntia engelmannii*), mariola (*Parthenium incanum*), honey mesquite, and littleleaf sumac (*Rhus microphylla*) (NatureServe 2009). Typical prey species include lizards, birds, and small mammals.

4.2.4 Field Survey Results

Field surveys identified shrubland habitat with 70% shrub coverage or lower, dominated by honey mesquite in the Project Action Area. The first area (located between milepost 1.75 and 2.50) of shrubland appears to have undergone recent succession from grassy open grazing land to a sparse, early successional scrub-shrub habitat. Herbaceous groundcover in the shrubland habitat is short, indicating the recent presence of cattle grazing. The shrubland habitat within the Project Action Area is approximately 15.49 acres. The shrubland is contiguous with approximately 280 acres of off-site shrubland habitat that extends outside the Project Action Area to the east and southeast. The majority of the 280-acre off-site shrubland habitat is within the boundaries formed by CR 93, SH 35, and SH 361. It is isolated from other shrubland habitat by these main roads and the surrounding agricultural lands, industrial lands, a small airport, and residential areas (the City of Ingleside). This off-site habitat is also extensively fragmented by existing roads, power line crossings, residential land, and maintained grass areas.

Shrubland is also located along the north boundary of the Fractionation Facility Site (west of milepost 0.50). This area is part of a small early succession property buffer of an active crop field. The habitat totals approximately 6.5 acres and is isolated by commercial/industrial lands to the north and active cropland to the south. Other shrubland habitat is crossed by the SPP Corridor at milepost 8.50, but consists of a narrow strip (less than 10 feet wide) of scrub-shrub land.

4.2.5 Impact Analysis

The nearest known population of ocelot is over 100 miles south/southwest of the Project Action Area. San Patricio County reports historic records of ocelot, with no recent observances since 1990. Jim Wells County, west of the Project area and contiguous to San Patricio County, also reports no photographic records of ocelot since 1990 (USFWS 2010b).

Shrubland habitat along the northern boundary of the Fractionation Facility Site is nominal in size and isolated by surrounding industrial and active cropland. The shrubland at milepost 8.75 is nominal and size and at most, 10 feet in width. Although shrubland was identified along the SPP Corridor between mileposts 1.75 and 2.50, the density of shrubs was less than optimal at 70% coverage or less; whereas optimal shrub cover for ocelot is considered 100% coverage. Regardless of the nominal quality of this habitat, OxyChem located the pipeline at the edge of

the shrubland to limit disturbance of the larger off-site shrubland habitat. The larger off-site shrubland habitat will remain intact and not be further fragmented by the Project.

Although shrubland habitat exists within the Project area and adjacent to it, the shrubland is comprised of successional pastureland now vegetated by honey mesquite, a low-density shrub (NatureServe 2009). The shrubland does not provide density (100%) to be suitable habitat for use by ocelots. The other shrubland in the Project site is too small to support the ocelot, especially due to the cat's sensitivity to disturbance from human activities. The patches of shrubland are isolated by commercial/industrial and agricultural lands and do not have the core density or size necessary to support the ocelot.

Given the suboptimal quality and isolated nature of the shrubland habitat within the Project Action Area, and its distance from known locations of ocelot populations, it is highly unlikely ocelots would use the shrubland habitat in or outside the Project area. The cat's largest documented home range is 12 square miles. An ocelot from one of the known populations (LANWR, Cameron County and on some private lands in Willacy and Kenedy Counties) in search of a new home range would likely not travel the distance (approximately 100 miles) necessary to reach suboptimal habitat (low density shrub, isolated, fragmented, and surrounded by human activity) in the Project area.

Personal communication with Dawn Whitehead of USFWS on March 20, 2013 (USFWS 2013d – see contact report in Appendix E) confirmed the low quality shrub habitat in the Project Action Area is considered isolated, not part of a habitat corridor, and is of such a distance from the last known record occurrence of ocelot (100 miles to the south/southwest at LANWR), that it is highly unlikely ocelot would take advantage of such suboptimal habitat. However, in the rare likelihood that this species would use such suboptimal shrub habitat, OxyChem will direct construction lighting downward and away from brushy areas with the potential to be used by this species to ensure it is not adversely affected.

4.2.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **ocelot**.

4.3 Red wolf (*Canis rufus*)

The red wolf (*Canis rufus*) is a medium to large sized member of the Canidae (dog) family. The red wolf has dark brown coloration on its back with reddish coloration on its legs and face. This carnivore can be confused with the coyote (*Canis latrans*) because of its similar size and coloration (USFWS 1989). The red wolf is larger than the coyote, but smaller than its close relative, the grey wolf (*Canis lupus*). The red wolf was first listed as endangered in 1967 under the protection of the ESA (USFWS 2013e). It remains listed as endangered under the ESA (TPWD 2013b).

4.3.1 Distribution

In the US, the red wolf is only known to occur in Florida and the Carolinas. There are also experimental populations in North Carolina and Tennessee (USFWS 2013e). The red wolf was accepted as extinct in the wild (EW) in 1980, but experimental populations were placed in the Smoky Mountains region of Tennessee and North Carolina that have been moderately successful since. The TXNDD has no record of the red wolf in Texas (TPWD 2013b). Personal

communication with Dawn Whitehead of USFWS revealed there are no known red wolves in the wild in Texas because the remaining wolves were removed from the wild and transported to zoos (USFWS 2013d).

4.3.2 Endangerment Factors

The primary limiting factors for red wolf populations are current low population levels, habitat conversion, habitat fragmentation, and permanent loss of habitat. The species was also hunted heavily during the early settlement of the US. It is also probable that the overhunting of white tailed deer (*Odocoileus virginiana*) in the early 1900s caused issues for red wolf. Large populations of coyote will out-compete red wolf populations, but small to medium populations do not seem to threaten these populations (USFWS 1989).

4.3.3 Life History Requirements

The red wolf is a pack animal. Only the dominant female and male of the pack are capable of breeding. Other adult members of the pack assist in raising pups. Breeding season is late winter and early spring (January to March). The gestation period is approximately two months, typically three to six pups are born, however, a litter can include up to 12 individuals. Young are typically raised for the first year and become fully functioning members of their parents' pack thereafter.

The red wolf uses vast habitat sizes of at least 170,000-acres (265 square miles) (USFWS 1989). Types of habitat include lowland forests, wetlands, and mountains. Prey species include deer, raccoon (*Procyon lotor*), rodents, and small mammals (Mulheisen and Csomos 2001).

4.3.4 Field Survey Results

The survey revealed no forests or mountains within the entire survey area. Four (4) small wetlands (considered non-jurisdictional by the USACE) were observed (all less than 0.5-acres). The desktop analysis did not indicate forested regions or mountainous topography in the vicinity of the Project and no recent records exist of red wolf populations in Texas or Louisiana.

4.3.5 Impact Analysis

The Project Action Area is comprised of maintained agricultural land, developed commercial/industrial land, and isolated shrublands, none of which are considered habitat for the red wolf. No recent records of red wolf are known in Texas. Additionally, the TXNDD data request revealed no records of the red wolf (TPWD 2013b) in the Project Action Area or in the surrounding 25-mile radius. Due to the absence of habitat within the Project Action Area and surrounding 25-mile radius, and the lack of records of red wolf in Texas, it is highly unlikely that the red wolf occurs in or near the Project Action Area.

4.3.6 Preliminary Determination

Based on the above analysis, and the fact that there are no known red wolves in the wild in Texas (USFWS 2013d), implementation of the proposed Project will have **no effect** on the **red wolf**.

4.4 West Indian manatee (*Trichechus manatus*)

The West Indian manatee (*Trichechus manatus*), also known as a sea cow, is a large water dwelling mammal in the Trichechidae (manatee) family and in the Sirenia (e.g. manatees and dugongs) order. This species is grey in color with short, round flippers and a paddle-shaped tail. Adults are approximately nine feet long and weigh up to 2,000 pounds. These herbivores have a whiskered muzzle and might have barnacles or algae on their bodies. The West Indian manatee was first listed as endangered in 1967 under the protection of the ESA (USFWS 2012f), and remains listed as endangered under the ESA (USFWS 2013a).

4.4.1 Distribution

In the US, the manatee is only known to occur in coastal zones along the Gulf of Mexico and Atlantic Ocean, from Texas to North Carolina. The TXNDD has four records of manatee in Corpus Christi Bay, in 2001, 2006, 2011, and 2012 (TPWD 2013a and TMMSN 2012). Since 1980, only about 10 have been rescued by the Texas Marine Mammal Stranding Network (TMMSN 2012). Experts at Florida Fish and Wildlife Conservation Commission (FFWCC 2012) indicate manatee sightings are rare in Texas based on direct observations as well as telemetry data on tagged manatees.

4.4.2 Endangerment Factors

The primary limiting factors for manatee populations are loss of habitat, degradation of water quality (older and juvenile manatees susceptible to red tide which results in mortality), and boat strikes (USFWS 2001).

4.4.3 Life History Requirements

The manatee is a very solitary animal for most of its life, but herds (up to 20 individuals) are witnessed when males begin to follow a female in estrous. Females reach sexual maturity around five years and males around nine years. Breeding season is late winter and early spring (January to March). The gestation period is approximately one year. Young are raised for the first two years. Migration regions are mostly contained to the coast of the US. In summer months the manatee can be seen as far north as Virginia, and in winter they congregate mostly around Florida estuaries and warm-water refugia (e.g., at Power Plants which use water to cool generators). The species rarely ventures farther west than Louisiana. It is an aquatic herbivore and retains characteristics of terrestrial herbivores (low metabolic rate, inefficient digestion systems, and low-nutrient foods). The manatee is a grazer and spends much of its time (6–8 hours a day) grazing seagrasses from the sea floor (Edwards 2000).

Though large, the West Indian manatee has a fairly stable habitat range. Individuals can be found in shallow rivers, estuaries, and canals as well as the shallow regions of the sea coast. Inland rivers must be at least 3.5 feet deep to accommodate these large mammals. The species is not often found outside of the littoral zone (i.e., the shallow portions of oceans to a depth of 20 feet) (USFWS 2001).

4.4.4 Field Survey Results

The survey area included the Fractionation Facility Site and SPP Corridor which are comprised of maintained agricultural land, developed commercial/industrial land, and small/isolated shrublands. Wetlands, streams, and drainage/irrigation ditches were documented on the

Fractionation Facility Site and in the SPP Corridor. However, none were considered jurisdictional by the USACE. Although these features on the Fractionation Facility Site were present, they had no hydrological connection to the marine/estuarine waters of Corpus Christi Bay and were separated approximately 500 feet from the Bay by a bluff near the waterward limit of the Fractionation Facility Site. Two intermittent streams and several drainage ditches (both ephemeral and intermittent) were observed in the area. None of the streams observed had a depth of more than 1 foot.

4.4.5 Previous Agency Coordination

During the February 14, 2012 meeting with USFWS, modifications to the adjacent (to the southeast) OxyChem Facility barge docks were discussed. At that time, no in-water work was proposed. Since the meeting, structural engineers determined the installation of two (2) monopiles, one at each barge dock, was necessary for the safe use of the docks by Fractionation Facility barges.

The likelihood of a manatee using the near shore waters of the Project is very low based on Florida Fish and Wildlife Conservation Commission (FFWCC) telemetry data, only an occasional male manatee might stray from the Florida coast to the Texas coast (personal communication with Mary Duncan, FFWCC 2012). Although a rare sighting of a manatee occurred recently in Corpus Christi Bay, due to their rare occurrence along the shoreline of Texas, in-water surveys were not deemed necessary by USFWS.

4.4.6 Impact Analysis

Habitat – Project activities in coastal/estuarine waters in which manatee might occur are limited to the installation of two monopiles, one at each of the existing OxyChem Facility barge docks. Use of the existing barge docks eliminates the need for new in-water structures/docks and thereby avoids new impacts to potential manatee habitat.

The proposed monopiles at the OxyChem Facility barge docks will be located in an area that was previously permitted by the USACE to be dredged and maintained in association with the existing OxyChem Facility barge docks. The barge docks are immediately adjacent to La Quinta Channel which is maintained at a depth of -45 feet at mean low water (MLW), deep enough for use by barge traffic along the shoreline. La Quinta Channel adjoins with the Corpus Christi Ship Channel (authorized dredge depth of -45 feet MLW) which extends to the deeper waters of the Gulf of Mexico via the Aransas Pass Entrance Channel (authorized dredge depths of -47' and -54 feet MLW) (Port Corpus Christi 2012). Use of the existing OxyChem Facility barge docks and Port Corpus Christi channels avoids the need for new dredging of submerged lands to accommodate deep draft barges, thereby avoiding new near shore impacts to potential manatee foraging areas (i.e., seagrass beds).

Vessel Traffic – The current vessel traffic from the OxyChem Facility barge docks is 25 to 50 barges per year and 120 to 180 ships per year. Statistics on vessel traffic for the Port of Corpus Christi in 2011 were 4,018 barges and 1,395 ships. OxyChem's current barge and ship traffic accounts for 1% and 13%, respectively, of the barge and ship traffic for the Port of Corpus Christ. No new ship traffic will result from the Project and therefore, no new impacts are expected from ship traffic. The barge traffic associated with the proposed Project will result in an increase of approximately 88 barges per year with a single cargo of natural gasoline. The Project will account for a negligible increase in barge traffic, 88 barges or 2% of typical barge traffic for the Port of Corpus Christi. Given the Project is in an area rarely used by manatees,

and the nominal increase in barge traffic associated with the Project, the increase in barge traffic is considered negligible and is not expected to adversely affect the West Indian manatee.

Additionally, the barges travel at slow speeds of 6 – 10 knots or 6.9 – 11.5 miles per hour (mph). Such slow speeds will afford manatees the time to swim away from barges and out of harms' way. The manatee's ability to elude an oncoming boat is largely determined by the speed of the approaching boat. Given ample time, manatees should be able to avoid lethal and injurious encounters with boats; thus, slow-moving boats are less of a threat to manatees (USFWS 2011c). The weight of scientific and anecdotal evidence suggests that slow boat speeds reduce the risk boats pose to manatees (Calleson and Frohlich 2007). Given the Project is in an area rarely used by manatees and the additional barge traffic will travel at slow speeds, the increased barge traffic is not expected to adversely affect the West Indian manatee.

Vessel Size – The size of barges likely to use the docks for the Project are expected to be 300-feet in length and 55-feet in width. The deepest draft of a fully loaded barge will be approximately 12 feet. The mooring area is approximately -30 feet in depth at MLW and channel depths range from -45 feet at MLW to -54 feet at MLW, thereby resulting in 18-42 feet of clearance between the bottom of the barge and the bottom of the channels used by the barges (La Quinta Channel and Port of Corpus Christi Ship Channel). This clearance provides adequate space to allow manatees to escape out of harms' way and prevent entrapment of manatees between the barge bottom and channel bottom.

Monopile Installation – Monopiles will be driven into place from a crane mounted on a barge. Construction is expected to occur over the course of two days with pile driving expected to occur a maximum of 8 hours each day. Although installation of the two monopiles involves in-water work, pile driving (instead of dredging/filling or jetting construction techniques) will minimize the area of disturbance to the submerged bottom, minimize turbidity generated from installation, and subsequently minimize degradation of water quality in waters that might be used by West Indian manatee. No dredging or placement of fill will be necessary for this minor modification to the barge docks, therefore impacts to manatee habitat will be avoided.

To ensure manatees are not adversely affected by the placement of monopiles or addition of barge traffic associated with the Project, OxyChem will provide pre-construction training of personnel performing in-water monopile construction activities. Specifically, construction personnel will be informed of the potential presence and identification of West Indian manatee, and instructed to cease work if a manatee is observed within 50 feet of the monopile installation. Construction will resume upon the manatee leaving the area where it is out of harms' way. Barge traffic will be operated at a speed which affords manatees adequate time to swim away from the barge and out of harms' way.

Noise – Monopile installation will be temporary in nature, and therefore is not expected to increase noise levels at the existing barge facility to the point where it adversely affects manatees. Additionally, the barge traffic expected to increase from use of the docks for the Fractionation Facility will result in noise levels comparable to existing noise levels at the dock. Given manatees are transient in Texas waters resulting in infrequent use of the Project waters, noise from operation of the barges is expected to have a negligible effect on the West Indian manatee.

Water Quality (chemical) – As indicated in Section 3.5 of this BA, the levels of contaminant discharged from the existing wastewater outfall/diffuser will be well below the level authorized by the permit which is considered to be protective of marine organisms in accordance with

Texas Surface Water Quality Standards for Marine Aquatic Life (30 TAC 307). As such, discharges associated with the proposed Project will not adversely affect the West Indian manatee.

Water Quality (thermal) – There is no thermal water discharge associated with the Project, therefore manatees will not be adversely affected by thermal water discharges. However, it should be noted, although thermal water discharges are artificial, West Indian manatee significantly benefit from such warm water discharges as is evident by the large congregations of manatees at the warm water discharges at power plants during the winter months in Florida (FFWCC 2012).

In summary, the likelihood of a West Indian manatee using the near shore waters of the Project area is low given past records of manatee sitings (TXNDD data and MMSN) and manatee telemetry data from Florida Fish and Wildlife Conservation Commission (FFWCC 2012). Any such use would be transient because this species is not a resident of Texas waters. Despite the low likelihood of occurrence, the Project will result in a negligible amount of additional barge traffic and the barges will be traveling at speeds in which manatees can move out of harms' way to prevent manatee/boat interactions. The Project is not expected to adversely affect the West Indian manatee.

4.4.7 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **West Indian manatee**.

4.5 Northern aplomado falcon (*Falco femoralis septentrionalis*)

The northern aplomado falcon (*Falco femoralis septentrionalis*) is a member of the Falconidae (falcon) family. Adults are a blue-grey color with a white neck and upper chest and a reddish lower chest. The bird also has two white stripes on each side of its head, one over and under the eye. The northern aplomado falcon was first listed as endangered in 1986 under the protection of the ESA (USFWS 2013g). The species remains listed as endangered under the ESA (USFWS 2013a).

4.5.1 Distribution

The northern aplomado falcon is found in Texas, but its complete range extends throughout Central and South America. Historically, the species was found along the southern boundaries of Texas, New Mexico, and Arizona, with a large percentage of nests occurring in the most southern reaches of Texas (USFWS 1990b). This species occurs in three national wildlife refuges: Laguna Acosta, Lower Rio Grande Valley, and Santa Ana. An experimental population also exists in New Mexico with a "non-essential" classification (USFWS 2013g).

4.5.2 Endangerment Factors

The primary limiting factors for northern aplomado falcon populations are conversion and succession of habitat. Channelization of stream beds might have also impacted breeding habitat through drainage of associated wetlands. The conversion of grasslands to agricultural fields has resulted in loss of habitat. Additionally, use of Dichlorodiphenyltrichloroethane (DDT) as a pesticide likely historically impacted the bird. Individuals in Mexico displayed heavy levels of DDT contamination in their clutches (USFWS 1990b).

4.5.3 Life History Requirements

In the US, the northern aplomado falcon uses nests made out of sticks by other species. In Central and South America, individuals build nests out of leaves of bromeliads (family Bromeliaceae) (USFWS 1990b). Members of this species breed for life and stay together year-round. Breeding season is spring to early summer (March to June). The average clutch size is two to three eggs. Both parents incubate the eggs, which hatch after about a month. Young fledge around one month later and exhibit nesting behavior after one year (USFWS 2007a).

The preferred habitat for this species is open terrain with sparse roosting trees or shrubs. If these key characteristics are present, they are found in a wide variety of habitats from wooded edges, mature forests, and bordering marsh wetlands. The northern aplomado falcon has a varied diet and will eat small birds, insects, rodents, and reptiles (USFWS 1990b).

4.5.4 Field Survey Results

The field survey revealed a landscape dominated by active agricultural fields in cotton cultivation, and four small ditch-form wetlands, two man-made drainage canals, and drainage ditches (seven intermittent and 29 ephemeral).

4.5.5 Impact Analysis

The TXNDD data request indicated no records of the northern aplomado falcon in San Patricio County (TPWD 2013b) or in Aransas, Bee, Calhoun, Jackson, Live Oak, Matagorda, Nueces, Refugio, Victoria, and Wharton Counties, Texas. No northern aplomado falcons were observed during field surveys.

Per personal communication with USFWS (USFWS 2013d), pairs of Aplomado falcon were released in the ANWR area. USFWS has observed these birds primarily in the Matagorda Island area as they tend to nest in tall structures along the coast. The Project Action Area consists primarily of maintained agricultural land and developed commercial/industrial land, with limited patches of shrubland and grassland, and limited streams that consist primarily of channelized drainages with limited to no riparian habitat. The dominant land types do not support quality northern aplomado falcon habitat. Additionally, no tall trees (for nesting) were observed during the Project surveys. Accordingly, it is highly unlikely the northern aplomado falcon would use the habitats/land uses present in the Project Action Area.

4.5.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **northern aplomado falcon**.

4.6 Piping plover (*Charadrius melodus*)

The piping plover (*Charadrius melodus*) is a small member of the Charadriiformes (shorebird) order. They are approximately the size of an American robin (*Turdus migratorius*). This species is characterized with beige on its back and top of its head, a white rear, and black tail with a white edge near the end of the tail. In breeding season, the legs and bill of this species are orange and a black band around the chest and above the eyes are present. In winter, the bands recede, the bill fades to black, and the legs become a pale yellow (Vinelli 2000). The piping plover was first listed as threatened in 1985 under the protection of the ESA (USFWS

2013h). The species is listed as threatened throughout its range, except in the Great Lakes region, where it was originally listed as endangered. It remains listed as threatened (endangered in the Great Lakes region) under the ESA (USFWS 2013a).

4.6.1 Distribution

Piping plover are known to occur throughout most of the states between the Rocky Mountains and the Mississippi River (except Missouri), in all of the states bordering the Great Lakes, and all states bordering the Atlantic Ocean and the Gulf of Mexico (except Georgia) (USFWS 2013h). The majority of those states bordering the Gulf of Mexico are wintering habitats for the piping plover (USFWS 2009).

4.6.2 Endangerment Factors

The primary limiting factor for piping plover populations is development and stabilization of shoreline habitat by humans (TPWD 2011). Recreational vehicles and pedestrian traffic can cause egg and chick mortality directly through nest destruction and indirectly through parental nest abandonment. The USFWS indicates that a variety of human activities are resulting in the exacerbation of natural predation (USFWS 1996).

4.6.3 Life History Requirements

The piping plover breeding season is approximately April through July throughout most of its range. The typical clutch size of four eggs takes approximately a month to incubate before hatching. Both parents will incubate the egg in hour long intervals (Vinelli 2000). Females will abandon their fledglings after two to three weeks but males stay with them until they can fly. Individuals reach sexual maturity in their second year (TPWD 2011).

The piping plover nests in sandy coastal areas above the high tide lines. Individuals are found in a variety of systems, including sparsely vegetated dunes, sandflats, beaches, and blowout areas behind dunes. Feeding areas are in almost any coastal wet area, including beaches, mudflats, sandflats, lagoons, and salt marshes (USFWS 1996). Wintering individuals in Texas seem to be primarily US Great Plains and Prairie Canada populations, though some members of the US Great Lakes region populations are present (USFWS 2009). The piping plover is carnivorous, feeding on mollusks, insects, crustaceans, worms, and beetles (Vinelli 2000).

4.6.4 Field Survey Results

Based on field survey, the Project Action Area is comprised of maintained agricultural land, developed commercial/industrial lands, and shrublands. Ditch-form wetlands, two man-made drainage canals, and drainage/irrigation ditches (seven intermittent and 29 ephemeral) were observed in the Project Action Area. These areas might be used by piping plover for foraging. No coastal wetlands were observed in the Project Action Area; however, coastal areas are situated within 500 feet of the Project Action Area (shoreline of La Quinta Channel/Corpus Christi Bay). Based on visual observation, no beaches are present along the shoreline adjacent to the Project Action Area.

4.6.5 Impact Analysis

The Project Action Area consists primarily of maintained agricultural land, developed commercial/industrial lands, and shrublands, none of which are considered suitable habitat for

the piping plover. Although monopiles are proposed at the two existing OxyChem Facility barge docks, the work will be waterward of the shoreline, and therefore will not affect potential habitat of this species.

One culverted crossing (with riprap) of the man-made ditch in the southeast portion of the Fractionation Facility Site is proposed for a rail spur. The culvert will be sized appropriately to maintain flow in the ditch. Additionally, the riprap will provide enhanced habitat for fish and invertebrates and therefore enhance foraging opportunities for the piping plover. Impacts to potential piping plover habitat in the SPP Corridor will be avoided by use of HDD construction under the waterbodies.

The TXNDD data indicates no occurrence records for the piping plover within four miles of the Project Action Area. Based on the field survey and the lack of presence of habitat in the Project Action Area, the piping plover is not likely to be found in the Project Action Area.

4.6.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **piping plover**.

4.7 Whooping crane (*Grus americana*)

The whooping crane (*Grus americana*) is a large sized member of the Gruidae (crane) family. Adults are white with a red and black patch on their face above the bill, and young are a reddish brown. Individuals might achieve a height of five feet and have a wingspan of about seven feet. It is one of only two species of crane in North America and is the largest. Often, it is more than one foot taller than the sandhill crane (*Grus canadensis*). The whooping crane was first listed as endangered in 1967 under the protection of the ESA (USFWS 2013i). The species remains listed as endangered under the ESA (USFWS 2013a).

4.7.1 Distribution

The whooping crane is only known in North America. The total population of whooping cranes once stood around 20 individuals; as of February 2006, there were 473 individuals documented (USFWS 2011d). There are two experimental non-migratory populations which include a non-migratory Florida population and a second non-migratory population that summers in Wisconsin. The only self-sustaining population of whooping cranes left in North America is the Aransas-Wood Buffalo National Park (AWBNP) population that spends summers in and around Wood Buffalo National Park in Canada (northeastern Alberta and southern Northwest Territories) and winters in the coastal marshes in Texas (Canadian Wildlife Service [CWS] and USFWS 2007). The coastal areas of Texas with whooping crane populations include Matagorda Island Wildlife Management Area (WMA), Welder Flats WMA, and ANWR. The AWBNP population follows a very linear migration route between summer and winter habitats, maintaining a stable flyway corridor width. Approximately 95% of the whooping crane individuals observed during migration are within a 170-mile corridor in Texas (USFWS 2012).

4.7.2 Endangerment Factors

The primary limiting factors for whooping crane populations have evolved as their recovery became increasingly apparent in the last 30 years. Historically, loss of nesting habitat and hunting were limiting factors. Current threats include loss of genetic variability, loss of migration

stopover habitat, coastal ecosystem degradation, and collision with man-made structures, such as power lines. Additionally, the potential for chemical spills in Texas is considered a threat to the species (CWS and USFWS 2007).

4.7.3 Life History Requirements

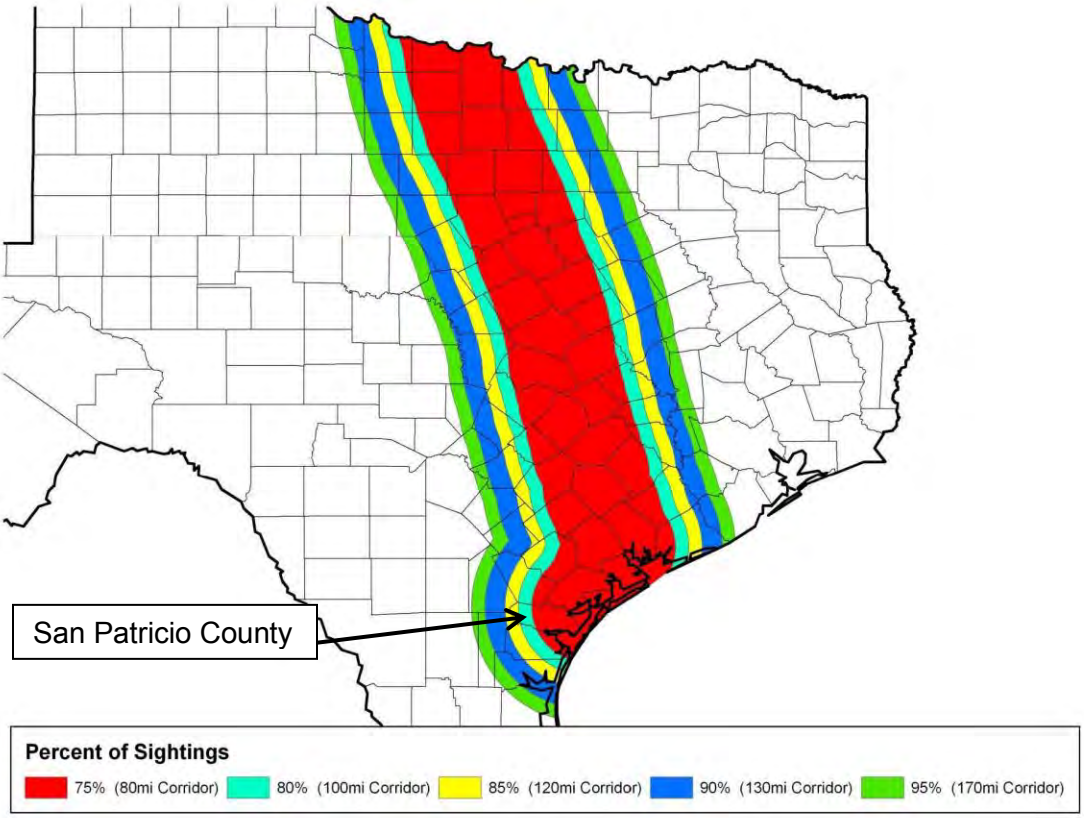
The whooping crane is monogamous and selects its mate for life. Although they pair at two or three years of age, sexual maturity is reached at four or five years. Breeding season is late spring (April and May). Both parents construct a nest on raised microtopography (typically in wetlands) so the nest is surrounded by water. Eggs are cared for by both parents and hatch after approximately a month. Young fledge around three months, but remain with the family until approximately nine months. The whooping crane is a very long lived species that often reaches over 20 years of age and up to 30 (Esch 2011).

All stages of life for the whooping crane take place in a variety of habitats, including breeding, foraging, and migration. Types of habitat include coastal marshes, estuaries, marshes, lakes, ponds, wet meadows, rivers, and agricultural fields (USFWS 2011d). The whooping crane has a varied diet, including crabs, wolfberry fruit (*Lycium carolinianum*), plant tubers, worms, minnows, insects, mollusks, and amphibians. In agricultural fields the primary food is waste grains (Esch 2011).

4.7.4 Field Survey Results

The field survey revealed four small ditch-form wetlands, two intermittent drainage canals, seven intermittent drainage ditches, 29 ephemeral drainage ditches, and active cropland. All of the observed crop fields were cotton fields. At the time of the survey, the fields had not been plowed or tilled for the upcoming growing season. Figure 4-1 below shows the eastern half of San Patricio County (the survey area) is located entirely within the corridor that contains 75% of migrating whooping crane sightings (USFWS 2012).

Figure 4-1 Whooping Crane Migration Corridor Sightings



Source: USFWS 2012

4.7.5 Impact Analysis

The TXNND data request revealed the only records of whooping crane in Texas are in management areas (and adjacent wetlands) located in Aransas and Refugio Counties and a single sighting of a foraging whooping crane in a ditch in Calhoun County (TPWD 2013a). Nonetheless, the Fractionation Facility Site and SPP Corridor are located within the historic migration corridor (USFWS 2012) of the only known self-sustaining North American whooping crane population. The migration route (titled the Central Flyway by USFWS) is 170 miles in width and extends from the Aransas County coast of Texas (winter habitat) in a north/northwesterly linear manner to the population's summer habitat at Wood Buffalo National Park in Canada (northeastern Alberta and southern Northwest Territories). Types of migratory (stopover and foraging) habitat used by whooping cranes include coastal marshes, estuaries, freshwater marshes, lakes, ponds, wet meadows, rivers, and agricultural fields (USFWS 2011d). In agricultural fields the primary food is waste grains (Esch 2011).

Based on field survey results, potential migratory whooping crane stopover and foraging habitat is nominal in the Project Action Area (Fractionation Facility and SPP Corridor). Much of the Project area and surrounding area contains maintained agricultural land, and developed commercial/industrial lands. The agricultural land in the Project area is comprised of cultivated cotton fields, which do not provide waste grain forage opportunities for whooping crane. The man-made ditch-form wetland and intermittent and ephemeral ditches might provide limited foraging habitat for the whooping crane as inundation is unreliable. The drainage canals also might provide limited foraging habitat for whooping crane due to their water depth (1 foot of less

at time of field survey). Additionally, OxyChem proposes to use HDD construction to avoid impacts to these water features. Pastureland present within the Project Action Area represents potential stopover and foraging habitat for the whooping crane, but comprises a minor component (4.26 acres or 0.6%) of the Project Action Area. This pastureland is located in the SPP Corridor, where both the temporary pipeline construction and permanent operation ROWs will be allowed to revegetate to pre-construction conditions. This habitat will remain as stopover areas for migrating whooping cranes.

During the February 2012 pre-application meeting, USFWS staff expressed concern regarding the potential for future bird strikes with new aboveground facilities proposed at the Fractionation Facility Site. To address this concern, lights will be located throughout the Fractionation Facility Site so new structures are visible during low-light conditions (dawn, dusk, and nighttime hours). As a matter of standard lighting procedures at the existing OxyChem Facility, OxyChem will ensure the Fractionation Facility Site will be well lighted for aircraft safety and to accommodate maintenance needs during nighttime hours. New overhead power lines will be located adjacent to and at a similar height as existing overhead power lines at the Fractionation Facility Site, thereby avoiding creation of a new potential strike hazard to migrating whooping cranes. Finally, the new electrical substation will be located adjacent to the existing DuPont substation at the Fractionation Facility Site, and will be well lighted for clear visibility during nighttime hours.

4.7.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **whooping crane**.

4.8 Sea turtles (Order Testudines)

All species of sea turtles are in the Order Testudines (turtles, tortoises, terrapins). Five species of sea turtle are federally protected under the ESA and might occur in or near the survey area and include: green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*).

The green sea turtle is a large sea turtle. Adults weigh up to 450 pounds. Its name is indicative of the color of its flesh (Crite 2000). The hawksbill sea turtle has a head that tapers to a "v", giving the illusion of the turtle having a beak. This turtle has two claws on each forelimb and young have a heart-shaped shell that lengthens with age. The head often has brown spots and adults weigh around 150 pounds (Edelman 2004). The Kemp's Ridley sea turtle is the smallest species of sea turtle and weighs between 65 – 110 pounds. It is often light green and has a grey-olive colored carapace (Klug 2006). The leatherback sea turtle is the largest living species of sea turtle. Adults can weigh between 500 – 2,000 pounds. They get their name from a layer of brown or black skin on top of their shell's bones (Fontanes et al. 2007). The loggerhead sea turtle has a large head in proportion to its body. It has a heart-shaped shell and weighs between 200 – 1,200 pounds. Adults are typically a reddish-brown color with olive green hues. This species is frequently found with barnacles and algae growing on its carapace (Duermit 2007). The hawksbill sea turtle, Kemp's Ridley sea turtle, and leatherback sea turtle are federally-listed endangered species. The green sea turtle and loggerhead sea turtle are federally-listed threatened species (USFWS 2013a).

4.8.1 Distribution

In the United States, sea turtles are typically found in the oceans close to shore and have been seen in every coastal continental state. Some species spend more time in the deeper waters away from shore and others venture into estuarine areas. All are capable of long distance migration.

The green sea turtle was historically heavily populated around Florida and the Texas Gulf Coast (NMFS and USFWS 1991), but they are currently known (or believed) to occur along every coastal state in the continental United States (USFWS 2013j). They also are known to nest in many different countries (Sea Turtle Restoration Project 2003).

The hawksbill sea turtle is known or believed to occur in every state on the coast of the Atlantic and the Gulf Coasts (USFWS 2013k) and nests in 60 different countries. Puerto Rico, Texas, and Florida are the places most populated by hawksbill sea turtles. Sightings north of Florida on the Atlantic Coast are very rare (NMFS and USFWS 1993).

The Kemp's Ridley sea turtle is known or believed to occur in states along the entire Gulf of Mexico and the Atlantic Coast (except Maine) (USFWS 2013l). Nest sites are primarily in the western Gulf of Mexico. The majority of nests on US lands are in southern Texas (Padre Island is most common), but some nests have been found in Florida, Alabama, Georgia, and the Carolinas (NMFS, USFWS, & SEMARNAT 2010).

The leatherback sea turtle has no documented nesting grounds under US jurisdiction. The largest known nesting area was on the Pacific coast of Mexico. Nesting also occurs in several western Pacific countries (NMFS and USFWS 1998). It is known or believed to occur in every Atlantic and Gulf Coast state and Alaska (USFWS 2013m).

The loggerhead sea turtle is known to inhabit the Atlantic, Pacific, and Indian Oceans in the temperate and tropical zones. The species nests in the entire Gulf of Mexico and the Atlantic Coast as far north as Virginia, but is concentrated along the eastern Gulf of Mexico and Cuba (NMFS and USFWS 2008). Florida is a major nesting area, where an estimated 14,000 individuals nest (Sea Turtle Restoration Project 2003).

4.8.2 Endangerment Factors

The primary limiting factors for sea turtle populations are habitat conversion, modification, human use of habitat, and light pollution (NMFS and USFWS 1991, 1993, 2008 and NMFS, USFWS, & SEMARNAT 2010). Some species, like the hawksbill, were hunted heavily for their shell (Sea Turtle Restoration Project 2003). The leatherback has no nesting habitat in the United States, but the limiting factors for nesting habitat are similar to the other species mentioned (NMFS and USFWS 1998).

In marine environments, the limiting factors for all five species are the same and include dredging, loss of foraging habitat from development, water pollution, and incidental catch by commercial fisheries (NMFS and USFWS 1991, 1993, 2008 and NMFS, USFWS, & SEMARNAT 2010).

4.8.3 Life History Requirements

Sea turtles are truly marine animals. Once the young reach the water after hatching, males never return to land. Females will go on shore to nest. All species (except Kemp's Ridley) nest

at night and females have multiple clutches (7–238 eggs, depending on species) per season. The incubation time for the eggs is about 2 months for all species. For most species, the sex of the young is determined during egg stage and is temperature dependent. After hatching, it is unsure how the young navigate to the ocean, but it seems that they are drawn toward the greater reflected light from the sea. It is also possible the young have an "internal compass" to direct them to the sea. These species usually reach sexual maturity between 10 and 35 years of age (Crite 2000, Edelman 2004, Klug 2006, Duermit 2007, and Fontanes et al. 2007).

Most sea turtles eat a variety of foods, including mollusks, crustaceans, plants, and fish (Pecor 2003a). The preferred diet of the leatherback is jellyfish (Pecor 2003b).

The green sea turtle lives throughout the tropical oceans of the world. Nests are built on unstable beaches and the species seems to prefer islands. Adult grazing habitats are located on large beds of vegetation. Coral reefs and rocky substrates also provide suitable habitats for this species (NMFS and USFWS 1991).

The hawksbill sea turtle prefers areas with hard bottoms and populations of sponges. It will be found in fairly shallow waters (less than 60 feet). Young depend on mats of algae (typically *Sargassum*) to hide in because they lack the ability to dive to deep depths (Edelman 2004). Nesting habitat is often shared with the green sea turtle on secluded beaches. The hawksbill is not very selective about the type of soil in which it will deposit eggs. Typically, the nests are covered with vegetation (NMFS and USFWS 1993).

The Kemp's Ridley sea turtle prefers shallow water systems like bays and lagoons, typically with substrates of soft muds and sands (Klug 2006). Nesting habitat is located on sandy beaches with most occurring in Padre Island, Texas, and Tamaulipus, Mexico (NMFS et al 2010).

The leatherback turtle has an enormous range throughout the oceans of the world. Few migration routes have been established due to lack of data but an important corridor seems to be the western seaboards between Mexico and the United States. Leatherbacks rarely nest on island shores. Typically, these beaches provide quick access to deep open water (NMFS and USFWS 1998).

The loggerhead nests on sandy ocean beaches. Occasionally, females might nest on estuarine shorelines. Little data is available about nest-site selection. One study conducted in Florida revealed that loggerheads prefer heavily sloped, coarse-grained sand beaches for nest sites. However, a later study found that loggerheads showed no preference toward the type or characteristics of the sandy beaches selected for nesting (NMFS and USFWS 2008).

4.8.4 Field Survey Results

The on-site field survey was limited to the top of berm on Fractionation Facility Site. Based on visual observations and aerial photographic interpretation, the shoreline of the Fractionation Facility is vegetated by black mangroves (*Avicennia germinans*) and the submerged lands are vegetated by a seagrass bed. Although black mangroves and seagrass beds are habitat for sea turtles, no activities are proposed waterward of the berm along the shoreline of the Fractionation Facility. These marine habitats are outside the Project Action Area and will not be impacted by the Project.

Per USGS topographic maps, the berm on the Fractionation Facility Site changes in elevation by 40-feet from top of berm to sea level. Although outside the field survey area for the Project, no beaches were observed along the base of the berm and therefore no sea turtle nesting

habitat is present in the Project Action Area. The only potential sea turtle habitat within the Project Action Area is the waters located at the existing VCM facility barge docks where OxyChem proposes to install two monopiles (one at each barge dock) to accommodate safe mooring of Fractionation Facility barges. The monopiles will be located in an area that was previously permitted by the USACE to be dredged and maintained in association with the existing OxyChem VCM Facility barge docks. Water depths in this area are a minimum of 30 feet below MLW and adjoin the La Quinta Channel. The La Quinta Channel which is maintained at a depth of -45 feet at mean low water (MLW), deep enough for use by barge traffic along the shoreline. La Quinta Channel adjoins with the Corpus Christi Ship Channel (authorized dredge depth of -45 feet MLW) which extends to the deeper waters of the Gulf of Mexico via the Aransas Pass Entrance Channel (authorized dredge depths of -47' and -54 feet MLW) (Port Corpus Christi 2012). Use of the existing OxyChem Facility barge docks and Port Corpus Christi channels avoids the need for new dredging of submerged lands to accommodate deep draft barges, thereby avoiding new near shore impacts to potential sea turtle foraging areas (i.e., seagrass beds).

4.8.5 Impact Analysis

Habitat – Project activities in coastal/estuarine water in which sea turtles might occur are limited to the installation of two monopiles, one at each of the existing OxyChem Facility barge docks. Use of the existing barge docks eliminates the need for new in-water structure/docks and thereby avoids new impact to potential sea turtle habitat.

The proposed monopiles at the OxyChem Facility barge docks will be located in an area that was previously permitted by the USACE to be dredged and maintained in association with the existing OxyChem Facility barge docks. The barge docks are immediately adjacent to La Quinta Channel which is maintained at a depth of -45 feet at mean low water (MLW), deep enough for use by barge traffic along the shoreline. La Quinta Channel adjoins with the Corpus Christi Ship Channel (authorized dredge depth of -45 feet MLW) which extends to the deeper waters of the Gulf of Mexico via the Aransas Pass Entrance Channel (authorized dredge depths of -47' and -54 feet MLW) (Port Corpus Christi 2012). Use of the existing OxyChem Facility barge docks and Port Corpus Christi channels avoids the need for new dredging of submerged lands to accommodate deep draft barges, thereby avoiding new near shore impacts to potential sea turtle foraging areas (i.e., seagrass beds).

Vessel Traffic – As indicated in Section 4.4.6, the current vessel traffic from the OxyChem Facility barge docks is 25 to 50 barges per year and 120 to 180 ships per year. Statistics on vessel traffic for the Port of Corpus Christi in 2011 were 4,018 barges and 1,395 ships. OxyChem's current barge and ship traffic accounts for 1% and 13%, respectively, of the barge and ship traffic for the Port of Corpus Christ. No new ship traffic will result from the Project and therefore, no new impacts are expected from ship traffic. The barge traffic associated with the proposed Project will result in an increase of approximately 88 barges per year with a single cargo of natural gasoline. The Project will account for a negligible increase in barge traffic, 88 barges or 2% of typical barge traffic for the Port of Corpus Christi. The Project increase in barge traffic will be negligible.

Additionally, the barges travel at slow speeds of 6 – 10 knots or 6.9 – 11.5 miles per hour (mph). Such slow speeds will afford sea turtles the time to swim away from barges and out of harms' way. Given ample time, sea turtles should be able to avoid lethal and injurious encounters with barges.

Vessel Size – The size of barges likely to use the docks for the Project are expected to be 300-feet in length and 55-feet in width. The deepest draft of a fully loaded barge will be approximately 12 feet. The mooring area is approximately -30 feet in depth at MLW and channel depths range from -45 feet at MLW to -54' at MLW resulting in 18-42 feet of clearance between the bottom of the barge and the bottom of the channels used by the barges (La Quinta Channel and Port of Corpus Christi Ship Channel). This is adequate space to allow sea turtles to swim out of harm's way and prevent entrapment between the barge bottom and channel bottom.

Monopile Installation – Although installation of the two monopiles involves in-water work, pile driving (instead of dredging/filling or jetting construction techniques) will minimize the area of disturbance to the submerged bottom, minimize turbidity generated from installation, and subsequently minimize degradation of water quality in waters that could potentially be used by sea turtles. No dredging or placement of fill will be necessary for this minor modification to the barge docks, therefore impacts to habitat will be avoided. To further ensure protected marine species will not be adversely affected by the Project, OxyChem will ensure compliance with NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions* (see Appendix F) during construction.

Noise - Construction is expected to be temporary in nature; it is to occur over the course of two days with pile driving expected to occur a maximum of 8 hours each day. The noise associated with the piling installation will be short-term and as such, its impacts on sea turtles are expected to be negligible. The barge traffic expected to increase from use of the docks for the Fractionation Facility will result in noise levels comparable to existing noise levels at the dock. Given the negligible increase in barge traffic, noise levels from barge traffic are not expected to adversely affect sea turtles.

Water Quality (chemical) - To ensure the Project does not adversely affect the quality of waters potentially used by sea turtles, wastewater generated from the new upland Fractionation Facility will be treated prior to its discharge into the La Quinta Channel adjoining Corpus Christi Bay. As indicated in Section 3.5 of this BA, the levels of contaminant discharged from the existing wastewater outfall/diffuser will be well below the level authorized by the permit which is considered to be protective of marine organisms in accordance with Texas Surface Water Quality Standards for Marine Aquatic Life (30 TAC 307). As such, discharges associated with the Proposed project will not adversely affect threatened or endangered sea turtles.

In addition to the previously-mentioned actions to avoid and minimize impacts to sea turtles or their habitat, OxyChem will use its existing local municipal water source and not surface waters associated with operation of the Fractionation Facility. Surface water withdrawals from La Quinta Channel/Corpus Christi Bay will not be necessary, thereby further avoiding impacts to protected sea turtles or their habitat. Temporary use waters will be treated prior to outfall to La Quinta Channel/Corpus Christi Bay as described in Section 3.5 of this BA.

Water Quality (thermal) – There is no thermal water discharge associated with the Project and therefore, sea turtles will not be adversely affected by thermal water discharges.

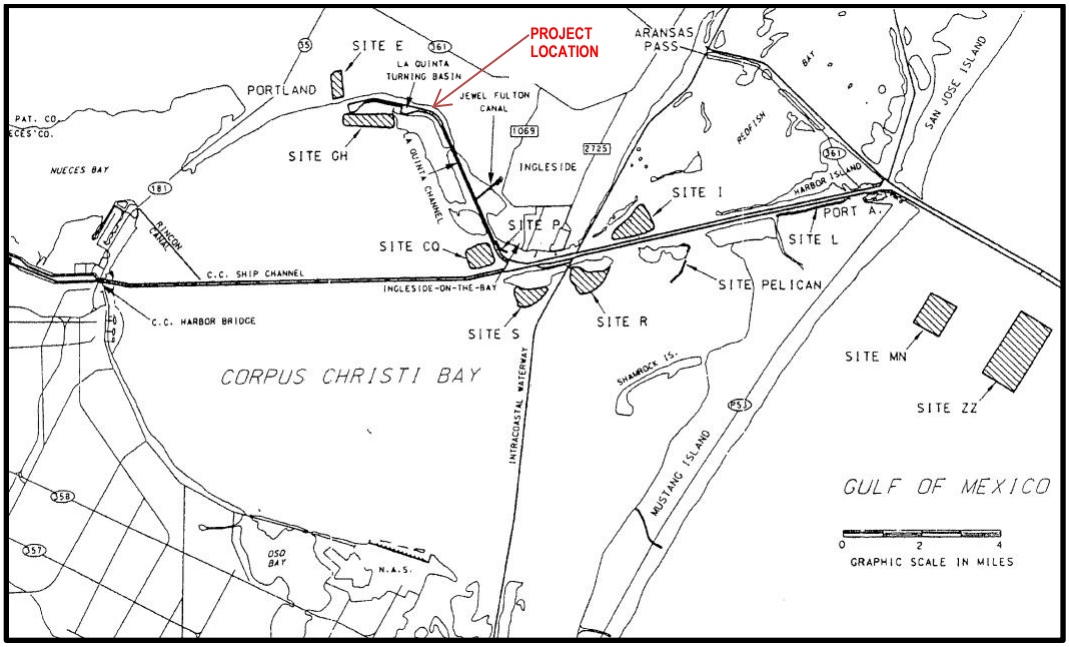
Corpus Christi Ship Channel – Channel Improvement Project – The widening, deepening, and extension of La Quinta Channel (extension to the west) and Corpus Christi Ship Channel (extension to the east) necessitated mitigation for project impacts. The mitigation involved placement of new dredge material for "beneficial use sites".

In accordance with the Final Environmental Impact Statement (FEIS) for the Channel Improvement Project (USACE 2003), beneficial use sites required for the channel authorization included the creation of approximately 1,035 acres of potential shallow-water unvegetated and vegetated bottom (including seagrass habitat, emergent, intertidal and marsh habitat), as well as 40 acres of open-bay, upland habitat. The beneficial use sites are not completed to date. However, most completed elevations of beneficial use sites will be -1 to -2 feet mean low tide to promote growth of seagrasses. Beneficial use sites are provided protection from erosion by breakwaters or existing spoil islands. Some breakwaters are set to be established to an elevation of +6 feet mean low tide and most have fringes of dredged construction material around the inside of the breakwaters with a design elevation of around +2 feet mean low tide suitable for *Spartina* growth.

The Fractionation Facility Site and Barge Docks are located east of the La Quinta Turning Basin as shown on Figure 4-2 (obtained from the FEIS). Beneficial use areas identified in the FEIS which are near channels include areas GH, CQ, S, R, and I (see Figure 4-2). Site GH is west of the proposed Barge Dock Modifications and will not be affected by the Project as barge traffic will not travel past this area but instead, will travel east and south in La Quinta Channel to access the Corpus Christi Ship Channel. Sites CQ and I are adjacent to La Quinta Channel through which Project barges will travel. Barges traveling through these areas will be going at low speeds (6 – 10 knots or 6.9 – 11.5 mph) resulting in minimal wake. The beneficial use sites are protected from erosion by breakwaters. The breakwaters were required to provide assurance that the created beneficial use areas would not be impacted by erosion from ship/barge wakes or natural currents. As such, the Project nominal barge traffic with minimal wake will not adversely affect these shallow water areas which are intended to promote the growth of seagrasses which serve as forage for sea turtles. Sites S and R are located behind existing spoil material placement areas/islands and as such, are also protected by the wakes of barges that travel through La Quinta Channel at these locations.

Based on the slow speed of additional barge traffic associated with the Project, and the fact that the beneficial use areas have been constructed to prevent erosion by adjacent ship/barge traffic, the Corpus Christi Channel Improvement beneficial use areas will not be adversely affected by the Project. Therefore, the habitat that becomes available in these beneficial use areas, once constructed, for sea turtle will not be impacted by the Project's additional barge traffic.

Figure 4-2 Project Location in Relation to the Beneficial Use Areas in Corpus Christi Bay



4.8.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **green sea turtle, hawksbill sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle,** and **loggerhead sea turtle**.

4.9 Smalltooth sawfish (*Pristis pectinata*)

The smalltooth sawfish (*Pristis pectinata*) is a large member of the Pristidae (sawfish) family. The species is part of the subclass Elasmobranchii (rays, skates, and sharks). Smalltooth sawfish are named for their long rostrum. The teeth point horizontally away from the rostrum (NMFS 2009a). The smalltooth sawfish was first listed as endangered in 2005 under the protection of the ESA (USFWS 2013n). It remains listed as endangered under the ESA (USFWS 2013a).

4.9.1 Distribution

In the United States, the smalltooth sawfish is known or thought to occur along the Gulf Coast and the southern reaches of the Atlantic Coast. This range includes the coastal areas of Texas, Louisiana, Mississippi, Alabama, Georgia, Florida, and the Carolinas (USFWS 2013n). Historically, the US population was common throughout the Gulf of Mexico from Texas to Florida, and along the east coast from Florida to Cape Hatteras. The known current range of smalltooth sawfish is limited to peninsular Florida where this species is relatively common only in the Everglades region at the southern tip of the state (NMFS 2009a). The southern reaches of Florida have the densest populations. This species has also been reported in the eastern Atlantic in Europe and West Africa; in the Mediterranean; South Africa; and the Indo-West Pacific (NMFS 2009b).

4.9.2 Endangerment Factors

The primary limiting factor for smalltooth sawfish populations is commercial fisheries. The animal's long rostrum and teeth are often caught in fishing nets. These trapped individuals are often killed by anglers rather than attempting to release them because of the smalltooth sawfish's large size and aggressive-looking rostrum. Loss of juvenile habitat, low rate of population growth, and late age of sexual maturity have also resulted in the decline of this species. The states of Florida, Louisiana, and Texas have prohibited the "take" of sawfish (NOAA 2009).

4.9.3 Life History Requirements

The smalltooth sawfish is ovoviviparous, meaning the female carries eggs inside her body until the eggs are ready to hatch. Each litter has approximately 15 - 20 pups that are each about 2.5 feet long (NMFS 2009a and NOAA 2009b). Very little data is available about breeding habits. In its first two years, this species grows extremely rapidly (almost 30 inches each year). Males are speculated to reach sexual maturity when they reach a length of 133 inches. The lifespan is estimated between 30 and 60 years.

Adult smalltooth sawfish are reported to use habitat along the coast and in deeper shelf waters. In areas of the highest population densities, most of the individuals were caught in depths ranging from 200 to 400 feet, but most captures were in winter. Recent research has indicated that smalltooth sawfish use the same general habitat as the other sawfish species around the world: coastal waters close to shore with soft bottoms (e.g., mud or sand), in shallow bays, and at river mouths (NOAA 2009).

In September of 2009, NMFS designated critical habitat for smalltooth sawfish along the southwest shoreline of Florida (Charlotte Harbor Estuary Unit and the Ten Thousand Islands/ Everglades Estuary Unit). The critical habitat is defined as shallow euryhaline areas that have red mangroves (*Rhizophora mangle*) and water depths between the mean high water (MHW) line and 3' below mean lower low water (MLLW) (NOAA 2009). The shallow water depths and mangroves provide refugia to help prevent predation of juveniles (NMFS 2009b). The last official sighting in Texas waters occurred in 1984 in Aransas Bay (NMFS 2000). Because of this, NMFS has not designated critical habitat for this species in Texas (NMFS 2012).

4.9.4 Field Survey Results

The on-site field survey was limited to the top of berm approximately 100 feet landward of the Fractionation Facility shoreline. Based on visual observations and aerial photographic interpretation, the shoreline of the Fractionation Facility is vegetated by black mangroves and submerged lands are vegetated by a seagrass bed. Although these areas provide habitat for smalltooth sawfish, no activities are proposed waterward of the berm along the shoreline of the Fractionation Facility. These marine habitats are outside the Project Action Area and will not be impacted by the Project.

The only marine habitat within the Project Action Area is the waters located at the existing VCM facility barge docks. OxyChem proposes to install two monopiles (one at each barge dock) to accommodate safe mooring of Fractionation Facility barges. The monopiles will be located in an area that was previously permitted by the USACE to be dredged and maintained in association with the existing OxyChem VCM Facility barge docks. Water depths in this area are a minimum of 30 feet below MLW and adjoin the USACE maintained La Quinta Channel. La Quinta Channel is contiguous with Corpus Christi Bay.

4.9.5 Impact Analysis

Habitat - It is highly unlikely the smalltooth sawfish uses the waters in the Project Action Area, however, OxyChem will take measures to ensure the installation of the monopiles does not adversely affect this species. Although installation of the two monopiles involves in-water work, pile driving (instead of dredging/filling or jetting construction techniques) will minimize the area of disturbance to the submerged bottom, minimize turbidity generated from installation, and subsequently minimize degradation of water quality in waters that could potentially be used by smalltooth sawfish. No dredging or placement of fill will be necessary for this minor modification to the barge docks; therefore impacts to habitat will be avoided. To further ensure this protected marine species will not be adversely affected by the Project, OxyChem will comply with NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions* (see Appendix F) during construction.

Noise - Construction is expected to be temporary in nature; it is to occur over the course of two days with pile driving expected to occur a maximum of 8 hours each day. The noise associated with the piling installation will be short-term and as such, its impacts on smalltooth sawfish are expected to be negligible. The barge traffic expected to increase from use of the docks for the Fractionation Facility will result in noise levels comparable to existing noise levels at the dock. Given it is highly unlikely smalltooth sawfish use the Project waters and the negligible increase in barge traffic, noise levels from barge traffic are not expected to adversely affect the smalltooth sawfish.

Water Quality (chemical) - To ensure the Project does not adversely affect the quality of waters potentially used by smalltooth sawfish, wastewater generated from the new upland Fractionation Facility will be treated prior to its discharge into the La Quinta Channel adjoining Corpus Christi Bay. As indicated in Section 3.5 of this BA, the levels of contaminant discharged from the existing wastewater outfall/diffuser will be well below the level authorized by the permit which is considered to be protective of marine organisms in accordance with Texas Surface Water Quality Standards for Marine Aquatic Life (30 TAC 307). As such, discharges associated with the Proposed project will not adversely affect smalltooth sawfish.

In addition to the previously-mentioned actions to avoid and minimize impacts to smalltooth sawfish or their habitat, OxyChem will use its existing local municipal water source and not surface waters associated with operation of the Fractionation Facility. Surface water withdrawals from La Quinta Channel/Corpus Christi Bay will not be necessary, thereby further avoiding impacts to protected smalltooth sawfish or their habitat. Temporary use waters will be treated prior to outfall to La Quinta Channel/Corpus Christi Bay as described in Section 3.5 of this BA.

Water Quality (thermal) – There will be no thermal water discharges associated with the Project, therefore, smalltooth sawfish will not be affected by thermal water discharges.

4.9.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project **may affect but is not likely to adversely affect** the **smalltooth sawfish**.

4.10 Slender rush-pea (*Hoffmannseggia tenella*)

Slender rush-pea (*Hoffmannseggia tenella*) is a small member of the Fabaceae (pea) family. It has alternate, bipinnate, compound leaves and short pink-orange flowers. It is rarely more than six inches tall (USFWS 1988). Slender rush-pea was first listed as endangered in 1985 under

the protection of the ESA (USFWS 2013o). It remains listed as endangered under the ESA (USFWS 2013a).

4.10.1 Distribution

In the US, the slender rush pea is only known in Texas. Currently, there are only four known populations (TPWD 2013a) in two Texas counties: Nueces and Kleberg (USFWS 1988). One large population was discovered in 1985 with 10,000 individuals (USFWS 1988).

4.10.2 Endangerment Factors

The primary limiting factor for slender rush-pea is permanent loss of Gulf Coast Prairie habitat (USFWS 2008 and TPWD 2013e). Most of the Gulf Coast Prairie lands have become agricultural fields or pasture lands. Grasses grown on pasture lands were aggressive (e.g., Bermuda grass and King Ranch bluestem [*Bothriochloa ischaemum* var. *songarica*]) (USFWS 1988) and out-competed slender rush-pea.

4.10.3 Life History Requirements

Slender rush-pea flowers in late winter until midsummer (February to July). After the initial flowering, this species sporadically flowers again after rainy periods. It only produces two to four seeds per fruit, but each plant will produce several fruits each year.

Habitat for this species is found in areas with clay soils and short native grasses. It is likely this is a pioneer species, one that can inhabit recently disturbed areas. It is intolerant of competition (USFWS 1988).

4.10.4 Field Survey Results

The field survey revealed no Gulf Coast prairie lands or native grasslands in the Project Action Area. Only mowed grassy roadside boundaries (less than 20 feet wide) exist in the survey area. The TXNDD request revealed three records of the slender rush-pea in Nueces County, the closest of which is approximately 25 miles from the Project Action Area (TPWD 2013b). The known four populations are monitored relatively often, and the last published element occurrence record in the TXNDD was in 2008 (TPWD 2013b).

4.10.5 Impact Analysis

This plant species is a species of the blackland prairie. The project action is comprised predominantly of agricultural lands and does not contain any blackland prairie. As a competition-intolerant plant, consistent mowing along roadsides and active agricultural cultivation would prevent or limit this woody plant from establishing due to repeated cutting before the seeds could germinate. The areas of shrubland habitat would not be suitable for the slender rush-pea because it is dependent on open grasslands. The slender rush-pea cannot compete with successional plants and it is highly unlikely that it would be found in the Project Action Area.

4.10.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project is expected to have **no effect** on the **slender rush-pea**.

4.11 South Texas ambrosia (*Ambrosia cheiranthifolia*)

South Texas ambrosia (*Ambrosia cheiranthifolia*) is a small member of the Asteraceae (sunflower) family. It blooms (small clusters of yellow flowers) in the fall and has one- to two-inch oval leaves with a ranked spiral phyllotaxy. It grows to approximately one foot in height. South Texas ambrosia was first listed as endangered in 1994 under the protection of the ESA (USFWS 1994 and 2013q). It remains listed as endangered under the ESA (TPWD 2013b).

4.11.1 Distribution

In the US, South Texas ambrosia is endemic to Texas. It is believed to be present in four counties: Nueces, Kleberg, Jim Wells, and Cameron (USFWS 2013p). The Five-Year Review of the species indicates that its range is Nueces and Kleberg Counties (USFWS 2010c). Currently, there are only six known populations of South Texas ambrosia (TPWD 2013f).

4.11.2 Endangerment Factors

The primary limiting factor for South Texas ambrosia is fragmentation and permanent loss of Gulf Coast Prairie habitat. Most of the Gulf Coast Prairie lands have become agricultural fields or pasture lands. Grasses that were permitted to grow in the newly maintained lands were aggressive and have outcompeted South Texas ambrosia in most areas (USFWS 2010c).

4.11.3 Life History Requirements

South Texas ambrosia flowers in fall. It is a monoecious plant (has both male and female flowers). Neither the male or female flowers are very pronounced. There are 10–20 male flowers on a stalk. Male flowers are 0.25-inch wide with a yellowish color. Female flowers are small, axillary clusters below the male stalks (TPWD 2013f). It also reproduces vegetatively through root sprouts (rhizomatic). This makes identification of a population or a single species difficult. Due to its similarity in habitat requirements, this species might occur with the slender rush-pea.

Habitat for this species is found in clay or sandy loam soils in open grasslands. It is a characteristic species of grassland and savannah habitats. It is intolerant of competition with either nonnative grass species (King Ranch bluestem and buffelgrass [*Pennisetum ciliare*]) or successional species, like honey mesquite (USFWS 2010c).

4.11.4 Field Survey Results

The survey revealed no Gulf Coast prairie lands or native grasslands in the Project Action Area. Only mowed grassy roadside boundaries (less than 20 feet wide) exist in the survey area.

An experiment on the species' response to growing was performed at Naval Air Station Kingsville in 1993. The results for weekly mowing indicated South Texas ambrosia was not able to thrive, especially in hot, dry weather. It was found mower-tolerant if it could grow to flowering height. Therefore, regular mowing could result in increased density of clonal stands (USFWS 2010c).

The TXNDD data request revealed five records of South Texas ambrosia in the vicinity of the Project area (TPWD 2013b). Sandy loam and clay loam soils (Or – Orielia fine sandy loam, OS-Orelia sandy clay loam, PaA – Papalote fine sandy loam, RaA and RaB – Raymondville clay

loam) exist within the Project Action Area (see Appendix G). However, all soils are located in areas disturbed by agricultural activities. The fields are planted with non-native plants and crops. As indicated earlier, South Texas ambrosia is easily out-competed by non-native plant species. As such, it is highly unlikely this plant is found within the Project Action Area.

4.11.5 Impact Analysis

Because this species can vegetatively reproduce, it could potentially be found in mowed areas, but surveys revealed no presence of this species. If the species was present in these areas, its natural history indicates there would be clonal stands, due to the regular mowing. Field surveys did not reveal any dominant stands of herbaceous vegetation other than bermuda grass.

The additional areas of shrubland habitat would not be suitable for South Texas ambrosia because the species is dependent on open grassland and prairie habitat. Honey mesquite, a successional plant, is present in the shrubland habitat. South Texas ambrosia cannot compete with this successional plant. Additionally, in those areas where suitable soils are present, they are located in agricultural fields where soils have been disturbed and non-native plant species have been introduced. Based on these reasons, it is highly unlikely South Texas ambrosia is found within the Project Action Area.

4.11.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project is expected to have **no effect** on **South Texas ambrosia**.

4.12 Golden Orb (*Quadrula aurea*)

The golden orb is a small (typically less than 3.2 inches) mussel with an oval to nearly round smooth and unsculptured shell. The shell color of this mussel ranges from yellow-brown, gold, or orangish-brown to dark brown or black with some individuals colored with faint greenish rays (USFWS 2011). The golden orb is one of 12 mussel species that are under review for federal listing as threatened or endangered. The golden orb was state-listed as threatened in January of 2010 and federally-listed as a candidate species in October of 2011. USFWS will be working on a proposed rule to list this species and determine if critical habitat will be identified.

4.12.1 Distribution

The golden orb is a species of freshwater mussel that is endemic to Texas with historic distributions throughout the Guadalupe-San Antonio and the Nueces-Frio River basins (Howells, et. al. 1996). It is considered extirpated from the entire Nueces-Frio River basin, with the exception of the golden orb populations in the lower reaches of the Nueces River within the Lake Corpus Christi Reservoir (USFWS 2011e). Live individuals of golden orb have been found within the Reservoir since 1994. Lake Corpus Christi is located in the northwestern portion of San Patricio County. However, San Patricio County is not identified as one of the known counties of recent occurrence for the golden orb (USFWS 2011e).

4.12.2 Endangerment Factors

The main threat to the golden orb is from changes to its habitat from the construction and operation of dams and reservoirs on Texas Rivers (USFWS 2011f). Such man-made structures prevent free flowing water habitats and reduce the ability of mussels and host fish (mussel

larvae attach to the gills and fins of fish) from dispersing which results in small isolated populations. Additionally, non-point source pollution of streams from runoff of toxic chemicals (i.e. fertilizers, herbicides, pesticides) from certain land uses is also a threat to mussels. Direct threats also include sedimentation in streams and habitat losses from dewatering due to droughts and water use. Sand and gravel mining also pose a threat to this species.

4.12.3 Life History Requirements

Mussels require flowing streams and rivers of good water quality. They embed in the mud, sand, and gravel of streams and rivers. Mussels filter food from the water column and their diet consists of algae, small plants and animals (plankton), and bacteria. The larvae are parasitic and attach to the gills and fins of fish. The larvae depend on host fish for dispersal. Mussels will use lures that mimic minnow, worms, leeches or aquatic insects to attract a suitable fish host. The larvae's parasitic phase typically last a 3 to 6 and it then becomes a young mussel and detaches from the host fish and embeds itself on the stream bottom. Recent research (Hammondtree, *et. al.* 2012) revealed substrate composition (sites with pebbles with cobbles and larger sized substrate) are preferable as they are associated with greater stability in the faster flows also characteristic of these sites. Golden orb densities are highest at sites where the larger substrate provides stability to the medium to find sands that lie underneath. It is typically found in depths up to 10 feet (TWPD 2013g). TPWD continues to conduct research to determine a more accurate assessment of the extent of the golden orb.

4.12.4 Field Survey Results

The survey revealed no perennial waterbodies, lentic or lotic, in the area. All identified drainages are intermittent. No substrates were identified that were sand, gravel, or cobble. The Nueces River and Lake Corpus Christi are approximately 25 miles away from the Project Action Area and do not contribute flow to the Project Action Area.

4.12.5 Impact Analysis

The Project Action Area does not contain suitable habitat for the golden orb. No perennial waterbodies, lentic or lotic, were identified in the Project Action Area. All identified drainages were intermittent. Although Lake Corpus Christi is located in the eastern extent of the Project county (San Patricio County), where known golden orb populations have recently been documented, the Lake is approximately 25 miles away from the Project Action Area and does not contribute flow to the Project Action Area. Given the lack of habitat and no connectivity to the Lake with documented presence of the species, it is unlikely the project habitat supports this species.

4.12.6 Preliminary Determination

Based on the above analysis, implementation of the proposed Project is expected to have **no effect** on the **Golden Orb**.

5.0 CUMULATIVE EFFECTS

The Project Action Area for the Project is limited to the area within the OxyChem Facility fence line and the approximately 18.5-mile-long, 100-foot-wide SPP Corridor. OxyChem is unaware of any future State, tribal, local or private actions, not involving Federal activities, proposed within the Project Action Area. Accordingly, the proposed Project, combined with other non-federal reasonably foreseeable future actions, will not result in any cumulative effects on water quality or air quality within the Project Action Area.

6.0 CONCLUSIONS

6.1 Determination of Effect

6.1.1 Protected Species

The recommended determinations of effect for USFWS regulated federally-protected species with the potential to occur within habitat located within the Project Action Area are summarized below in Table 5-1.

Table 6-1 Threatened and Endangered Species with the Potential to Occur in San Patricio County Based on Habitat Presence and their Preliminary Effect Determination

Common Name	Scientific Name	Preliminary Determination
Mammals		
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	May affect, not likely to adversely affect
Ocelot	*Leopardus pardalis*	May affect, not likely to adversely affect
Red wolf	*Canis rufus*	No effect
West Indian manatee	*Trichechus manatus*	May affect, not likely to adversely affect
Birds		
Northern aplomado falcon	*Falco femoralis septentrionalis*	May affect, not likely to adversely affect
Piping plover	*Charadrius melodus*	May affect, not likely to adversely affect
Whooping crane	*Grus americana*	May affect, not likely to adversely affect
Reptiles		
Green sea turtle	*Chelonia mydas*	May affect, not likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricata*	May affect, not likely to adversely affect
Kemp's Ridley sea turtle	*Lepidochelys kempii*	May affect, not likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	May affect, not likely to adversely affect
Loggerhead sea turtle	*Caretta caretta*	May affect, not likely to adversely affect
Fish		
Smalltooth sawfish	*Pristis pectinata*	May affect, not likely to adversely affect
Plants		
Slender rush-pea	*Hoffmannseggia tenella*	No effect
South Texas ambrosia	*Ambrosia cheiranthifolia*	No effect
Mollusks		
Golden Orb	*Quadrula aurea*	No effect

Additionally, T&E species promulgated to NMFS per the ESA and MMPA are not likely to be affected by the Project. Furthermore, the Project is not anticipated to result in the "take" of migratory birds, bald eagles, and golden eagles as defined in the MBTA and BGEPA, respectively.

6.1.2 Critical Habitat and Other Sensitive Resources

The Project Action Area does not traverse any critical habitat identified by the USFWS or other Sensitive Resources as identified by TPWD (TPWD 2001) or USEPA (USEPA 2011).

6.2 Conservation Measures

This section provides a summation of conservation measures to ensure federally-listed species in and surrounding the Project Action Area will not be affected by the Project.

6.2.1 Fractionation Facility

Air Quality – OxyChem will design the Fractionation Facility to use the BACT to control the project emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. As demonstrated by the Air Quality Modeling for the Facility, all concentrations of pollutants from the Fractionation Facility Site are below the SILs at ground level at all points throughout the Fractionation Facility Site and do not extend beyond the Fractionation Facility Site boundaries. The Fractionation Facility will have no effect on air quality for federally-listed T&E species.

Wastewater – OxyChem will design the Fractionation Facility to ensure the Project does not adversely affect the quality of waters used by federally-listed T&E species (USFWS and NMFS promulgated ESA species), EFH, marine mammals, migratory birds, and bald and golden eagles. Spill containment areas will be provided at the new upland Fractionation Facility. Contaminated water will be collected from process, storage, storage pump pads, loading areas, utilities, and firewater areas. The contaminated water will be stored in tanks and then fed to the contaminated water stripper to remove volatile hydrocarbons prior to discharge to the existing OxyChem Facility wastewater treatment unit. The wastewater will be treated so it meets state of Texas water quality standards prior to its discharge into La Quinta Channel which adjoins Corpus Christi Bay. Wastewater from the Fractionation Facility will be routed to the existing OxyChem Facility where it will be processed in the existing wastewater treatment unit (TPDES Permit No. WQ0003083000). It will subsequently be discharged to an outfall diffuser as required by the permit.

Stormwater – Non-contact stormwater runoff will be routed to an existing DuPont stormwater outfall and discharged into a man-made drainage canal with a manually operated gate as required in the DuPont TPDES Permit (Permit No. WQ0001651000). As required by the permit, water discharges are monitored for several water quality parameters and outfall discharges into La Quinta Channel will meet state water quality standards, thereby avoiding degradation in waters used by protected species. The use of the existing outfall structures also eliminates the need for new outfall structures along the Fractionation Facility Site shoreline, thereby conserving habitat used by protected species.

Barge Docks – OxyChem will use the existing adjacent OxyChem Facility barge docks in lieu of constructing new barge docks along the shoreline at the Fractionation Facility. This avoids in-water impacts and impacts to coastal resources, thereby conserving habitat and surface waters used by protected species.

The likelihood of a West Indian manatee using the near shore waters of the Project area is low, and any such use would be transient because this species is not a resident of Texas waters. Despite the low likelihood of occurrence, OxyChem will provide pre-construction training of personnel performing in-water monopile construction activities. Specifically, construction personnel will be informed of the potential presence and identification of West Indian manatee, and instructed to cease work if a manatee is observed within 50 feet of the monopile installation. Construction will resume upon the manatee leaving the area where it is out of harm's way.

OxyChem barge attendants will be trained in proper spill prevention and containment procedures. Clean-up procedures will begin immediately after a spill is contained and will comply with applicable state and federal spill clean-up rules and regulations.

Operation of Fractionation Facility – OxyChem will use its existing local municipal water source and not surface waters associated with operation of the Fractionation Facility. Surface water withdrawals from La Quinta Channel/Corpus Christi Bay will not be necessary, thereby avoiding impacts to surface waters used by protected species.

Fractionation Facility Lighting – Lights will be located throughout the Fractionation Facility Site so new structures are visible during low-light conditions (dawn, dusk, and nighttime hours). As a matter of standard lighting procedures at the existing OxyChem Facility, OxyChem will ensure the Fractionation Facility Site will be well lighted for aircraft safety and to accommodate maintenance needs during nighttime hours. New overhead power lines will be located adjacent to and at a similar height as existing overhead power lines at the Fractionation Facility Site, thereby avoiding creation of a new potential strike hazard to migrating whooping cranes. Finally, the new electrical substation will be located adjacent to the existing DuPont substation at the Fractionation Facility Site, and will be well lighted for clear visibility during nighttime hours. These actions particularly will avoid impacts to migrating whooping cranes that might use the Project Action Area or surrounding areas as stopping grounds. These actions will also avoid impacts to other migrating birds, the bald eagle, and the golden eagle. OxyChem has committed to this conservation measure per their letter to USFWS (see Appendix H).

Sensitive Snake Education and Management Plan – Although no snakes in Texas are federally-listed, because potential suitable habitat exists within the Project site, USFWS expressed concerns regarding potential construction-related impacts to Texas indigo snakes (*Drymarchon melanurus erebennus*) during the February 2012 pre-application meeting. Although habitat for the state-listed threatened Texas scarlet snake (*Cemophora coccinea lineri*) and timber rattlesnake (*Crotalus horridus*) and the state-listed rare gulf saltmarsh snake (*Nerodia clarkii*) is not present within the Project site, USFWS also expressed construction-related concerns regarding these species.

To address USFWS's concerns regarding potential adverse impacts to sensitive snakes during construction, OxyChem will provide environmental training to on-site construction personnel. The intent of the training is to instruct construction personnel on how to identify and avoid snakes with the expectation that this will reduce snake fatalities and the danger to workers during construction given the timber rattlesnake is venomous and other non-listed native venomous snakes might be encountered during construction. Appendix I provides the *Sensitive Snake Education and Management Plan* that outlines sensitive snake description/identification, habitat/behavior, threats to each species, and actions to be taken if sensitive snakes are observed during Project construction. Implementation of this plan will minimize potential impacts to sensitive snakes during construction.

6.2.2 Barge Dock Modifications

The monopiles will be comprised of steel and will be driven into place from a crane mounted on a barge. Although installation of the two monopiles involves in-water work, pile driving (instead of dredging/filling or jetting construction techniques) will minimize the area of disturbance to the submerged bottom, minimize turbidity generated from installation, and subsequently minimize degradation of water quality during construction.

Vapors will be returned to storage tanks or the thermal oxidizers in dedicated headers. A multi-fiber optic communication system will be provided to the barge loading area and it will carry communications with the DCS and alarm system. The barge dock will have a remote control system that will communicate with the DCS.

Stormwater and gasoline drips will be collected from the barge docks and returned to the contaminated water storage tanks. Firewater from the NGL firewater system will be provided to the dock.

6.2.3 Pipeline

Hydrostatic Testing – OxyChem will use water obtained from potable sources and transported to the SPP Corridor or nitrogen for hydrostatic testing of pipelines. Operational test waters will also be obtained from potable sources. Surface water withdrawals will not be necessary, thereby avoiding impacts to surface waters potentially used by protected species.

Horizontal Directional Drilling – Although no USACE jurisdictional wetlands or waters occur on the Fractionation Facility Site or within the SPP Corridor, the pipelines will traverse non-jurisdictional aquatic features. The non-jurisdictional aquatic features include: four ditch-form wetlands; two intermittent drainage canals; and 36 ditches (seven intermittent and 29 ephemeral). The majority of these aquatic features contained water depths no greater than one foot with the exception of the man-made drainage canals. As necessary, OxyChem will use HDD techniques to install the pipelines and other construction items on the Fractionation Facility Site where HDD is an appropriate methodology. This will avoid disturbance to these aquatic features. It will also avoid impacts to water quality in these areas. OxyChem will have a Frac-Out Contingency Plan to be prepared in the event of an inadvertent frac-out during HDD construction.

In addition to the use of the measures described above, the Fractionation Facility, SPP Corridor, and use of the existing adjacent OxyChem Facility barge docks will comply with all conditions of the required regulatory permits necessary for their construction and operation.

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8.0 REFERENCES

Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250). 1940 and as amended. Accessed September 2012 and February 25, 2013. www.fws.gov/midwest/Eagle/guidelines/bgepa.html.

Calleson, C.S., and R.K. Frohlich. 2007. Slower boat speeds reduce risks to manatees. Endangered Species Research 3:295-304.

Canadian Wildlife Service and US Fish and Wildlife Service (CWS and USFWS). 2007. International Recovery Plan for the Whooping Crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW) and US Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/recovery_plan/070604_v4.pdf.

Clean Air Act. (42 U.S.C. §§ 7401 et seq.). 1967 and as amended. Accessed March 6, 2012 and February 25, 2013. http://www.epa.gov/air/caa/.

Crite, J. 2000. Green Sea Turtle (*Chelonia mydas*, Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 19, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Chelonia_mydas.html.

Department of the Interior (DOI). 2012. Endangered and Threatened Wildlife and Plants; Review of Native Species that are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions. Federal Register Volume 76, Number 225. 68 pp. Accessed February 19, 2013. http://www.gpo.gov/fdsys/pkg/FR-2012-11-21/pdf/2012-28050.pdf.

Duermit, L. 2007. Loggerhead Sea Turtle (*Caretta caretta*), Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Caretta_caretta.html.

Edelman, M. 2004. Hawksbill Sea Turtle (*Eretmochelys imbricata*), Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Eretmochelys_imbricata.html.

Edwards, H. 2000. West Indian Manatee (*Trichechus manatus*), Animal Diversity Web. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Trichechus_manatus.html.

Endangered Species Act (16 USC §§1531-1544, 87 Stat. 884). 1973 and as amended. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. www.fws.gov/laws/lawsdigest/esact.html.

Esch, J. 2011. Whooping Crane (*Grus americana*), Animal Diversity Web. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Grus_americana.html.

Federal Energy Regulatory Commission (FERC). 2003a. Upland Erosion Control, Revegetation, and Maintenance Plan Wetland and Waterbody Construction and

Mitigation Procedures. Accessed March 6, 2012 and February 25, 2013. www.ferc.gov/industries/gas/enviro/guidelines/AD12-2.pdf.

Federal Energy Regulatory Commission (FERC). 2003b. Wetland and Waterbody Construction and Mitigation Procedures. Accessed March 6, 2012 and February 25, 2013. www.ferc.gov/industries/gas/enviro/wetland.pdf.

Florida Fish and Wildlife Conservation Commission (FFWCC). 2012. Personal communication with Mary Duncan of FFWCC. Tallahassee, Florida.

Fontanes, F.; A. Roszko; S. Flore; K. Hatton; V. Combos and A. Helton. 2007. Leatherback Sea Turtle (*Dermochelys coriacea*), Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Dermochelys_coriacea.html.

Howells, R.G.,R.W. Neck, and H.D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press. Austin, Texas.

Hammontree, S.E., J.A. Mabe, and J.H. Kennedy. 2012. University of North Texas Department of Biological Sciences. Habitat Requirements of the Golden Orb (Quadrula aurea) Final Report for Texas Water Development Board and Texas parks and Wildlife Department. Denton, Texas.

Kittel, J. 2011. Ocelot (*Leopardus pardalis*), Animal Diversity Web. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Leopardus_pardalis.html.

Klug, Z. 2006. Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Lepidochelys_kempii.html.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 USC §§ 1801-1884; 90 Stat. 331). 1976 and as amended. Accessed October 4, 2012, February 25, 2013, and March 11, 2013. http://www.nmfs.noaa.gov/sfa/magact/.

Marine Mammal Protection Act (MMPA) (16 USC §§ 1361-1407). 1972 and as amended. Accessed October 4, 2012, February 25, 2013, and March 11, 2013. www.nmfs.noaa.gov/pr/laws/mmpa/.

Migratory Bird Treaty Act (MBTA) (16 USC §§ 703-712). 1918 and as amended. Accessed March 6, 2012 and February 25, 2013. www.fws.gov/laws/lawsdigest/migtrea.html.

Mulheisen, M. and R. Csomos. 2001. Red Wolf (*Canis rufus*), Animal Diversity Web. Accessed March 6, 2012, February 25, 2013, and March 12, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Canis_rufus.html.

National Marine Fisheries Service (NMFS). 2000. Status Review of Smalltooth Sawfish (Pristis pectinata). Accessed January 11, 2013, February 14, 2013, and March 11, 2013. http://www.flmnh.ufl.edu/fish/sharks/sawfish/srt/statusreview.pdf.

National Marine Fisheries Service (NMFS). 2009a. Smalltooth sawfish. National Marine Fisheries Service, Washington, D.C. Accessed March 06, 2012, February 22, 2013, and March 11, 2013. http://www.nmfs.noaa.gov/pr/species/fish/smalltoothsawfish.htm.

National Marine Fisheries Service (NMFS). 2009b. Recovery Plan for the Smalltooth sawfish (*Pristis pectinata*). Prepared by the Smalltooth Sawfish Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. Accessed March 06, 2012, February 22, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/smalltoothsawfish.pdf.

National Marine Fisheries Service (NMFS) 2013a. NOAA Office of Protected Resources – Marine Mammals Protected Under the Marine Mammal Protection Act (MMPA). Accessed March 20, 2013. http://www.nmfs.noaa.gov/pr/species/mammals/.

National Marine Fisheries Service (NMFS). 2013b. Marine Mammal Species under the Endangered Species Act (ESA). Accessed October 4, 2012, February 22, 2013, and March 11, 2013. http://www.nmfs.noaa.gov/pr/species/esa/mammals.htm.

National Marine Fisheries Service (NMFS). 2012. Personal communication (September 5, 2012) with Shelley Norton, Natural Resource Specialist, NMFS Southeast Region, Protected Resources Division. St. Petersburg, Florida.

National Marine Fisheries Service and US Fish and Wildlife Service. (NMFS & USFWS). 1991. Recovery Plan for US Population of Atlantic Green Turtle. National Marine Fisheries Service, Washington, D.C. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/911126c.pdf.

National Marine Fisheries Service and US Fish and Wildlife Service. (NMFS & USFWS). 1993. Recovery Plan for Hawksbill Turtles in the US Caribbean Sea, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Florida. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/931110.pdf.

National Marine Fisheries Service and US Fish and Wildlife Service. (NMFS & USFWS). 1998. Recovery Plan for US Populations of the Leatherback Sea Turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Silver Spring, Maryland. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/920406.pdf.

National Marine Fisheries Service and US Fish and Wildlife Service. (NMFS & USFWS). 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*). National Marine Fisheries Service, Silver Spring, Maryland. Accessed March 06, 2012, February 21, 2013, March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/090116.pdf.

National Marine Fisheries Service, US Fish and Wildlife Service and Secretaria de Medio Ambiente y Recursos Naturales (NMFS, USFWS, & SEMARNAT). 2010. Draft Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second

Revision. National Marine Fisheries Service, Silver Spring, Maryland. Accessed March 6, 2012, February 14, 2013, and March 11, 2013. http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_kempsridley_draft2.pdf.

National Oceanic and Atmospheric Administration (NOAA). 2009. Endangered and Threatened Species; Critical Habitat for the Endangered Distinct Population Segment of Smalltooth Sawfish. Federal Register Vol 74, No 169. 26 pp. National Marine Fisheries Service, Washington, D.C. Accessed March 06, 2012, February 22, 2013, and March 11, 2013. http://www.nmfs.noaa.gov/pr/pdfs/fr/fr74-45353.pdf.

NatureServe. 2009. Appendix 1: Animal EO Specs - Separation Distances and Interferred Extent Distances. Accessed January 16, 2012 and February 25, 2013. http://www.natureserve.org/prodServices/pdf/Animal_separation_and_IE_distances.pdf.

Pecor, K. 2003a. Cheloniidae, Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Cheloniidae.html.

Pecor, K. 2003b. Dermochelyidae, Animal Diversity Web. Accessed March 06, 2012, February 21, 2013, and March 12, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Dermochelyidae.html.

Port Corpus Christi. 2012. Ship Channel Map. Accessed November 5, 2012 and February 25, 2013. http://www.portofcorpuschristi.com/templates/pcctemplate1/ShipChannelMap/index.html.

Rick, J. 2004. Gulf Coast Jaguarundi (*Puma yagouaroundi*), Animal Diversity Web. Accessed March 6, 2012 and February 25, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Puma_yagouaroundi.html.

Sea Turtle Restoration Project. 2003. *Sea turtle fact sheet.* Sea Turtle Restoration Project, Forest Knolls, California. Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://seaturtles.org/downloads/ACF831.pdf.

Texas Marine Mammal Stranding Network (TMMSN). 2012. West Indian Manatee (*Trichechus manatus*) Sighted on Shoreline Drive. Accessed October 4, 2012 and February 25, 2013. http://www.kiiitv.com/story/19599478/west-indian-manatee-sighted-on-shoreline-drive.

Texas Parks and Wildlife Department (TPWD). 2001. Ecologically Significant River and Stream Segments. Accessed March 6, 2012 and February 25, 2013. http://www.tpwd.state.tx.us/landwater/water/environconcerns/water_quality/sigsegs/media/sigseg_map_allregions.pdf.

Texas Parks and Wildlife Department (TPWD). 2011. Piping Plover (*Charadrius melodus*). Texas Parks and Wildlife Department, Austin, Texas. Accessed March 6, 2012 and February 25, 2013. http://www.tpwd.state.tx.us/huntwild/wild/species/piplover/.

Texas Parks and Wildlife Department (TPWD). 2013a. Endangered Species Mapper by County. Texas Parks and Wildlife Department, Austin, Texas. Accessed October 4,

2012, February 25, 2013, and March 11, 2013. http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/.

Texas Parks and Wildlife Department (TPWD). 2013b. County Lists of Texas' Special Species [Aransas, Bee, Calhoun, Jackson, Live Oak, Matagorda, Nueces, Refugio, San Patricio, Victoria, and Wharton Counties, Texas, 2012]. Accessed January 16, 2012, February 10, 2012, October 4, 2012, February 25, 2013, and March 11, 2013. http://www.tpwd.state.tx.us/gis/ris/es/.

Texas Parks and Wildlife Department (TPWD). 2013c. Gulf Coast jaguarundi (*Herpailurus yagouaroundi cacomitli*) Fact Sheet. Accessed October 3, 2012 and February 25, 2013. http://www.tpwd.state.tx.us/huntwild/wild/species/jag/.

Texas Parks and Wildlife Department (TPWD). 2013d. Ocelot (*Leopardus pardalis*) Fact Sheet. Accessed October 4, 2012 and February 25, 2013. http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0013_ocelot.pdf.

Texas Parks and Wildlife Department (TPWD). 2013e. Slender rush-pea (*Hoffmannseggia tenella*). Texas Parks and Wildlife Department, Austin, Texas. Accessed March 6, 2012, February 25, 2013, and March 21, 2013. http://www.tpwd.state.tx.us/huntwild/wild/species/rushpea/.

Texas Parks and Wildlife Department (TPWD). 2013f. South Texas ambrosia (*Ambrosia cheiranthifolia*) Fact Sheet. Accessed March 6, 2012, February 25, 2013, and March 21, 2013. http://www.tpwd.state.tx.us/huntwild/wild/species/ambrosia/.

Texas Parks and Wildlife Department (TPWD). 2013g. Golden Orb. Accessed March 21, 2013. http://www.tpwd.state.tx.us/gis/ris/es/ES_Reports.aspx?county=San Patricio.

US Army Corps of Engineers (USACE). 2003. Final Environmental Impact Statement, Corpus Christi Ship Channel, Texas, Channel Improvement Project, Volume II, Appendices. Accessed March 21, 2013. http://ww3.swg.usace.army.mil/pe/Corpus/Files/CorpusFEISAppendices.pdf.

US Environmental Protection Agency (USEPA). 2011. Surf Your Watershed. Accessed February 29, 2012 and February 25, 2013. http://cfpub.epa.gov/surf/locate/index.cfm.

US Fish and Wildlife Service (USFWS). 1988. Slender rush-pea (*Hoffmannseggia tenella*) Recovery Plan. US Fish and Wildlife Service, Albuquerque, New Mexico. 38 pp. Accessed March 6, 2012, February 25, 2013, and March 21, 2013. http://ecos.fws.gov/docs/recovery_plan/880913.pdf.

US Fish and Wildlife Service (USFWS). 1989. Red Wolf (*Canis rufus*) Recovery Plan. US Fish and Wildlife Service, Atlanta, Georgia. 110 pp. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/901026.pdf.

US Fish and Wildlife Service (USFWS). 1990a. Listed Cats of Texas and Arizona Recovery Plan (with Emphasis on the Ocelot). US Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. 131 pp. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/recovery_plan/900822.pdf.

US Fish and Wildlife Service (USFWS). 1990b. Northern Aplomado Falcon (*Falco femoralis septentrionalis*) Recovery Plan. US Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/recovery_plan/900608.pdf.

US Fish and Wildlife Service (USFWS). 1994. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Plants *Ayenia limitaris* (Texas Ayenia) and *Ambrosia cheiranthifolia* (South Texas Ambrosia). Accessed March 21, 2013. http://ecos.fws.gov/docs/federal_register/fr2665.pdf.

US Fish and Wildlife Service (USFWS). 1996. Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan. US Fish and Wildlife Service, Northeast Region, Hadley, Massachusetts. 258 pp. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/recovery_plan/960502.pdf.

US Fish and Wildlife Service (USFWS). 2001. Florida Manatee (*Trichechus manatus latirostris*) Recovery Plan, Third Revision. US Fish and Wildlife Service, Southeast Region, Atlanta, Georgia. 144 pp. Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://ecos.fws.gov/docs/recovery_plan/011030.pdf.

US Fish and Wildlife Service (USFWS). 2007a. Northern aplomado falcon (*Falco femoralis septentrionalis*) Fact Sheet. 2 pp. Accessed March 6, 2012 and February 25, 2013. http://www.fws.gov/endangered/esa-library/pdf/aplomado_falcon_fact_sheet.pdf.

US Fish and Wildlife Service (USFWS). 2008. Slender rush-pea (*Hoffmannseggia tenella*) 5-Year Review: Summary and Evaluation. US Fish and Wildlife Service, Corpus Christi, Texas. Accessed March 6, 2012, February 25, 2013, and March 21, 2013. http://ecos.fws.gov/docs/five_year_review/doc1920.pdf.

US Fish and Wildlife Service (USFWS). 2009. Piping Plover (*Charadrius melodus*) 5-Year Review: Summary and Evaluation. US Fish and Wildlife Service, Northeast Region, Hadley, Massachusetts. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/five_year_review/doc3009.pdf.

US Fish and Wildlife Service (USFWS). 2010a. Revised List of Migratory Birds and Your Permit – Questions and Answers [Fact Sheet]. Accessed March 6, 2012, February 25, 2013, and March 12, 2013. http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/Part%2010.muscovy%20Fact%20Sheet.11-1-2010.pdf.

US Fish and Wildlife Service (USFWS). 2010b. Draft Ocelot (*Leopardus pardalis*) Recovery Plan, First Revision. US Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. Accessed March 6, 2012 and February 25, 2013. http://www.fws.gov/southwest/es/Documents/R2ES/Draft_Ocelot_Recovery_Plan-First_Revision.pdf.

US Fish and Wildlife Service (USFWS). 2010c. South Texas Ambrosia (*Ambrosia cheiranthifolia*) 5-Year Review: Summary and Evaluation. Corpus Christi, Texas. Accessed March 6, 2012, February 25, 2013, and March 21, 2013. http://ecos.fws.gov/docs/five_year_review/doc3601.pdf.

US Fish and Wildlife Service (USFWS). 2011a. ESA Basics – More Than 30 Years of Conserving Endangered Species [Fact Sheet]. Accessed March 6, 2012 and February 25, 2013. http://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.

US Fish and Wildlife Service. 2011b. Golden Eagles (*Aquila chrysaetos*) Status Fact Sheet. Accessed October 4, 2012 and February 25, 2013. http://www.fws.gov/habitatconservation/Golden_Eagle_Status_Fact_Sheet.pdf.

US Fish and Wildlife (USFWS). 2011c. Letter dated March 21, 2011 from David L. Hankla, USFWS Field Supervisor to Colonel Alfred A. Pantano, Jr., USACE District Engineer. Jacksonville, Florida.

US Fish and Wildlife Service (USFWS). 2011d. USFWS Five-Year Review of the Whooping Crane (*Grus americana*). Corpus Christi, Texas. Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/docs/five_year_review/doc3977.pdf.

US Fish and Wildlife Service (USFWS). 2011e. Five Central Texas Mussel Species. http://www.fws.gov/southwest/es/Documents/R2ES/5_central_Texas_mussels_fact_sheet_2011.pdf Accessed October 5, 2012 and March 21, 2013.

US Fish and Wildlife Service (USFWS). 2011f. Endangered and Threatened Wildlife and Plants: 12-Month Finding on a Petition to List Texas Fatmucket, Golden Orb, Smooth Pimpleback, Texas Pimpleback, and Texas Fawnsfoot as Threated or Endangered. Federal Register Volume 76, No. 194, Thursday, October 6, 2011, Proposed Rules.

US Fish and Wildlife Service (USFWS). 2012. [Graphic illustration of percent of whooping crane sightings in Texas]. *Percent of Sightings*. Provided by Mary Orms, USFWS Corpus Christi Ecological Services Field Office via e-mail to Chase Hahn of Tetra Tech on February 28, 2012.

US Fish and Wildlife Service (USFWS). 2013a. Endangered Species Program. Accessed October 4, 2012, February 25, 2013, and March 11, 2013. http://www.fws.gov/endangered/.

US Fish and Wildlife Service (USFWS). 2013b. Species Profile: Gulf Coast jaguarundi (*Herpailurus yagouaroundi cacomitli*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A05H.

US Fish and Wildlife Service (USFWS). 2013c. Species Profile: Ocelot *(Leopardus pardalis*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A084.

US Fish and Wildlife Service (USFWS). 2013d. Personal communication with Dawn Whitehead, Field Supervisor, USFWS Corpus Christi Ecological Field Office on March 20 and 21, 2013. Corpus Christi, Texas.

US Fish and Wildlife Service (USFWS). 2013e. Species Profile: Red Wolf (*Canis rufus*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A00F.

US Fish and Wildlife Service (USFWS). 2013f. Species Profile: West Indian Manatee (*Trichechus manatus*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A007.

US Fish and Wildlife Service (USFWS). 2013g. Species Profile: Northern Aplomado Falcon (*Falco femoralis ssp. septentrionalis*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B06V.

US Fish and Wildlife Service (USFWS). 2013h. Species Profile: Piping Plover (*Charadrius melodus*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B079.

US Fish and Wildlife Service (USFWS). 2013i. Species Profile: Whooping Crane (*Grus americana*). Accessed March 6, 2012 and February 25, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003.

US Fish and Wildlife Service. (USFWS). 2013j. Species Profile: Green Sea Turtle (*Chelonia mydas*). Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C00S.

US Fish and Wildlife Service. (USFWS). 2013k. Species Profile: Hawksbill Sea Turtle (*Eretmochelys imbricata*). Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C00E.

US Fish and Wildlife Service. (USFWS). 2013l. Species Profile: Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C00O.

US Fish and Wildlife Service. (USFWS). 2013m. Species Profile: Leatherback Sea Turtle (*Dermochelys coriacea*). Accessed March 06, 2012, February 21, 2013, and March 11, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C00F.

US Fish and Wildlife Service. (USFWS). 2013n. Species Profile: Smalltooth sawfish (*Pristis pectinata*). Accessed March 06, 2012, February 22, 2013, and March 11, 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E0A9.

US Fish and Wildlife Service (USFWS). 2013o. Species Profile: Slender rush-pea (*Hoffmannseggia tenella*). Accessed March 6, 2012, February 25, 2013, and March 11, 2013. http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=Q1XI.

US Fish and Wildlife Service (USFWS). 2013p. Species Profile: South Texas Ambrosia (*Ambrosia cheiranthifolia*). Accessed March 6, 2012, February 25, 2013, and March 2013. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q1SS.

Vinelli, R. 2000. *Charadrius melodus*, Animal Diversity Web. Accessed March 6, 2012 and February 25, 2013. http://animaldiversity.ummz.umich.edu/site/accounts/information/Charadrius_melodus.html.

APPENDIX A

FEBRUARY 14, 2012 US FISH AND WILDLIFE SERVICE (USFWS) AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION – NATIONAL MARINE FISHERIES (NOAA-NMFS) MEETING MINUTES

MEETING MINUTES PREPARED BY OXYCHEM
Occidental Chemical Corporation's Proposed Ingleside Fractionation Project
Pre-application Meeting with United States Fish and Wildlife Service
and National Marine Fisheries Service

Meeting Date: **February 14, 2012**

Meeting Location: **United States Fish and Wildlife Service Office, Corpus Christi University, 6300 Ocean Drive, Unit 5837, Corpus Christi, TX 78412-5837**

Meeting Attendees (see attached sign-in sheet):
Dawn Whitehead, USFWS
Mary Orms, USFWS
Craig Giggleman, USFWS
Heather Young, NMFS-Galveston (via telephone)
Mark Evans, OxyChem
Steve Compton, Tetra Tech
Chase Hahn, Tetra Tech (via telephone)
Pat Green, Tetra Tech (via telephone)
Chris Sourcier, Tetra Tech (via telephone)
Brian Dresser, Tetra Tech (via telephone)

Introduction

The purpose of this pre-application meeting is to introduce the project to the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), identify potential and obtain clarification on required permits, permitting jurisdiction, permit application form and content requirements, and agency review process and timelines.

Project Description

Mark Evans of Occidental Chemical Corporation (OxyChem) provided a handout and presented a summary of the proposed project. The proposed project includes a natural gas liquids (NGL) fractionation unit with 86,000 barrel per day (Bpd) capacity, to be constructed at an existing industrial site owned and operated by OxyChem. The fractionator will use NGL feedstock obtained via pipeline to produce ethane, propane (about 28,000 Bpd), butane (about 16,000 Bpd), and natural gasoline (about 8,000 Bpd). Ethane would be directly transported to market via pipeline. Propane and butane would be temporarily stored in on-site tanks, and transported to market via pipeline, rail, truck, and barge. Natural gasoline would be temporarily stored in an on-site tank, and transported to market via barge. All four pipelines (incoming NGL, and outgoing ethane, propane, and butane) would be located in the same approximately 17-mile-long pipeline corridor heading north then northwest from the fractionator site to various pipeline interconnects along the corridor.

Fractionator construction staging and activities would be located on an approximately 300-acre site located in an upland area adjacent to Nueces Bay and the La Quinta Navigation Channel near Ingleside, Texas. The project will not involve any marine or dredging impacts, as barge transport will involve use of an existing barge dock, and retrofitting with on-dock facilities only.

Regarding the pipelines, based on initial in-field reconnaissance of the proposed pipeline corridor, approximately 95% of the project would cross agricultural land with very limited wetland/drainage areas. Pipeline construction would avoid open cuts of any potential Section 10 waters by boring all drainage crossings to limit potential impacts. Oxy believes pipeline construction will likely qualify for a Nationwide

Permit 12 pursuant to Section 404 of the Clean Water Act from the U.S. Army Corps of Engineers, and may not even require submittal of a pre-construction notification (PCN) due to the limited impacts.

Process Wastewater – The fractionator facility will produce about 50 gallons per minute (gpm) of process wastewater and contact stormwater. OxyChem plans to route this wastewater stream to the existing OxyChem VCM plant to be processed in the existing wastewater treatment facility. Accordingly, OxyChem plans to amend its existing TCEQ Texas Pollutant Discharge Elimination System (TPDES) industrial wastewater permit pursuant to Section 402 of the Clean Water Act and Chapter 26 of the Texas Water Code to add the treatment and discharge this additional process wastewater stream.

Non-Contact Stormwater – A portion of the new facilities will be located on land that currently discharges non-contact stormwater to an existing DuPont stormwater outfall. OxyChem plans to discharge non-contact stormwater from the other portion of the land through a new outfall.

Temporary Water Use – OxyChem plans to use its existing local municipal water source, and likely would not use surface water withdrawal. Accordingly, OxyChem does not expect to require a temporary water use permit.

Hydrostatic Test Water Discharge – OxyChem currently plans to discharge hydrostatic test water on-site at the fractionation facility.

Project Schedule

- April 2012 – File GHG Permit application and associated approvals
- April 2013 – Begin construction
- End 2014 – Start-up

Essential Fish Habitat (EFH)

Heather Young, NMFS-Habitat Conservation Division, Galveston Office, stated that based on the information presented about the project, she does not expect impacts to EFH, and therefore consultation likely would not be needed pursuant to the Magnuson Stevens Fishery Conservation and Management Act. She suggested that OxyChem submit to her a letter requesting approval that summarizes the proposed project facilities and activities, and addresses the fact that there will be no tidal water dredging, placement of fill, or construction; all pipeline construction across waters of the United States and Section 10 navigable waters would be bored with no fill; and summarizes that the project would result in no potential impacts to EFH.

Marine Protected Species

Heather Young stated that although the project likely would not result in impacts to marine species protected pursuant to the Endangered Species Act and Marine Mammal Protection Act, and therefore likely would not require consultation under these regulations, OxyChem should directly contact NMFS-Protected Resources Division, St. Petersburg, Florida, to discuss and confirm an appropriate procedure for project review.

USEPA Greenhouse Gas Permit

OxyChem will be required to apply for a Greenhouse Gas (GHG) permit from the USEPA. The Texas Council on Environmental Quality (TCEQ) does not currently have the authority to permit emissions of GHG. In previous consultation with USEPA, they noted that this is a new process and they have only received a handful of applications. Additionally, the USEPA-Region 6 Office has only approved a single GHG permit to date.

As the lead federal agency on this project, the USEPA noted that the GHG permitting process is exempt from the National Environmental Policy Act. However, as the lead federal agency, USEPA must ensure

the project complies with other federal acts, including the Endangered Species Act, the Magnuson Stevens Fishery Conservation and Management Act, and the Coastal Zone Management Act.

USEPA does not expect OxyChem to address GHG impacts on a global scale. OxyChem will only need to address potential impacts (associated with National Ambient Air Quality Standard criteria pollutants) within a specified Action Area. USFWS concurred that the Action Area for the proposed project t may be defined as the *de minimus* emission zone (as determined via air pollution modeling) of NAAQS criteria pollutants.

USFWS stated that in previous projects that they have reviewed, the Action Area has been within the boundaries of the project (i.e., has not extended over marine waters) and the impact analysis has been limited. USFWS noted that if the Action Area for the project is within the industrial complex, then there will be no real impact. If the Action Area is outside the existing industrial complex (specifically, extends over marine waters), then OxyChem should review what is included within the Action Area and call USFWS to discuss further issues.

Biological Assessment

In order to complete the biological assessment, OxyChem plans to confirm the list of threatened and endangered species in the area, complete biological field surveys, and prepare a letter summary report for USFWS to determine if species specific surveys are required.

USFWS provided a copy of the **list of federally-listed threatened and endangered species for San Patricio County (see attachment)**. USFWS and NMFS stated that for this project, given anticipated potential impacts on federally-listed species, a letter biological assessment likely would be suitable, and that it would be acceptable to submit a combined report to both parties for review and approval.

Based on the proposed project facilities and activities, USFWS stated that it did not anticipate any impacts on the federally-listed threatened and endangered species of San Patricio County, with the possible exception of whooping crane (see below). Specifically, USFWS noted it did not anticipate any impacts on the five listed species of sea turtles (no marine impacts), the brown pelican (which has been delisted), the jaguarundi (no habitat), ocelot (no habitat), piping plover (no habitat), or manatee (no habitat).

USFWS stated that the project will be located along the edge but within the historic migration corridor of the whooping crane. USFWS noted that OxyChem will need to address potential impacts to whooping crane and include best management practices to avoid or minimize impacts on this species. USFWS suggested that OxyChem mark all structures within the facility that are greater than 15 feet tall (i.e., lighting), and place bird diverters on electric lines.

General Wildlife Impacts

Additionally, USFWS suggested that OxyChem consider volunteering to perform pre-construction training of construction crews to properly identify and avoid impacts to snakes, as this is one of USFWS's primary concerns regarding general wildlife impacts for the project.

Federally Listed as Threatened and Endangered Species of Texas
January 26, 2012

County-by-County lists containing species information is available at the U.S. Fish and Wildlife Service's (Service), Southwest Region, web site
http://www.fws.gov/southwest/es/EndangeredSpecies/lists.

This list represents species that may be found in counties throughout the state. It is recommended that the field station responsible for a project area be contacted if additional information is needed.

DISCLAIMER

This County by County list is based on information available to the U.S. Fish and Wildlife Service at the time of preparation, date on page 1. This list is subject to change, without notice, as new biological information is gathered and should not be used as the sole source for identifying species that may be impacted by a project.

San Patricio County

Brown pelican	(DM)	*Pelecanus occidentalis*
Green sea turtle	(T)	*Chelonia mydas*
Gulf Coast jaguarundi	(E)	*Herpailurus yagouaroundi cacomitli*
Hawksbill sea turtle	(E w/CH‡)	*Eretmochelys imbricata*
Kemp's Ridley sea turtle	(E)	*Lepidochelys kempii*
Leatherback sea turtle	(E w/CH‡)	*Dermochelys coriacea*
Loggerhead sea turtle	(T)	*Caretta caretta*
Ocelot	(E)	*Leopardus pardalis*
Piping plover	(T w/CH)	*Charadrius melodus*
West Indian manatee	(E)	*Trichechus manatus*
Whooping crane	(E w/CH)	*Grus americana*

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Statewide or areawide migrants are not included by county, except where they breed or occur in concentrations. The whooping crane is an exception; an attempt is made to include all confirmed sightings on this list.

E = Species in danger of extinction throughout all or a significant portion of its range.
T = Species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
DM = Delisted, monitoring for 5 years
C = Species for which the Service has on file enough substantial information to warrant listing as threatened or endangered.
CH = Critical Habitat (in Texas unless annotated ‡)
P/ = Proposed ...
P/E = Species proposed to be listed as endangered.
P/T = Species proposed to be listed as threatened.
□ = with special rule
‡ = CH designated (or proposed) outside Texas

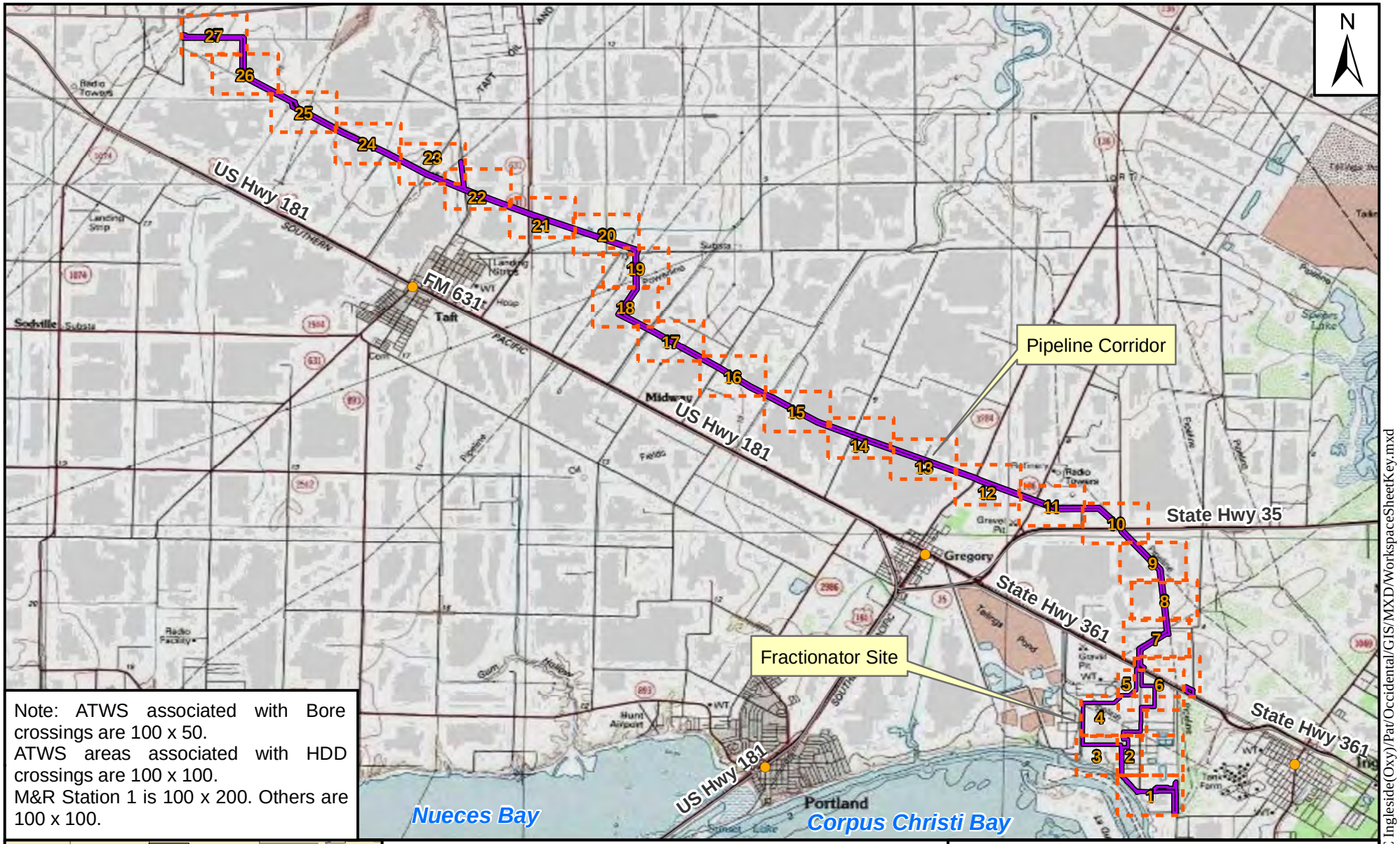
NAME	AFFILIATION	PHONE #	EMAIL
Dawn Whitehead	USFWS	(361) 994-9005	Dawn_Whitehead@fws.gov
Mary Orms	USFWS	"	mary-orms@fws.gov
Craig Giggleman	USFWS	"	craig-giggleman@fws.gov
Mark Evans	OxyChem	361-776-6169	Mark_Evans@Oxy.com
Steve Compton	TETRA TECH	832-477-3355	steve.compton@tetratech.com

CALL-IN PARTICIPANTS

HEATHER YOUNG	NMFS - GALVESTON
CHASE HAHN	TETRA TECH
PAT GREEN	"
CHRIS SOURCIER	"
BRIAN DRESSER	"

APPENDIX B

PERMANENT AND TEMPORARY IMPACTS OF THE OXYCHEM FRACTIONATION FACILITY PROJECT



Note: ATWS associated with Bore crossings are 100 x 50.
ATWS areas associated with HDD crossings are 100 x 100.
M&R Station 1 is 100 x 200. Others are 100 x 100.

Source: National Geographic 2D Topo basemap from ESRI Online Mapping Services. Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

Project Facilities — Roads

Sheet Boundary — Cities

0 1 2 3 4 5 Miles

Scale = 1:125,000

Sheet 1 of 1

Sheet Key for Figure 1. Permanent and Temporary Impacts of the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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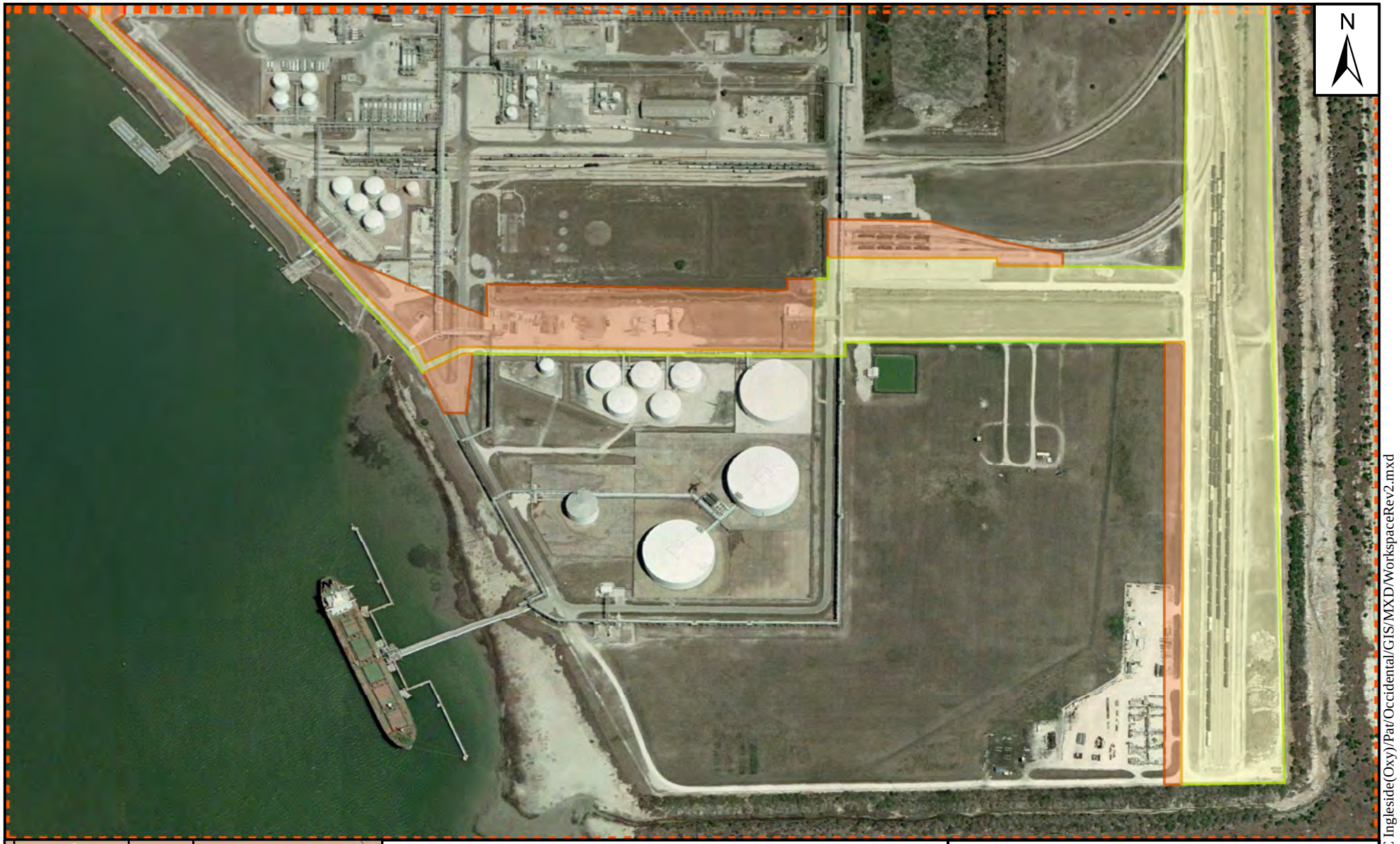

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 1 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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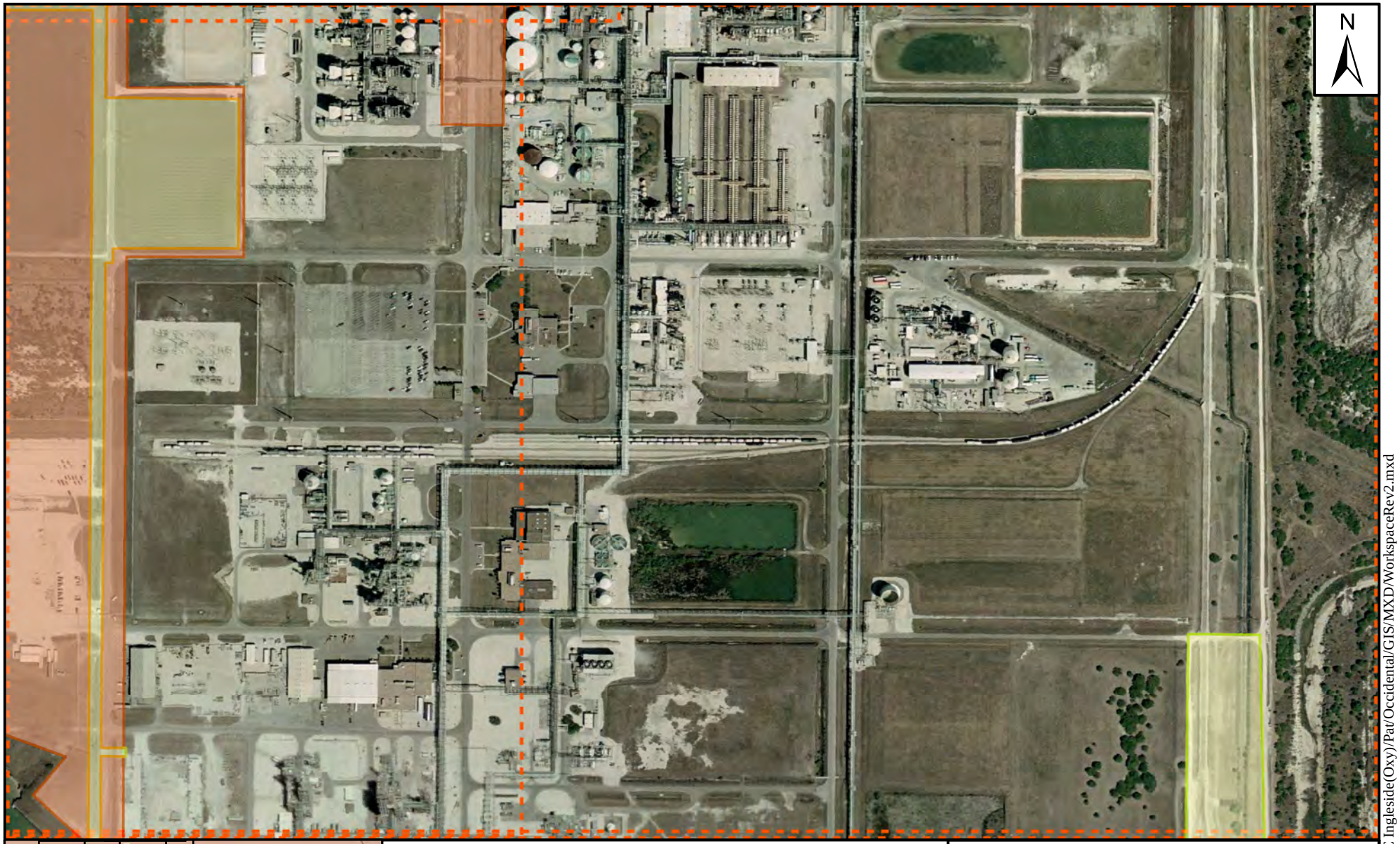

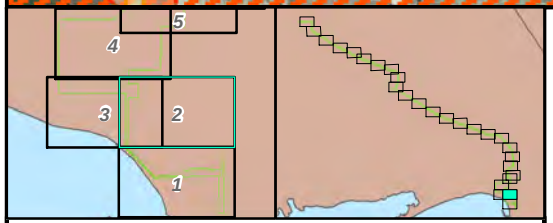

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 2 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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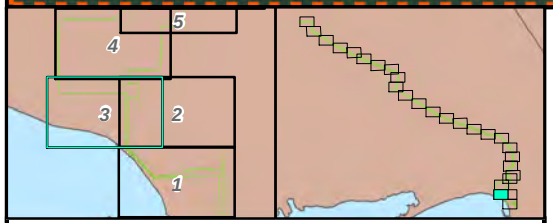

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 3 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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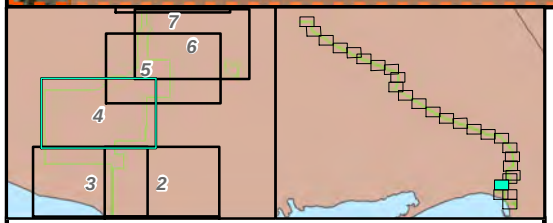

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 4 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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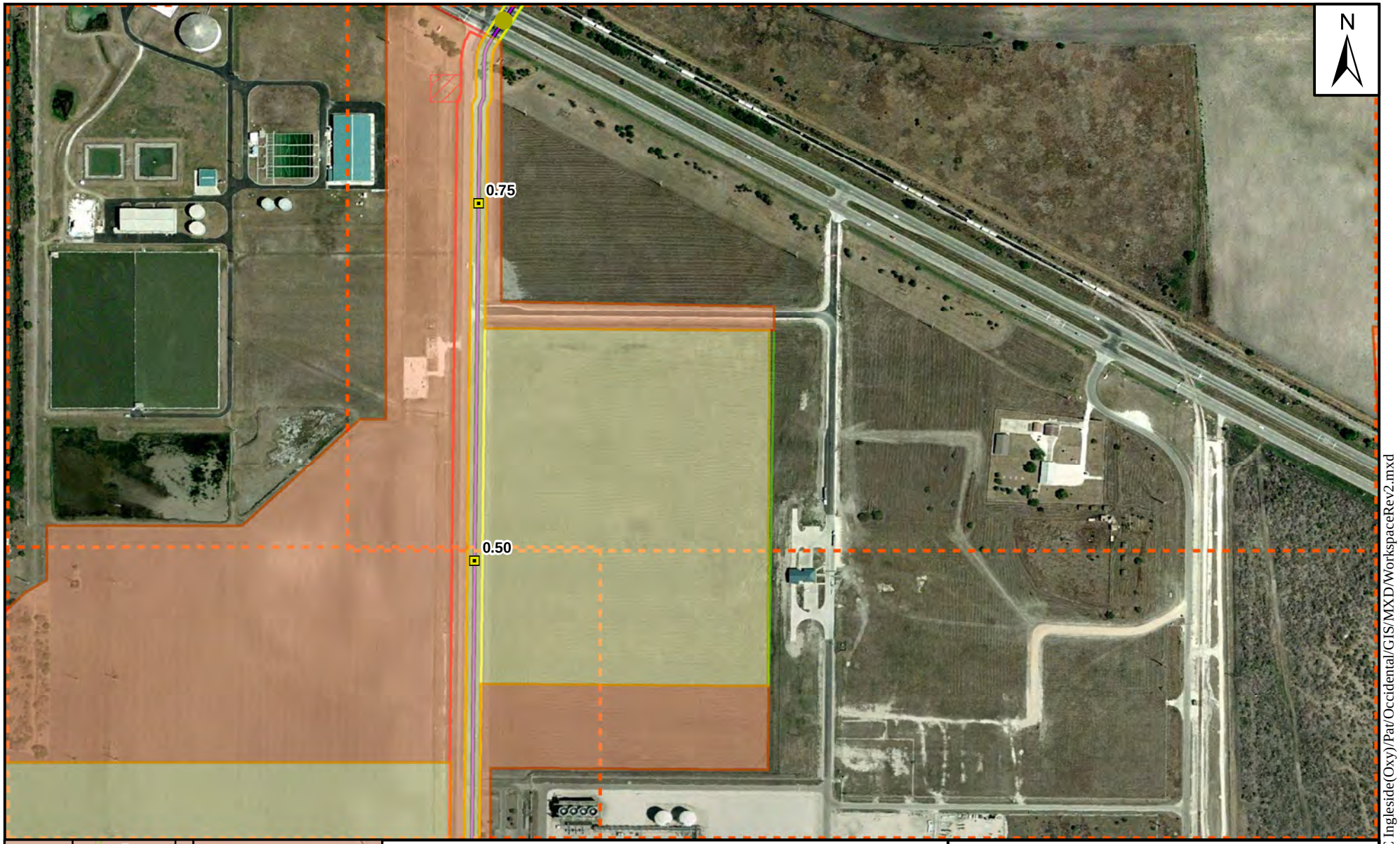

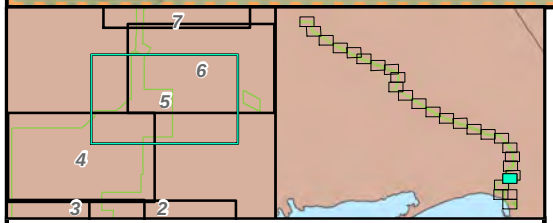

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 5 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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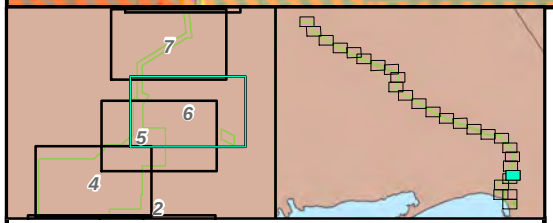

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
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- M&R Station
- Permanent
- Temporary

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Scale = 1:6,000

SHEET 6 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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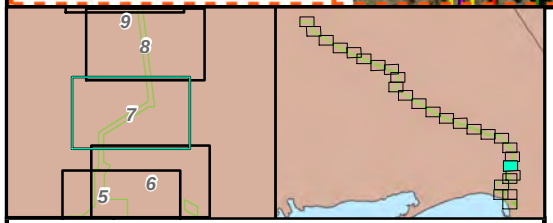

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
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- Permanent
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Scale = 1:6,000

SHEET 7 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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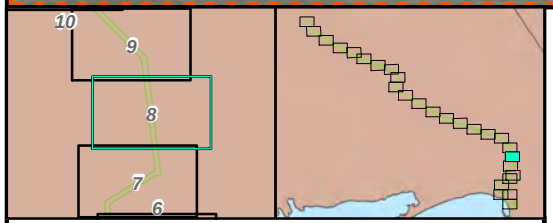

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
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- ATWS
- M&R Station
- Permanent
- Temporary

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Scale = 1:6,000

SHEET 8 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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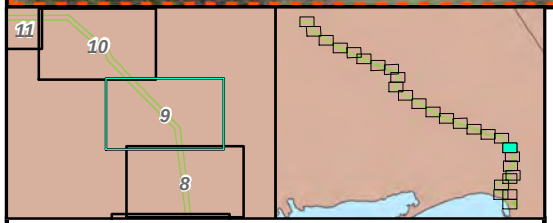

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LEGEND

- Sheet Boundary
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- M&R Station
- Permanent
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0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 9 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

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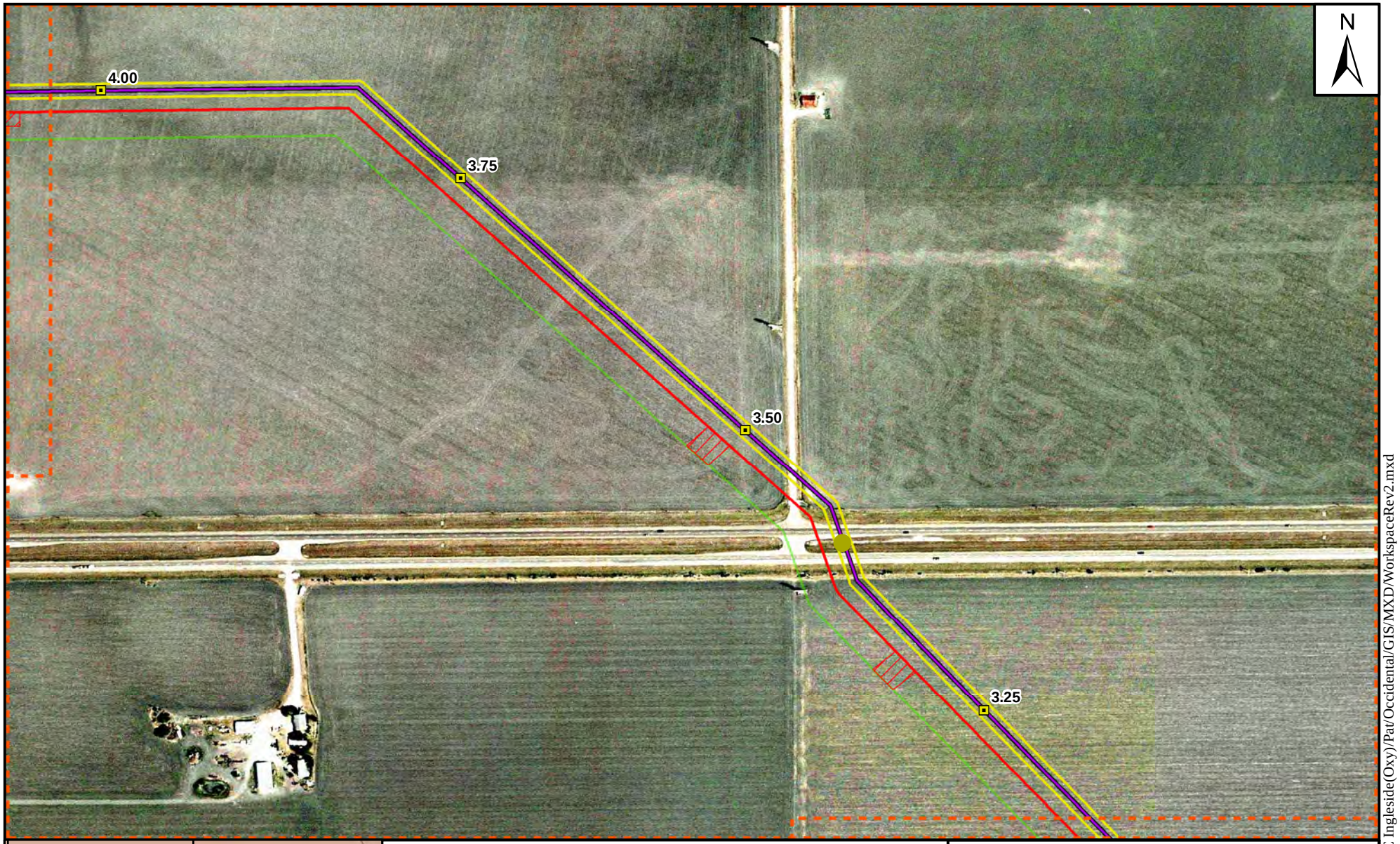

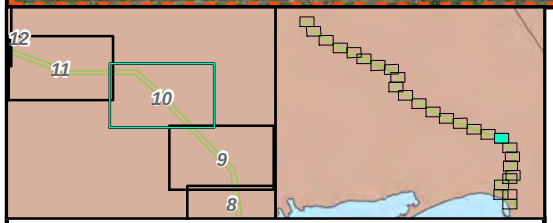

Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

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0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 10 of 27

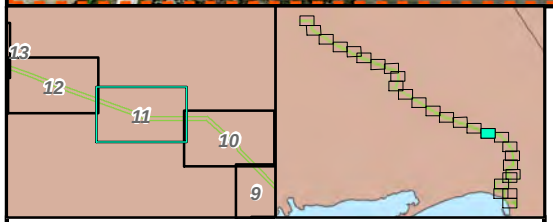
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 11 of 27

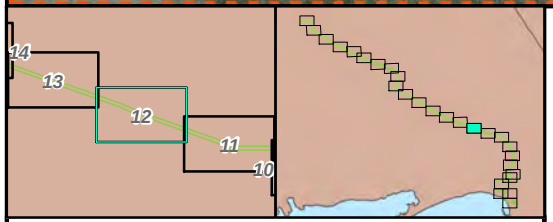
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 12 of 27

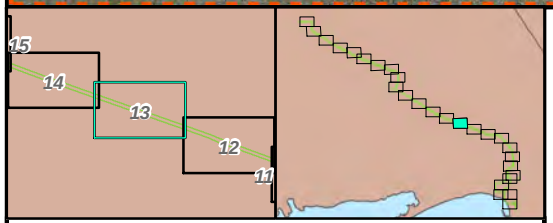
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 13 of 27

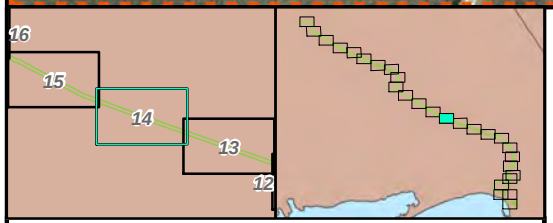
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 14 of 27

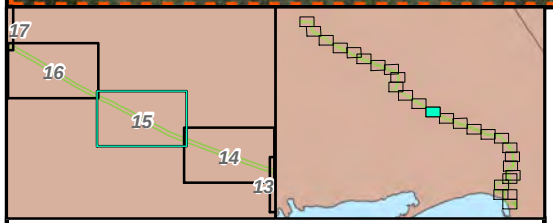
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 15 of 27

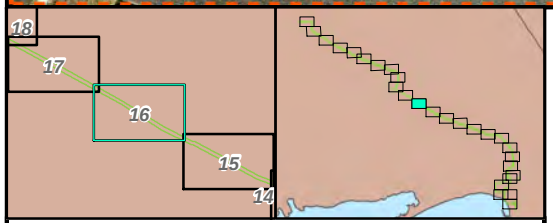
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 16 of 27

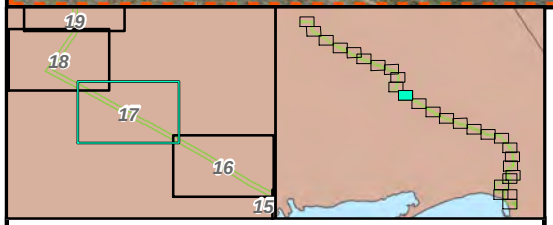
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 17 of 27

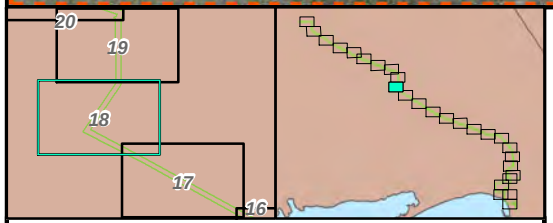
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 18 of 27

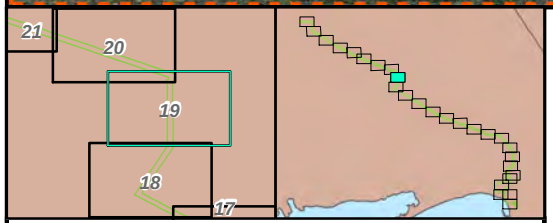
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 19 of 27

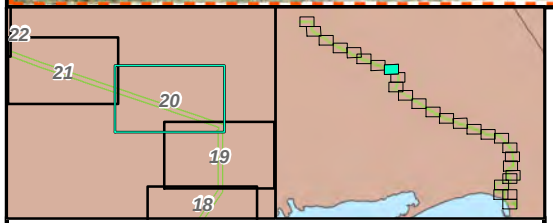
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 20 of 27

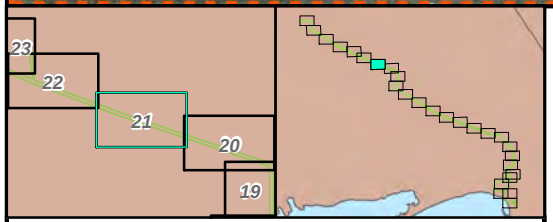
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 21 of 27

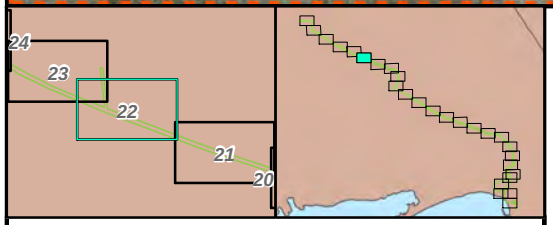
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 22 of 27

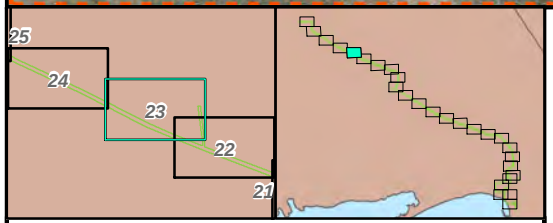
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 23 of 27

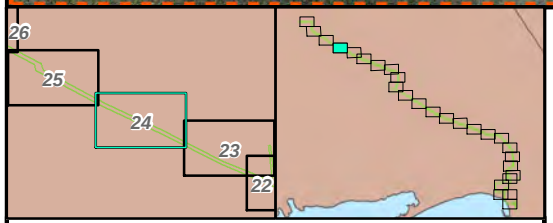
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 24 of 27

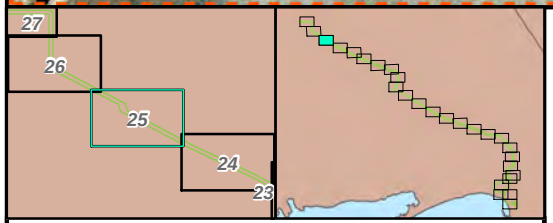
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 25 of 27

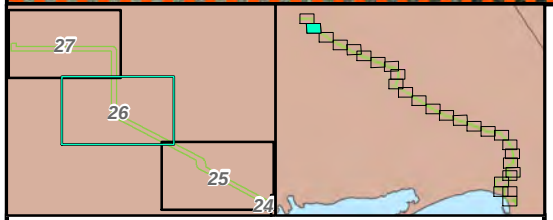
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 26 of 27

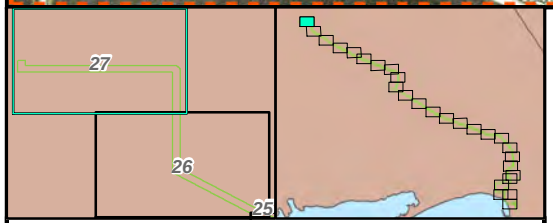
Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\WorkspaceRev2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- Bore
- HDD
- ATWS
- M&R Station
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 27 of 27

Figure 1. Permanent and Temporary Impacts of the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

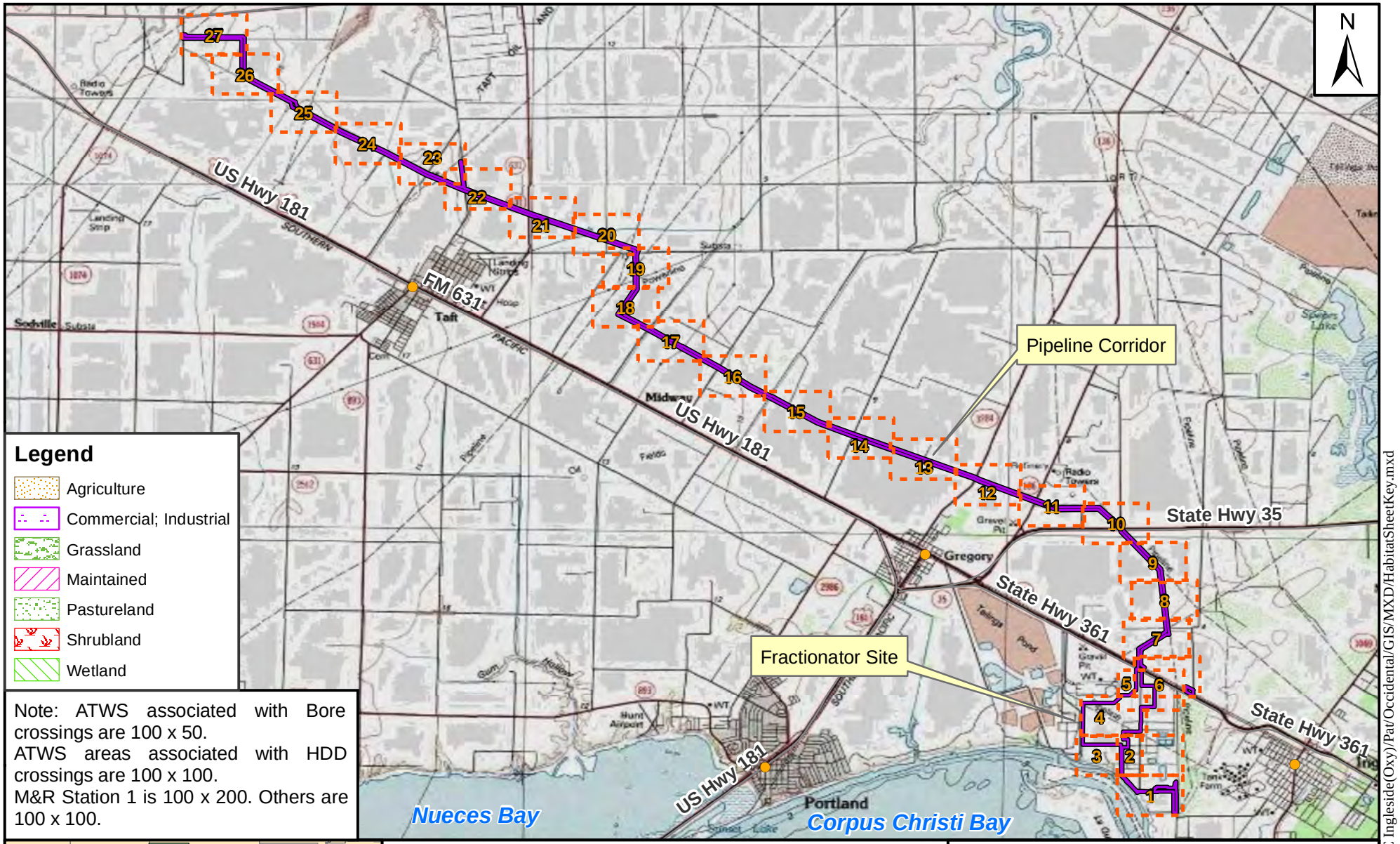
Prepared By: TETRA TECH

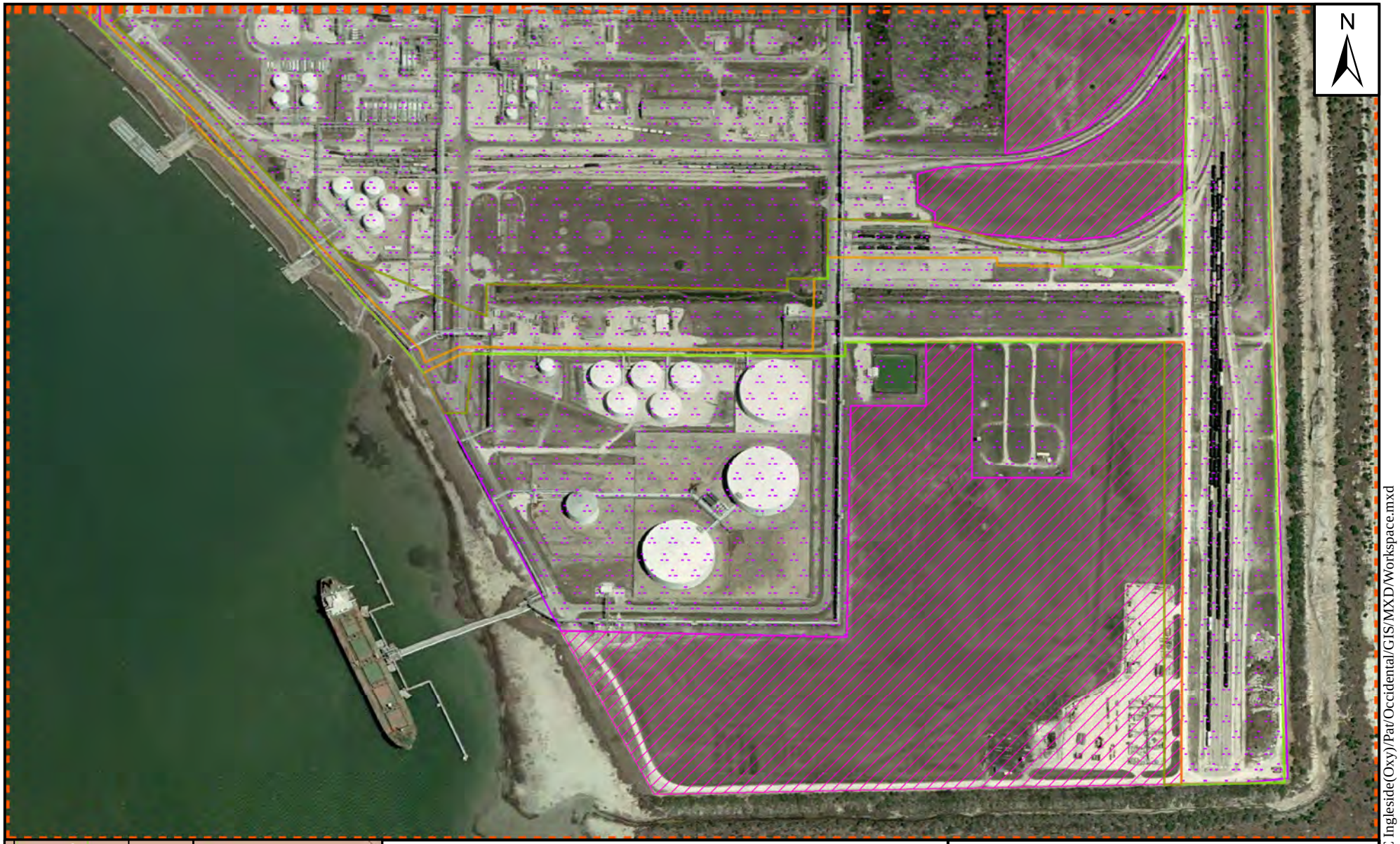
Date: 10/12

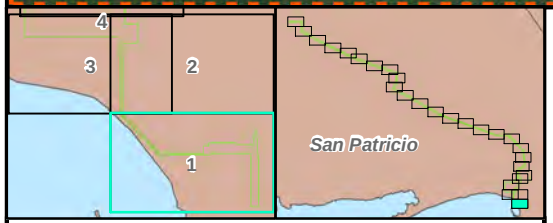
P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/WorkspaceRev2.mxd

APPENDIX C

HABITATS TRAVERSED BY THE OXYCHEM FRACTIONATION FACILITY PROJECT


N
Pipeline Corridor
Fractionator Site
US Hwy 181
FM 631
State Hwy 35
State Hwy 361
Taft
Gregory
Portland
Midway
Sodville
Nueces Bay
Corpus Christi Bay
Legend
Agriculture
Commercial; Industrial
Grassland
Maintained
Pastureland
Shrubland
Wetland
Note: ATWS associated with Bore crossings are 100 x 50.
ATWS areas associated with HDD crossings are 100 x 100.
M&R Station 1 is 100 x 200. Others are 100 x 100.
United States
Arizona
New Mexico
Oklahoma
Arkansas
Tennessee
Texas
Missi-ssippi
Alab-ama
Louisiana
Sonora
Chihuahua
Coahuila
Mexico
Project Location
Gulf of Mexico
Source: National Geographic 2D Topo basemap from ESRI Online Mapping Services. Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.
LEGEND
Project Facilities
Roads
Sheet Boundary
Cities
0 1 2 3 4 5 Miles
Scale = 1:125,000
Sheet 1 of 1
Sheet Key for Figure 2. Habitats Traversed by the Oxy-Chem Fractionation Facility Project, San Patricio, Texas
Prepared For: Occidental Chemical Corporation
Prepared By: TETRA TECH
Date: 10/12
P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/HabitatSheetKey.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 1 of 27

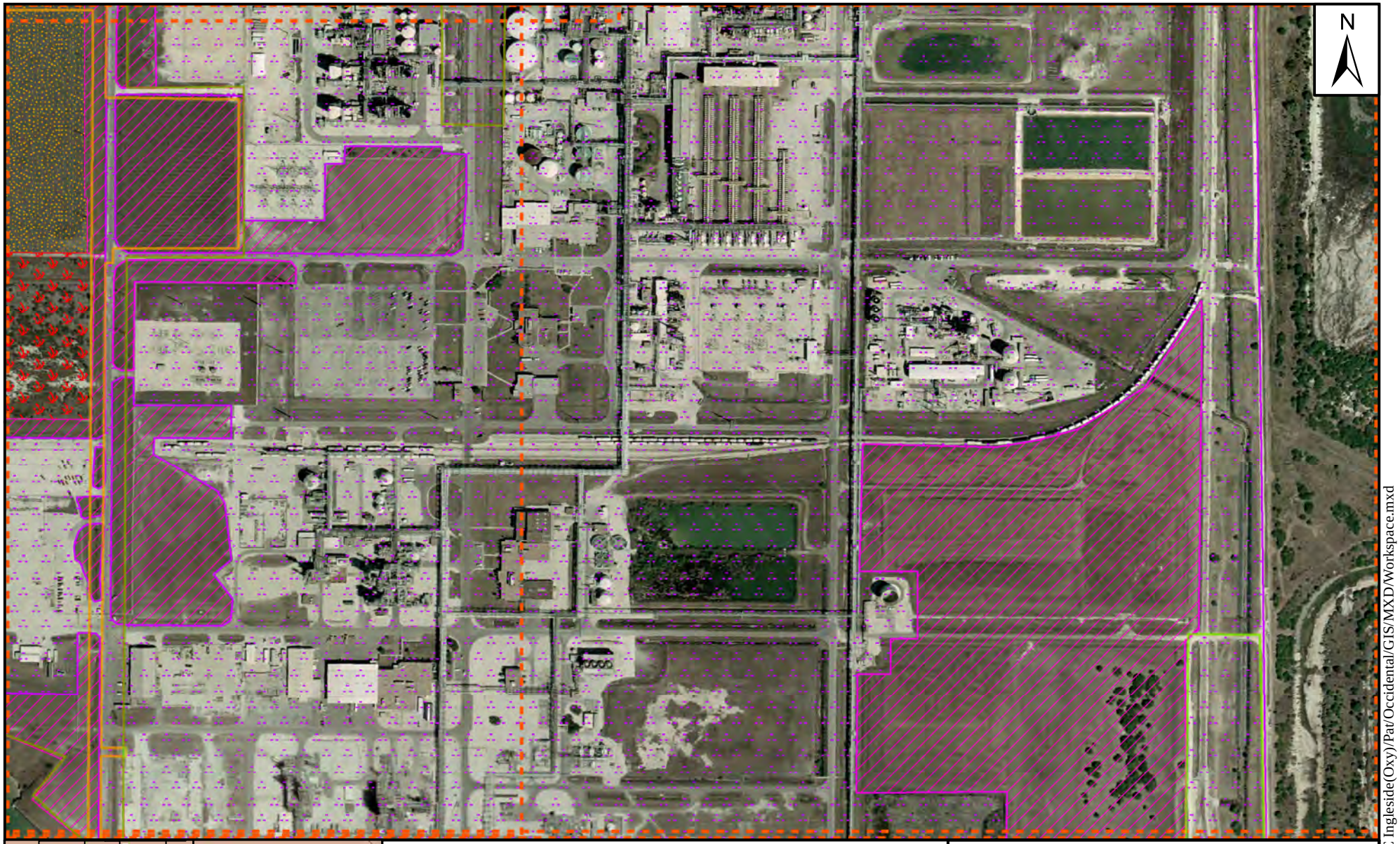
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

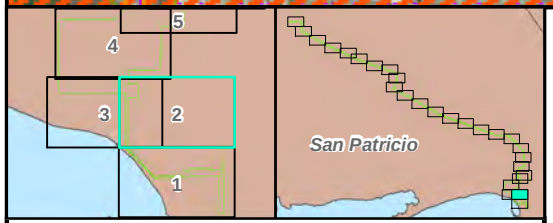
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 2 of 27

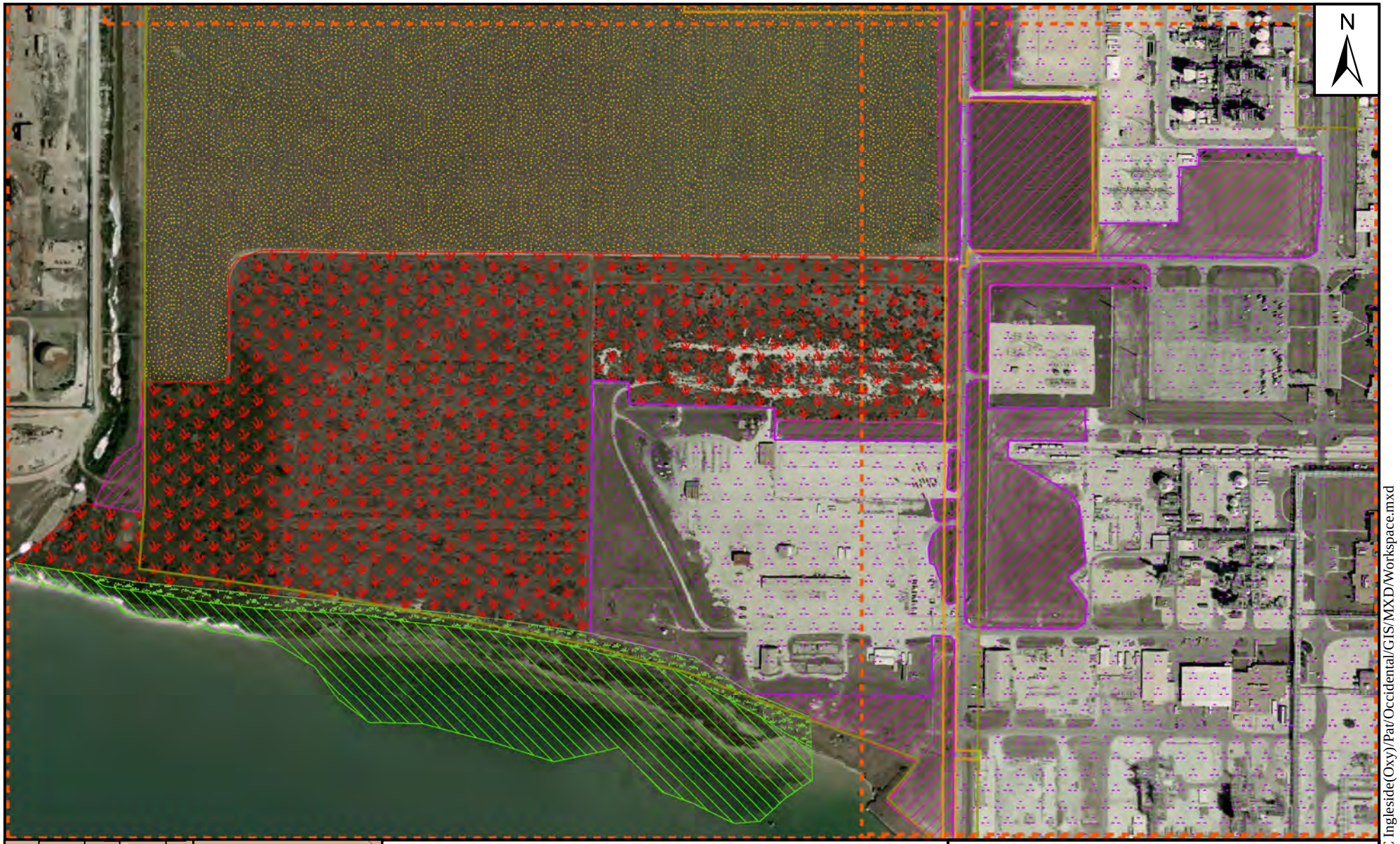
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

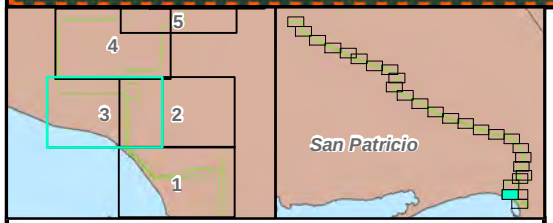
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 3 of 27

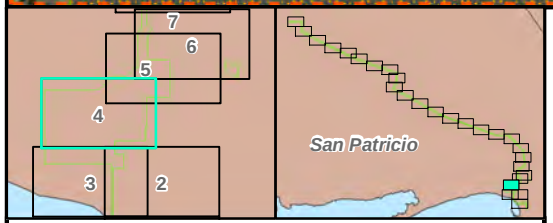
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 4 of 27

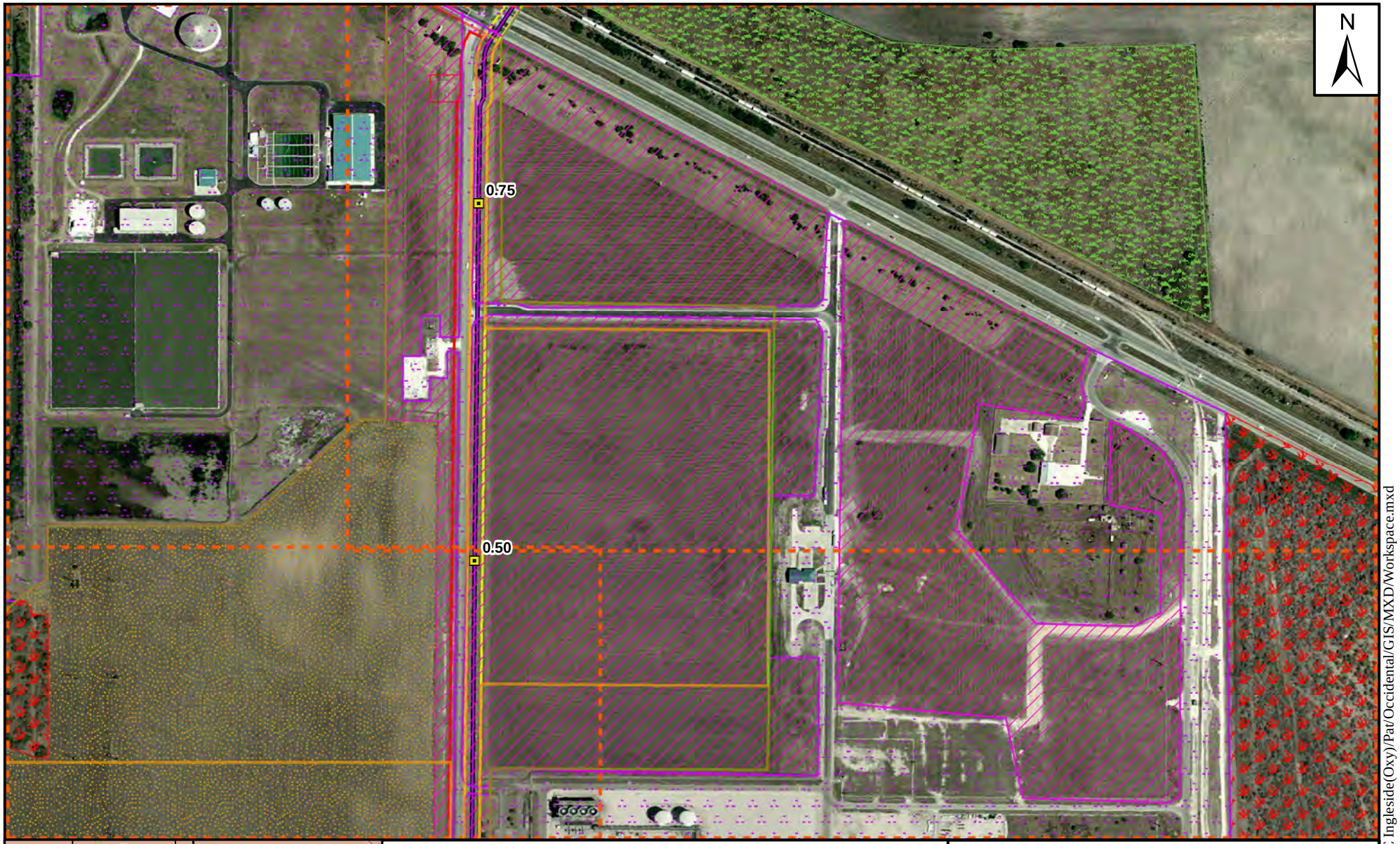
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

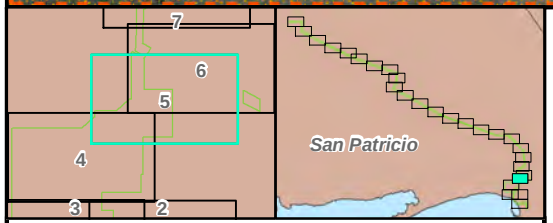
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 5 of 27

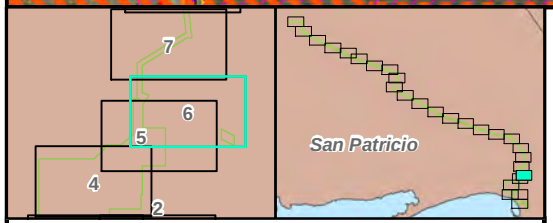
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 6 of 27

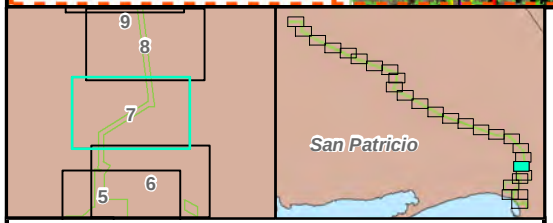
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 7 of 27

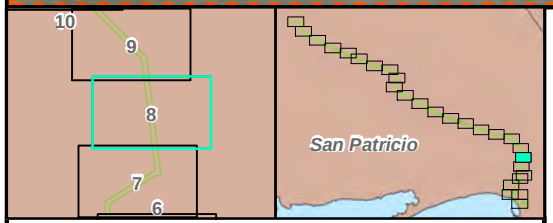
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 8 of 27

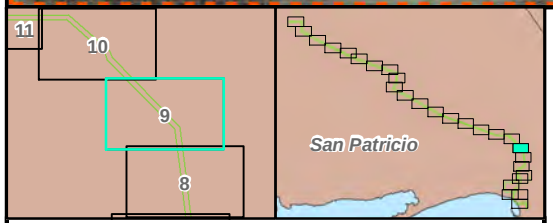
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 9 of 27

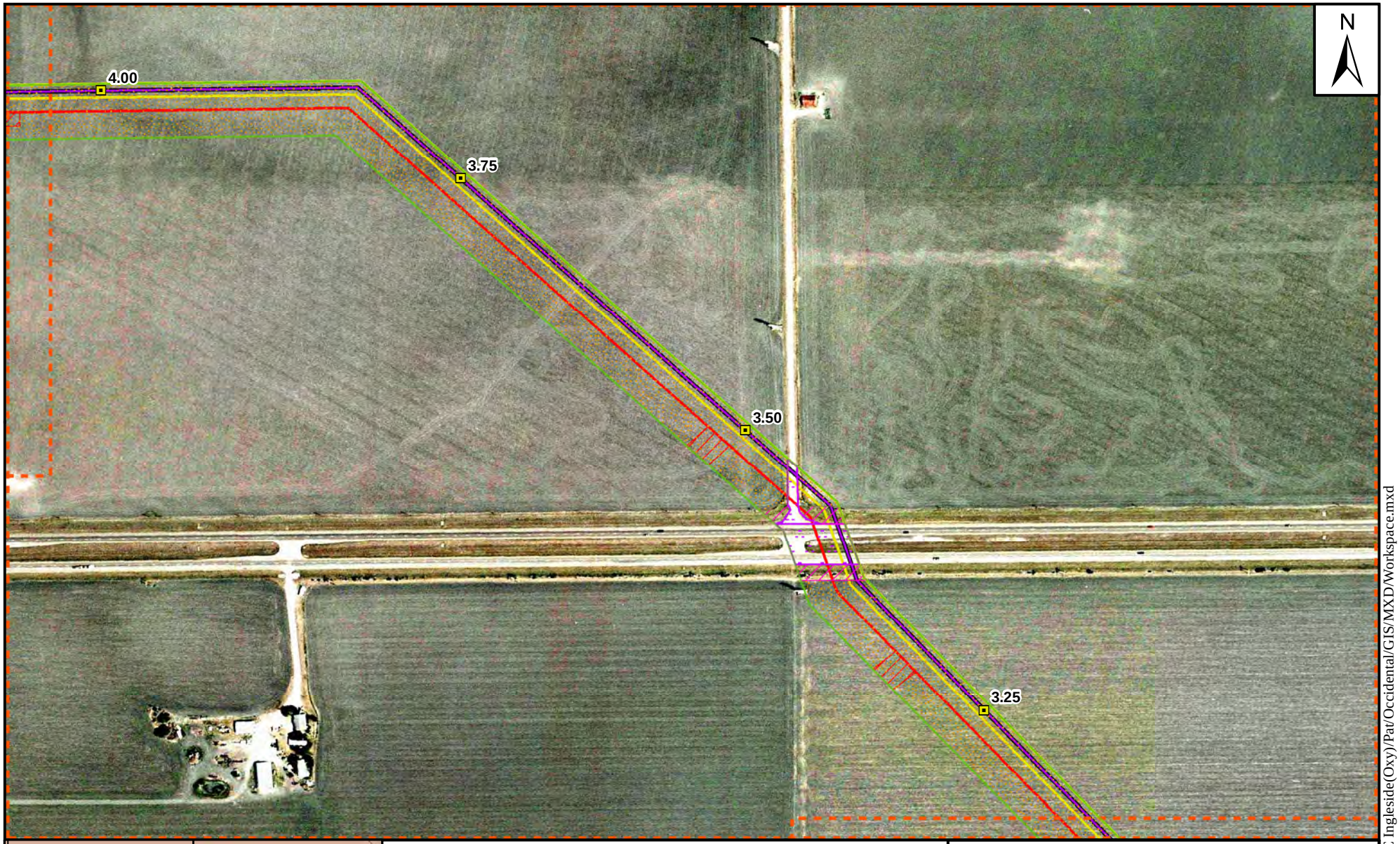
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

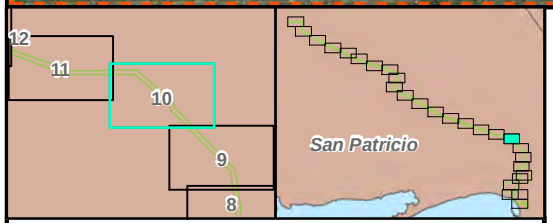
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 10 of 27

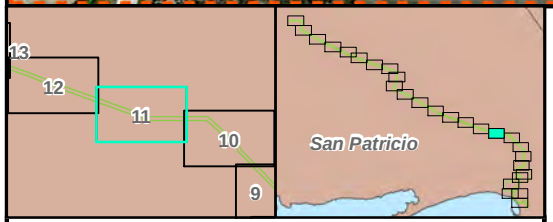
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 11 of 27

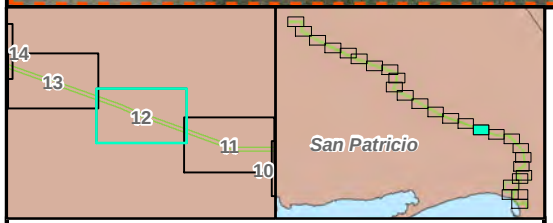
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 12 of 27

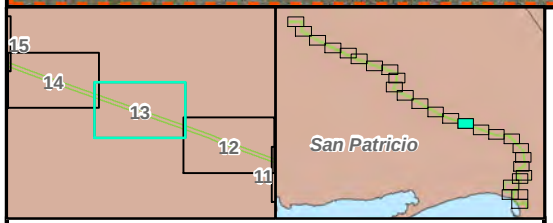
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 13 of 27

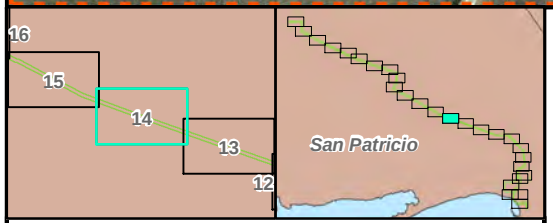
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 14 of 27

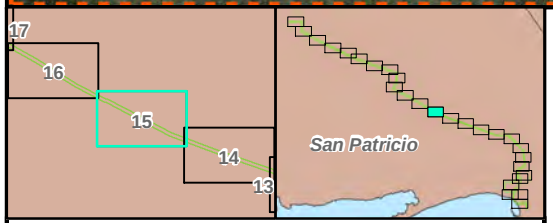
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 15 of 27

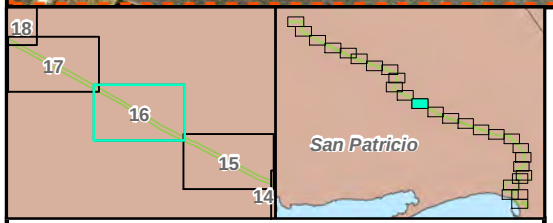
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 16 of 27

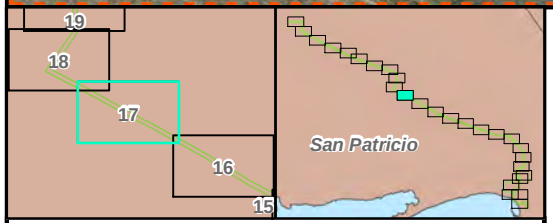
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 17 of 27

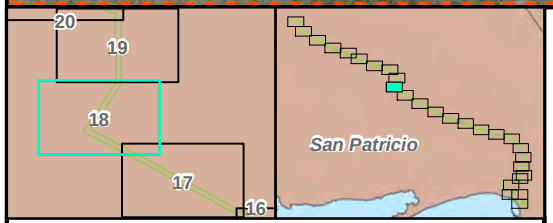
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 18 of 27

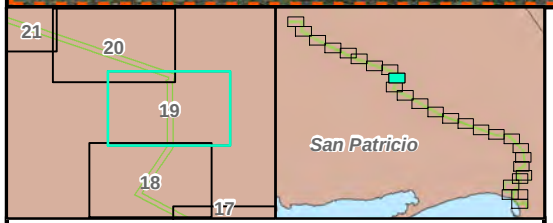
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 19 of 27

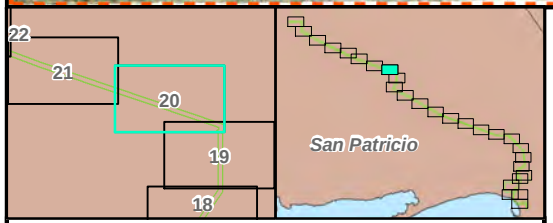
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 20 of 27

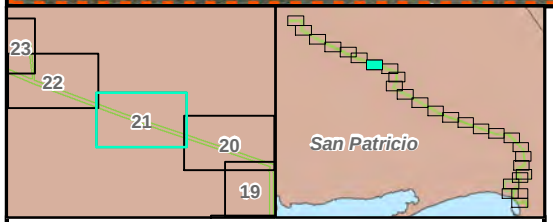
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 21 of 27

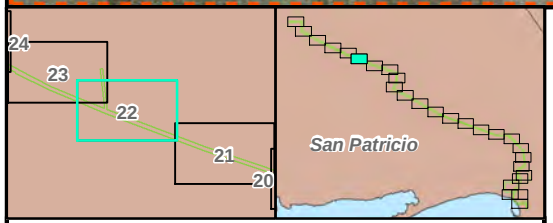
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 22 of 27

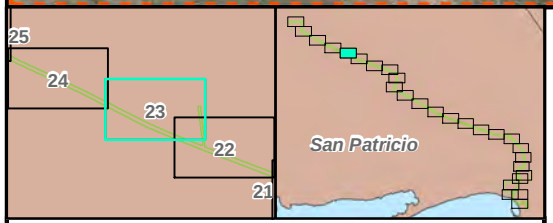
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 23 of 27

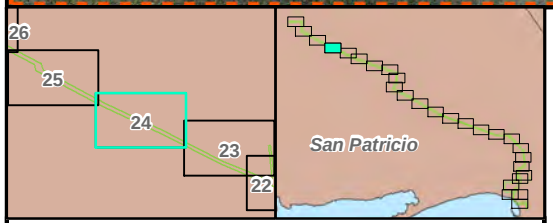
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 24 of 27

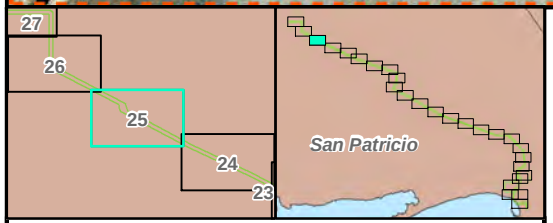
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 25 of 27

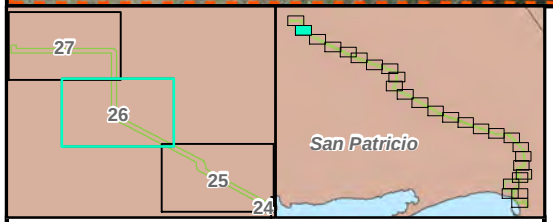
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 26 of 27

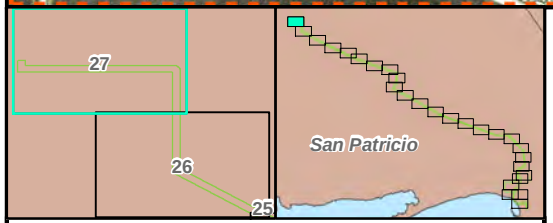
Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Workspace.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

- Sheet Boundary
- Survey Area
- Centerline
- M&R Station
- ATWS
- Permanent
- Temporary

0 400 800 1,200 1,600 Feet

Scale = 1:6,000

SHEET 27 of 27

Figure 2. Habitats Traversed by the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

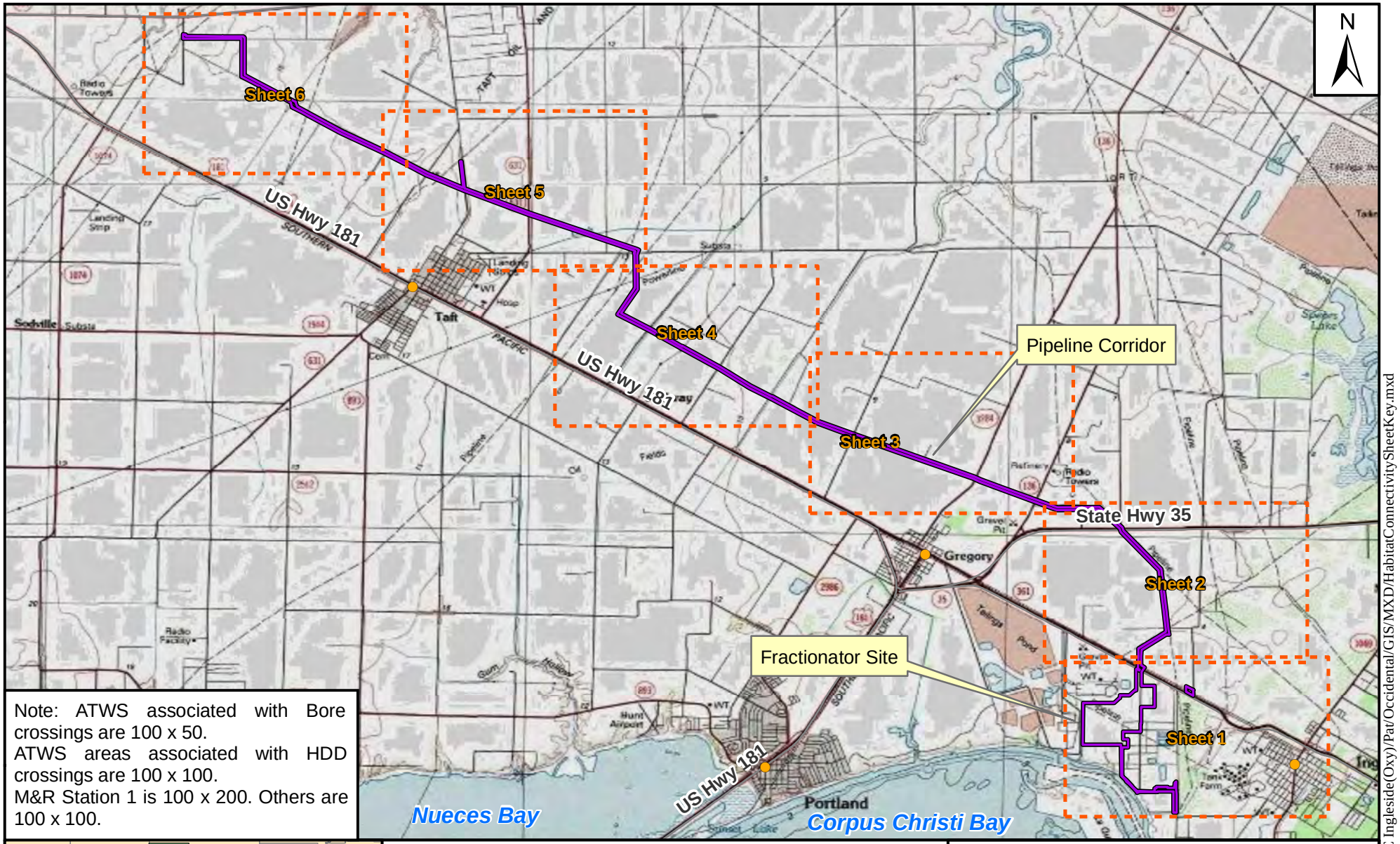
Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Workspace.mxd

APPENDIX D

CONNECTIVITY TO HABITATS ADJACENT TO THE OXYCHEM FRACTIONATION FACILITY PROJECT



Note: ATWS associated with Bore crossings are 100 x 50.
ATWS areas associated with HDD crossings are 100 x 100.
M&R Station 1 is 100 x 200. Others are 100 x 100.

Source: National Geographic 2D Topo basemap from ESRI Online Mapping Services. Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

Project Facilities — Roads

Sheet Boundary — Cities

0 1 2 3 4 5 Miles

Scale = 1:125,000

Sheet 1 of 1

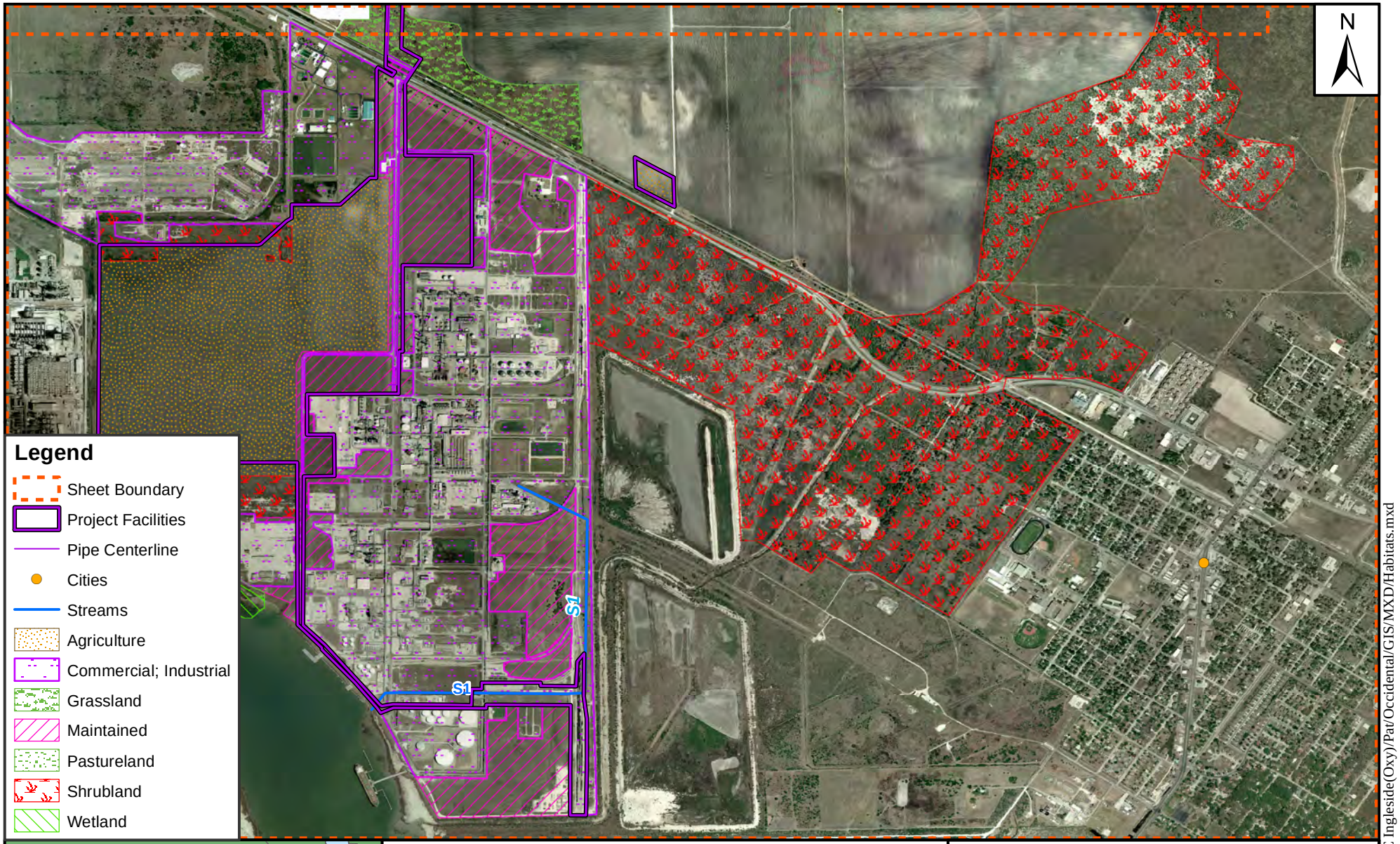
Sheet Key for Figure 3. Connectivity to Habitats Adjacent to the OxyChem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/HabitatConnectivitySheetKey.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

Scale = 1:24,000

Sheet 1 of 6

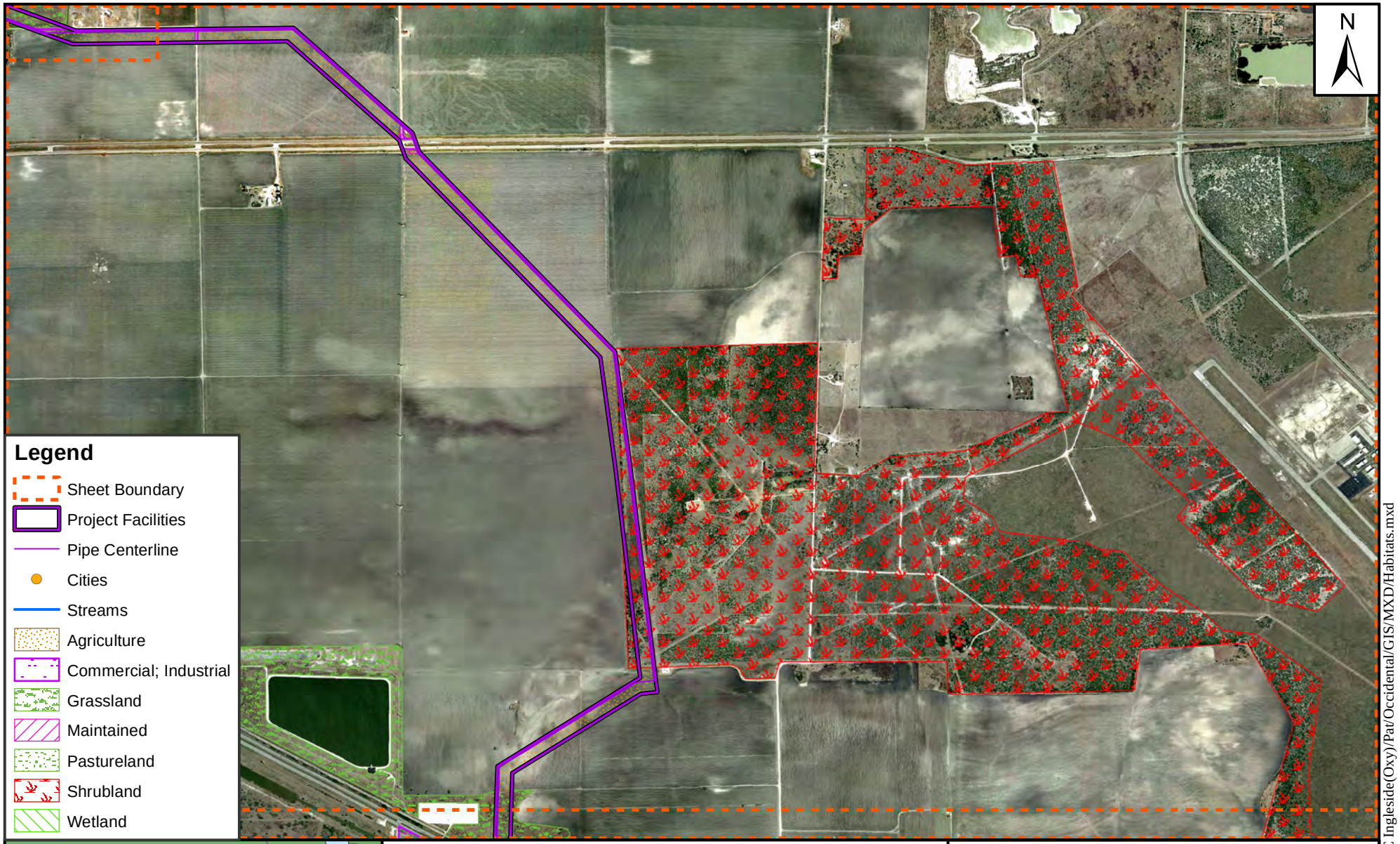
Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

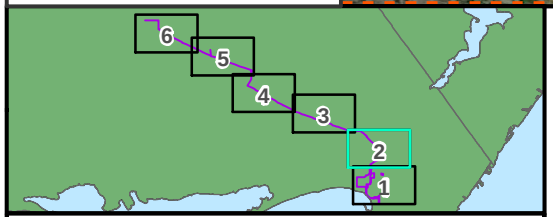
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Habitats.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

0 1,500 3,000 4,500 6,000 Feet

0 300 600 900 1,200 1,500 Meters

Scale = 1:24,000

Sheet 2 of 6

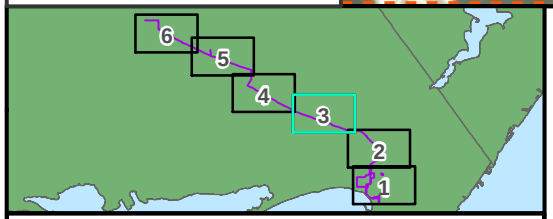
Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Habitats.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

0 1,500 3,000 4,500 6,000 Feet

0 300 600 900 1,200 1,500 Meters

Scale = 1:24,000

Sheet 3 of 6

Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

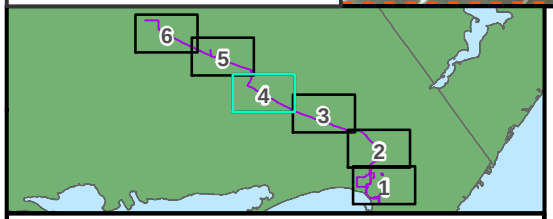
Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Habitats.mxd

Legend

- Sheet Boundary
- Project Facilities
- Pipe Centerline
- Cities
- Streams
- Agriculture
- Commercial; Industrial
- Grassland
- Maintained
- Pastureland
- Shrubland
- Wetland



Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

0 1,500 3,000 4,500 6,000 Feet

0 300 600 900 1,200 1,500 Meters

Scale = 1:24,000

Sheet 4 of 6

Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat/Occidental/GIS/MXD/Habitats.mxd

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

Scale = 1:24,000

Sheet 5 of 6

Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:\100-NRS-T27819.0001 OEVC Ingleside(Oxy)\Pat\Occidental\GIS\MXD\Habitats.mxd

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

Scale = 1:24,000

Sheet 6 of 6

Figure 3. Connectivity to Habitats Adjacent to the Oxy-Chem Fractionation Facility Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 10/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Habitats.mxd

APPENDIX E

MARCH 21, 2013 CONTACT REPORT WITH US FISH AND WILDIFE SERVICE

TETRA TECH

TELEPHONE CONTACT REPORT

Date: March 21, 2013

Project: Occidental Chemical Corporation's Proposed Ingleside Fractionator Project

Prepared by: Peggy Grant, Tetra Tech, Inc., Buffalo, New York

Contact: Dawn Whitehead, Deputy Field Supervisor
US Fish and Wildlife Service
c/o TAMU-CC-Ecological Services Field Office, Corpus Christi
6300 Ocean Drive, Unit 5837
Corpus Christi, Texas 78412
dawn_whitehead@fws.gov
(361) 994-9005 ext. 259

Introduction

US Environmental Protection Agency (USEPA) provided comments on the OxyChem Fractionation Facility Project. The purpose of the telephone conversation with US Fish and Wildlife Service (USFWS) was to discuss USEPA's questions regarding federally-listed species under USFWS' promulgation.

Project Description

Peggy Grant indicated the inquiry was regarding the Fractionation Facility and 18.5-mile San Patricio Pipeline Corridor project which TetraTech held a pre-application meeting with USFWS on February 14, 2012. Peggy also forwarded an e-mail to Dawn to show her the project location and habitats traversed by the project.

The following topics discussed are itemized below.

Ocelot/Jaguarundi
Peggy inquired if USFWS would view the minimal amount of scrub/shrub habitat (although low quality) as habitat that ocelot and jaguarundi would use. Dawn indicated because it was isolated and not part of a riverine corridor, USFWS would not expect it to be used by these species.

Aplomado Falcon
Dawn confirmed that there was a release of Aplomado falcons in the Laguna, Texas area and at Aransas National Wildlife Refuge. USFWS has been observing the birds in the Matagorda Island area because the birds tend to nest in coastal areas. Peggy explained a survey of the Project Action Area had been conducted and that no tall structures/trees were observed which could serve as potential nesting habitat for the falcon. Given this, USFWS would consider the Project "may affect, it not likely to adversely affect" this species.

Candidate Species
Dawn indicated these species should be included in the BA (Sprague's pipet and Golden Orb for San Patricio County). Mountain plover does not need to be addressed in the BA, it is no longer a candidate species.

Tetra Tech, Inc.
2901 Wilcrest Drive, Suite 425, Houston, Texas 77042
Tel: 832.251.5191 **Fax:** 832.251.5170
www.tetratech.com

Pipeline Construction Noise
USFWS typically is not concerned with pipeline noise unless the pipeline traverses songbird areas. This is a concern more inland, not in the Project Action Area.

Discountable Effects
Dawn indicated the use of "may affect, not likely to adversely affect" would be most appropriate.

Red Wolf
Dawn indicated the red wolf in Texas has been removed from the wild (sent to zoos) and this determination could be a "no effect".

End of Telephone Conversation

Tetra Tech, Inc.
2901 Wilcrest Drive, Suite 425, Houston, Texas 77042
Tel: 832.251.5191 **Fax:** 832.251.5170
www.tetratech.com

APPENDIX F

NMFS SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

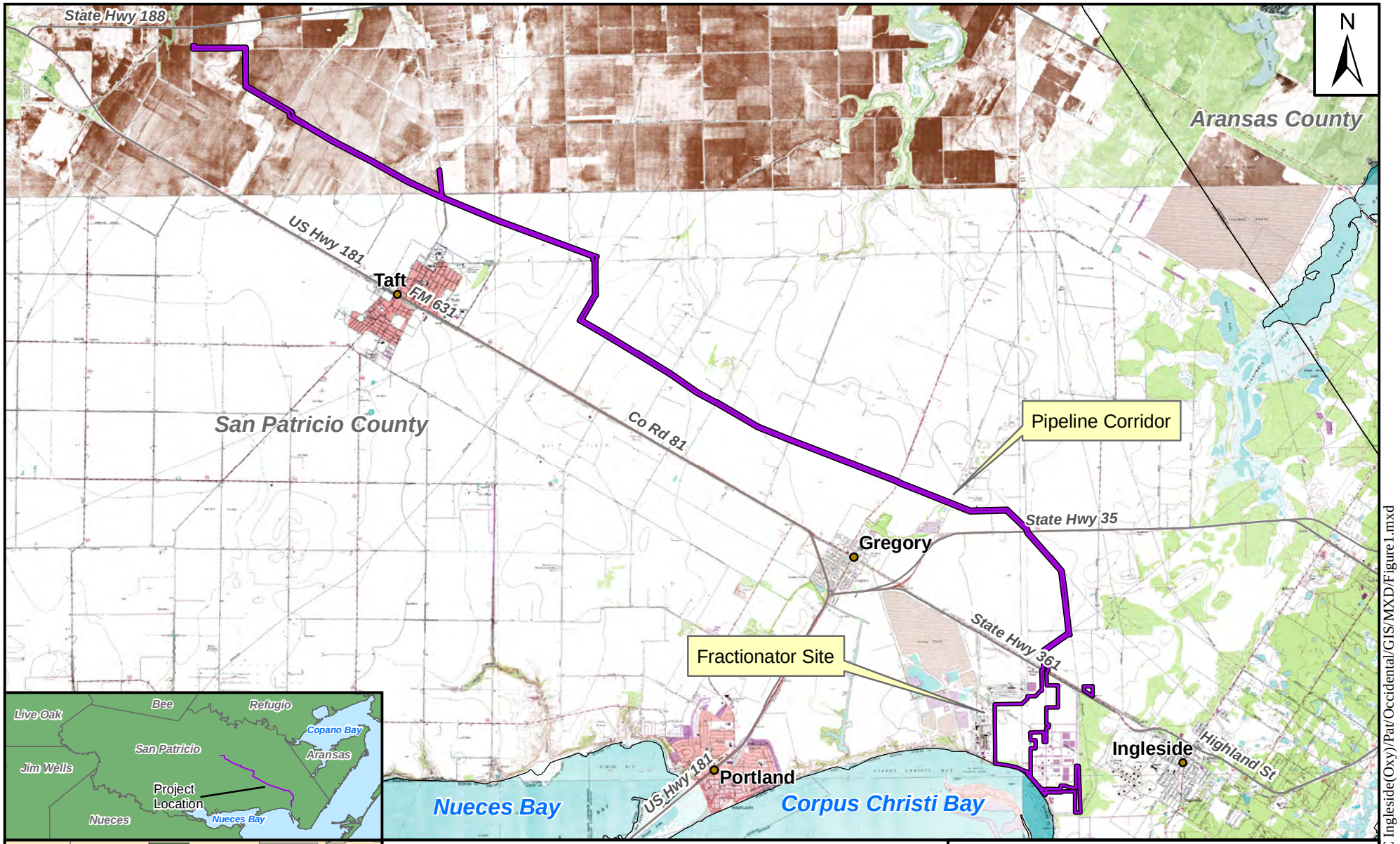
f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc

APPENDIX G

SOILS MAP



Source: USGS 15' Topo Quads downloaded from USDA NRCS Data Giveaway, downloaded 2/12.

LEGEND

Project Facilities
Cities
County Boundary
Roads

0 1.5 3 4.5 6 Miles

Scale = 1:125,000

Sheet 1 of 1

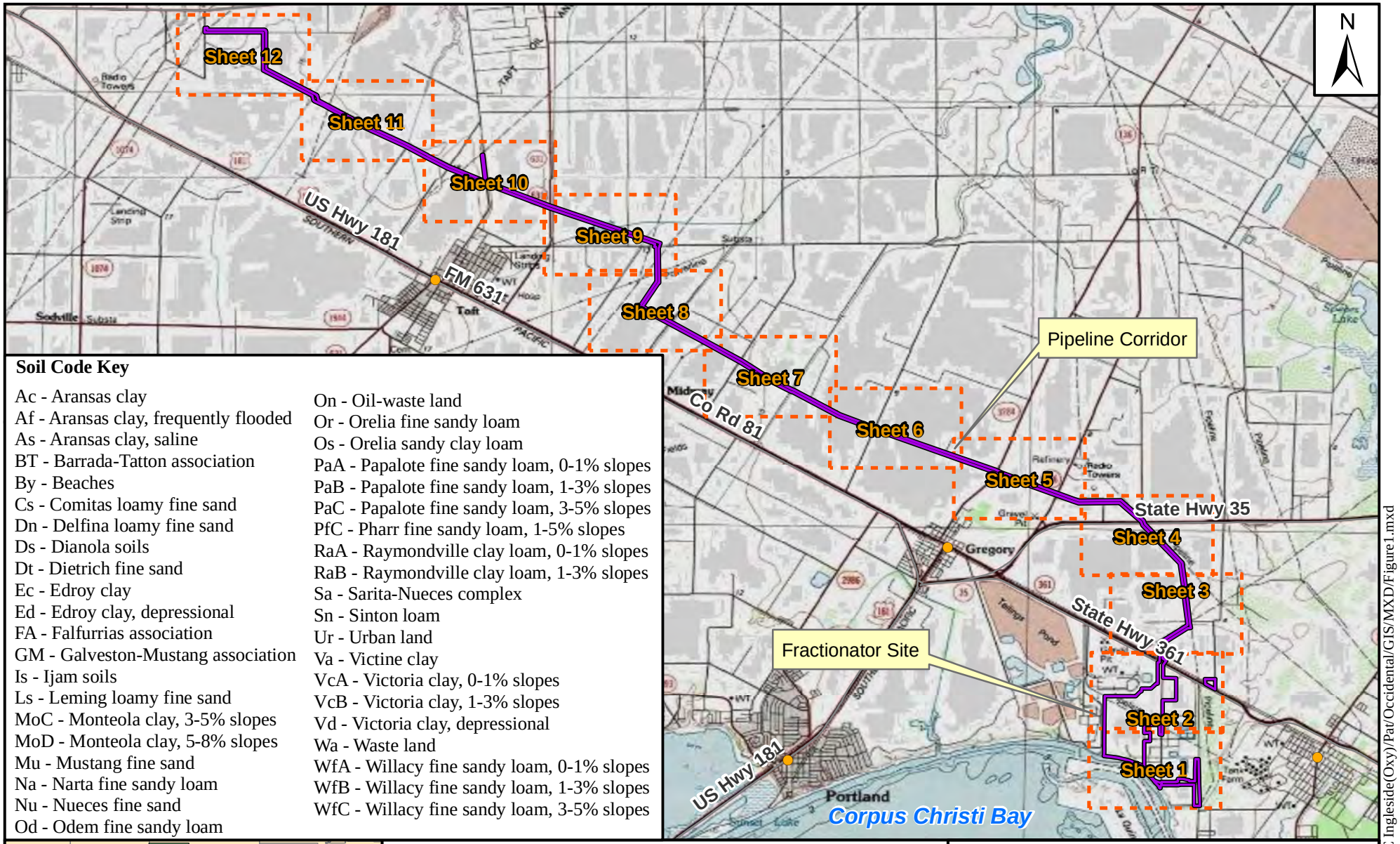
Figure 1. Site Location for Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Figure1.mxd



Soil Code Key

Ac - Aransas clay
Af - Aransas clay, frequently flooded
As - Aransas clay, saline
BT - Barrada-Tatton association
By - Beaches
Cs - Comitas loamy fine sand
Dn - Delfina loamy fine sand
Ds - Dianola soils
Dt - Dietrich fine sand
Ec - Edroy clay
Ed - Edroy clay, depressional
FA - Falfurrias association
GM - Galveston-Mustang association
Is - Ijam soils
Ls - Leming loamy fine sand
MoC - Monteola clay, 3-5% slopes
MoD - Monteola clay, 5-8% slopes
Mu - Mustang fine sand
Na - Narta fine sandy loam
Nu - Nueces fine sand
Od - Odem fine sandy loam
On - Oil-waste land
Or - Orelia fine sandy loam
Os - Orelia sandy clay loam
PaA - Papalote fine sandy loam, 0-1% slopes
PaB - Papalote fine sandy loam, 1-3% slopes
PaC - Papalote fine sandy loam, 3-5% slopes
PfC - Pharr fine sandy loam, 1-5% slopes
RaA - Raymondville clay loam, 0-1% slopes
RaB - Raymondville clay loam, 1-3% slopes
Sa - Sarita-Nueces complex
Sn - Sinton loam
Ur - Urban land
Va - Victine clay
VcA - Victoria clay, 0-1% slopes
VcB - Victoria clay, 1-3% slopes
Vd - Victoria clay, depressional
Wa - Waste land
WfA - Willacy fine sandy loam, 0-1% slopes
WfB - Willacy fine sandy loam, 1-3% slopes
WfC - Willacy fine sandy loam, 3-5% slopes

Source: National Geographic 2D Topo basemap from ESRI Online Mapping Services. Roads from NRCS Geospatial Data Giveaway, downloaded 2/12.

LEGEND

Project Facilities — Roads
Sheet Boundary — Cities

0 1 2 3 4 5 Miles

Scale = 1:125,000

Sheet 1 of 1

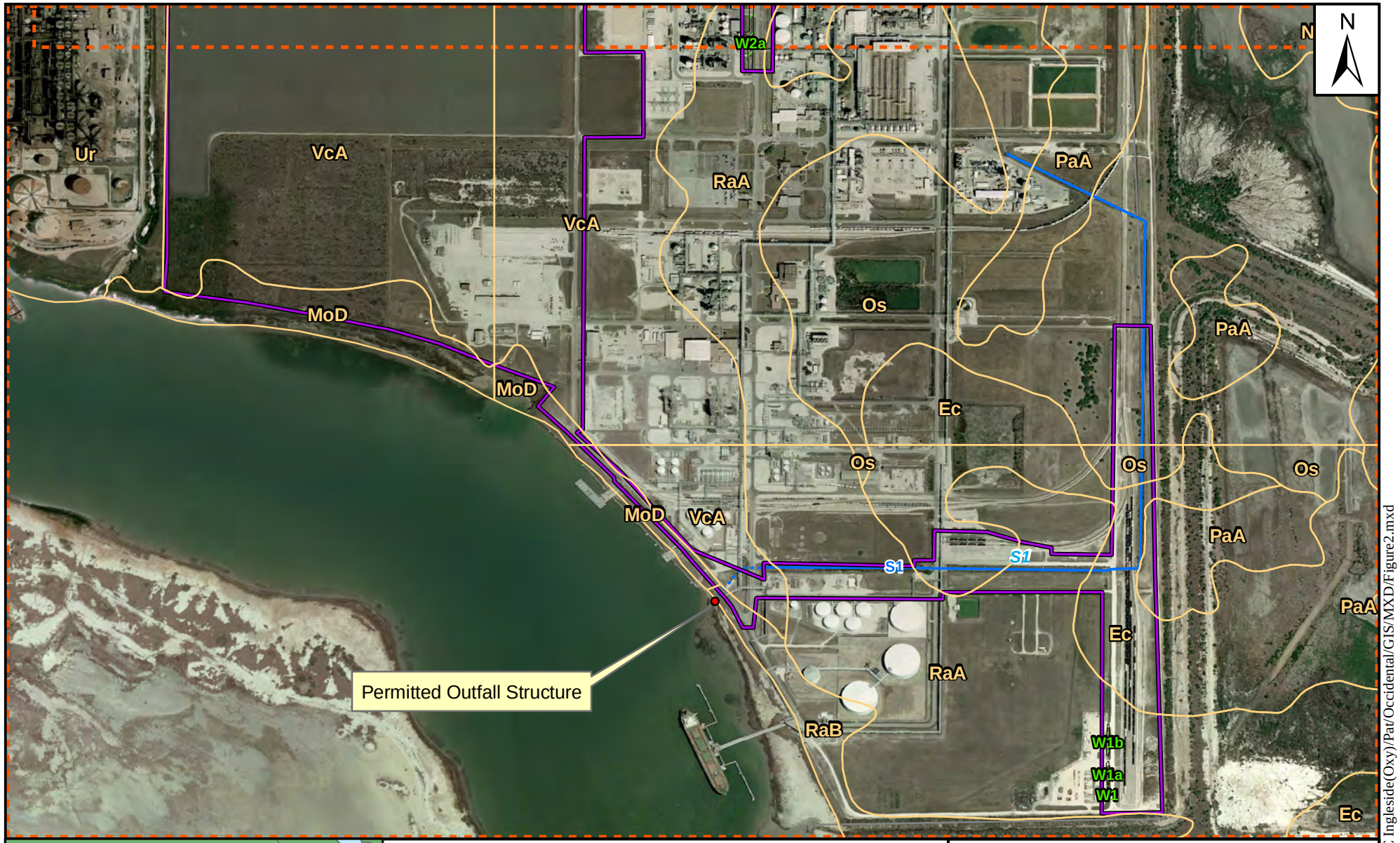
Sheet Key for Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

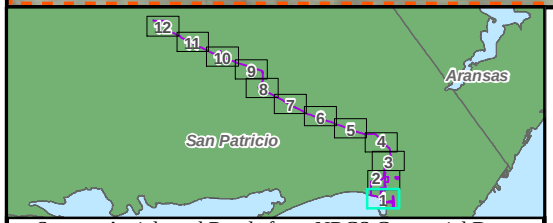
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Figure1.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary
Project Facilities
Soils
Wetlands
Streams
Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 1 of 12

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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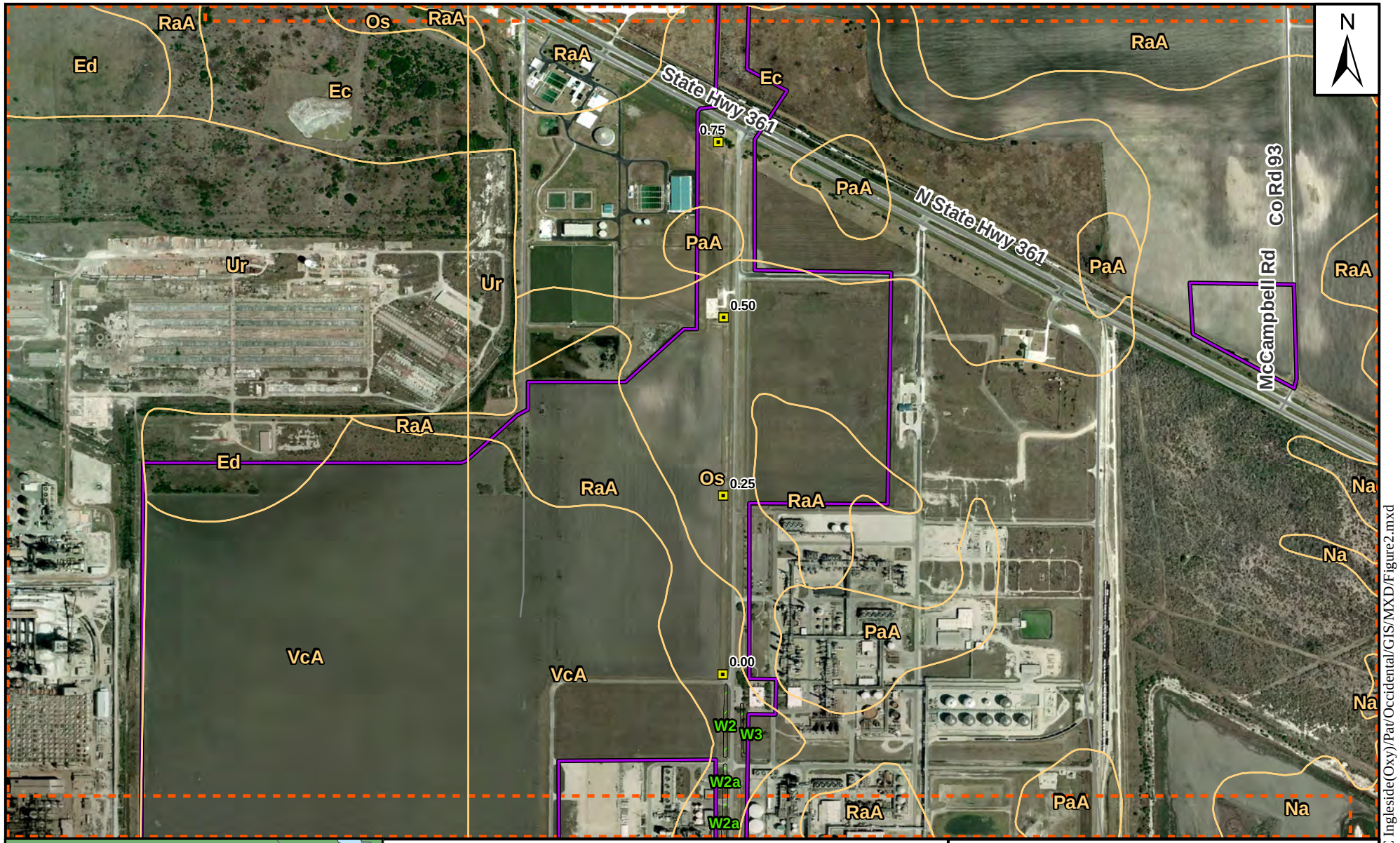

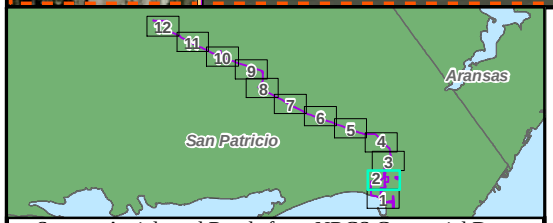

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000 **Sheet 2 of 12**

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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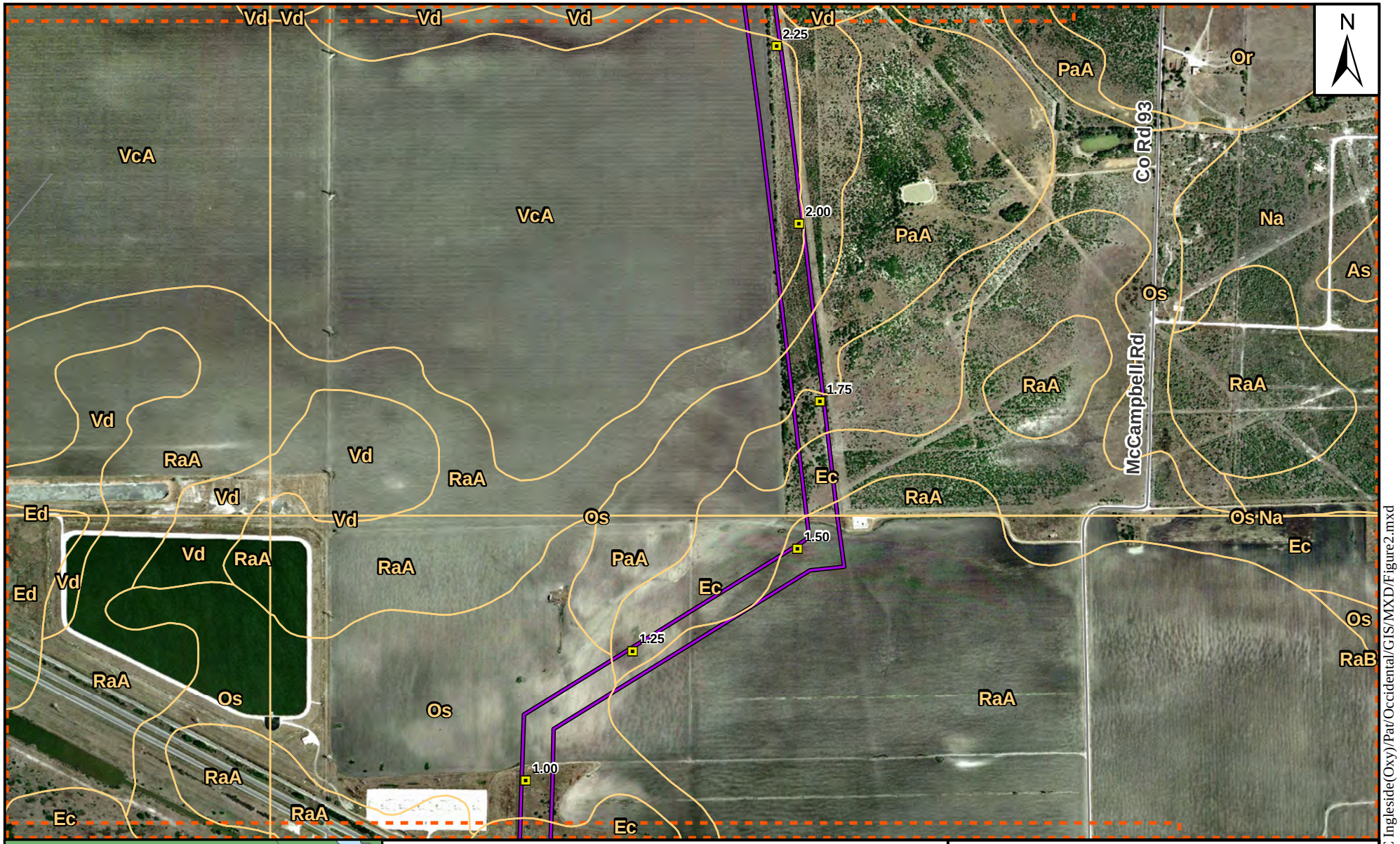

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000 **Sheet 3 of 12**

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

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Date: 05/12

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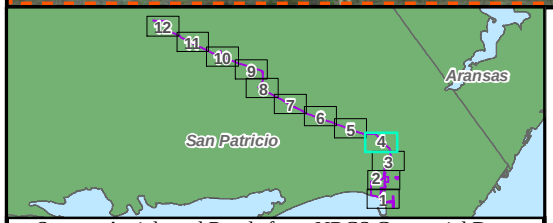

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000 **Sheet 4 of 12**

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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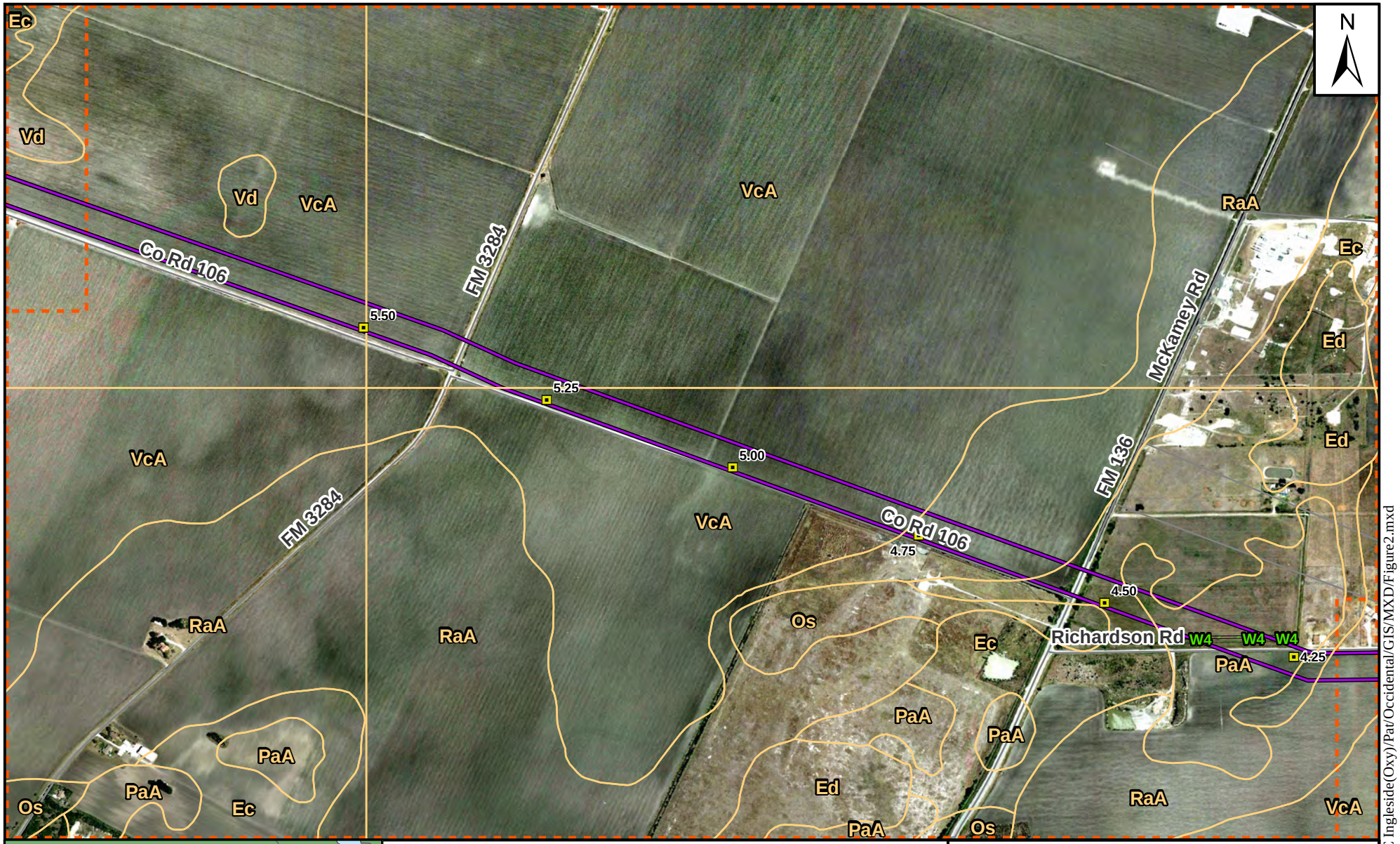

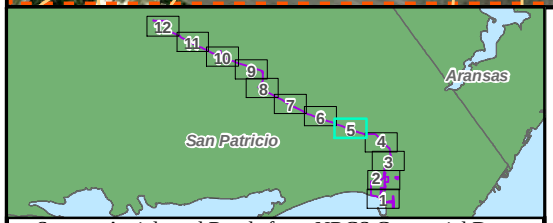

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary
Project Facilities
Soils
Wetlands
Streams
Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 5 of 12

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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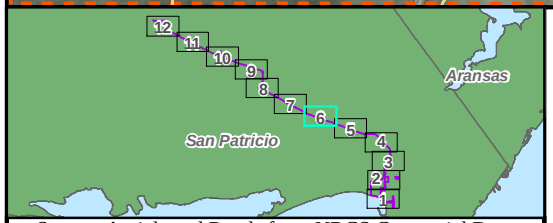

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000 **Sheet 6 of 12**

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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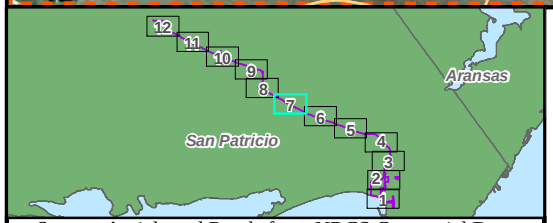

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary
Project Facilities
Soils
Wetlands
Streams
Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 7 of 12

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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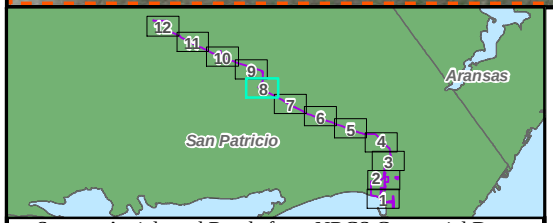


Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000 **Sheet 8 of 12**

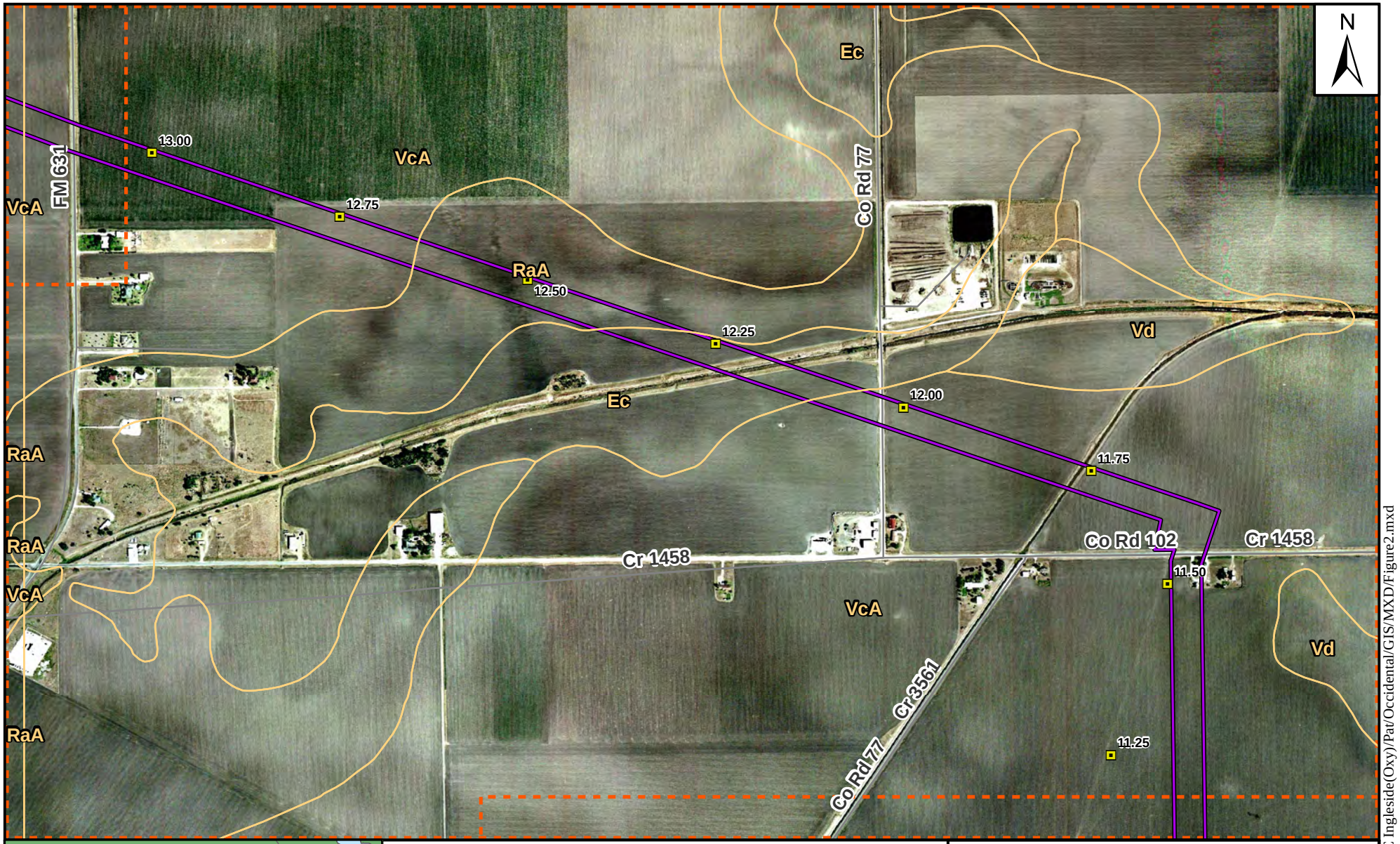
Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

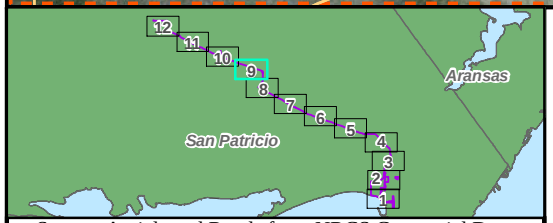
Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Figure2.mxd





Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 9 of 12

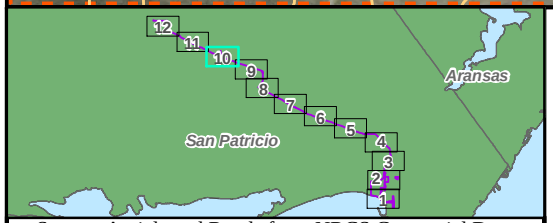
Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Figure2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 10 of 12

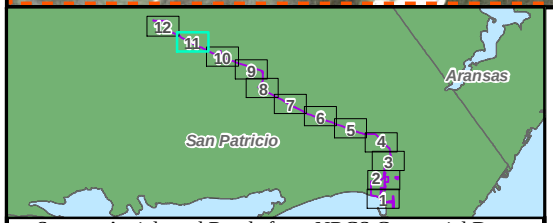
Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

P:100-NRS-T27819.0001 OEVC Ingleside(Oxy)/Pat/Occidental/GIS/MXD/Figure2.mxd



Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 11 of 12

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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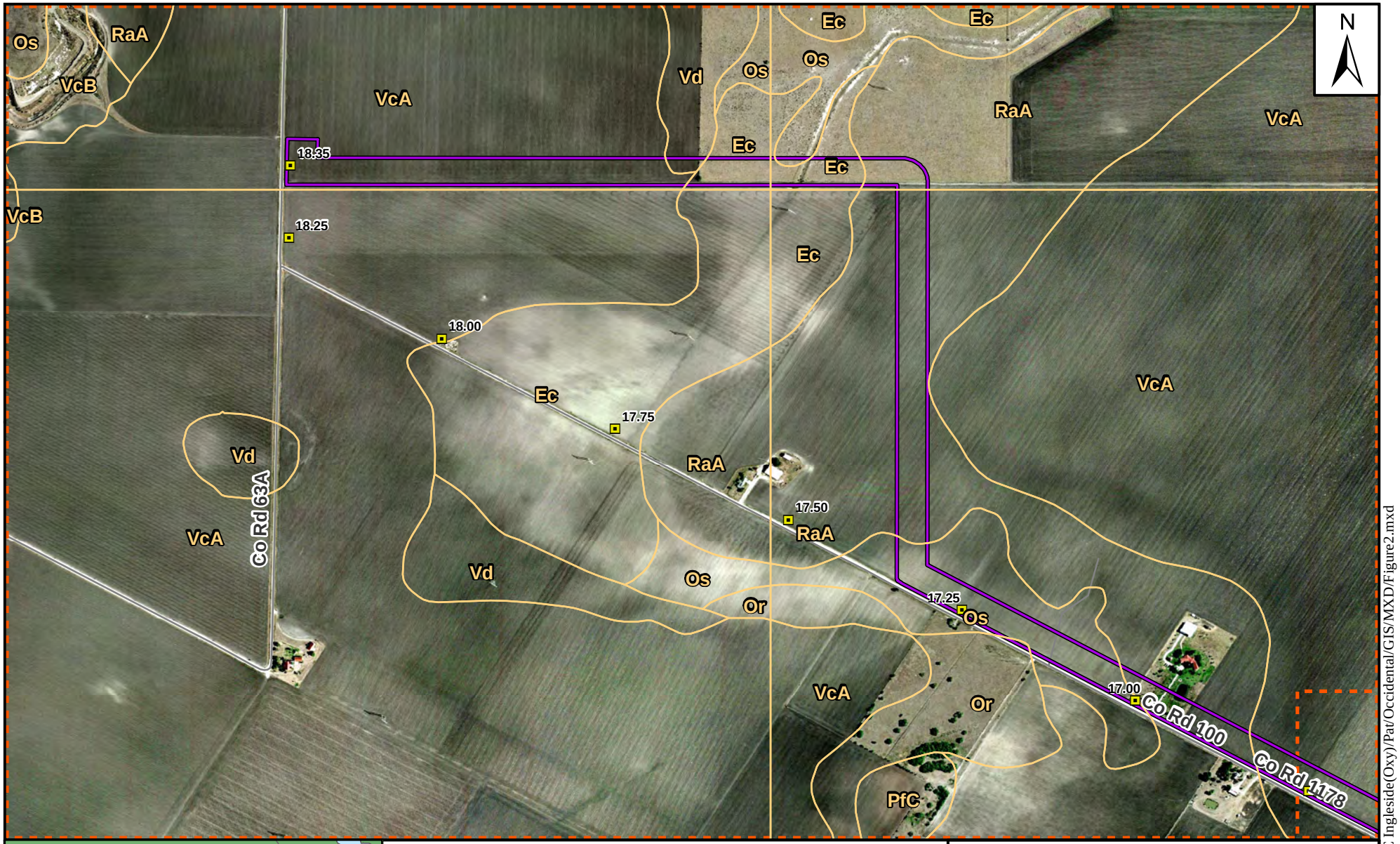

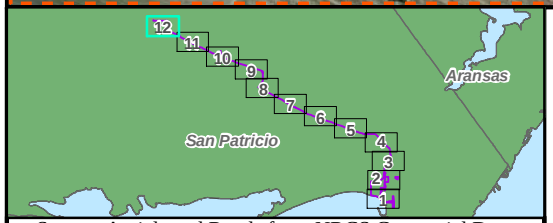

Source: Aerials and Roads from NRCS Geospatial Data Giveaway. USDA NRCS Soil Survey Geographic (SSURGO) database for San Patricio County, all downloaded 2/12.

LEGEND

Sheet Boundary | Soils | Streams

Project Facilities | Wetlands | Roads

0 750 1,500 2,250 3,000 Feet

Scale = 1:12,000

Sheet 12 of 12

Figure 2. Soils Traversed by the Ingleside Fractionator Project, San Patricio, Texas.

Prepared For: Occidental Chemical Corporation

Prepared By: TETRA TECH

Date: 05/12

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APPENDIX H

OXYCHEM LETTER TO USFWS REGARDING LIGHTING OF FACILITY FOR WHOOPING CRANE

Occidental Chemical Corporation OxyChem.
A subsidiary of Occidental Petroleum Corporation

P. O. Box CC, Ingleside, Texas 78362-0710
4133 Hwy 361, Gregory, Texas 78359
Phone 361.776-6000 Fax 361.776-6208

June 7, 2013

Ms. Dawn Whitehead, Deputy Field Supervisor
U.S. Fish and Wildlife Service c/o TAMU-CC
Ecological Service Field Office Corpus Christi
6300 Ocean Drive, Unit 5837
Corpus Christi, TX 78412-5837

RE: Occidental Chemical Corporation's Proposed Fractionation Facility Project
San Patricio County, Texas
Whooping Crane Lighting

Dear Ms. Whitehead:

As discussed during our pre-application meeting regarding the above referenced Project, the Fractionation Facility Site and San Patricio Pipeline (SPP) Corridor are located within the historic migration corridor of the Aransas-Wood Buffalo National Park (AWBNP) whooping crane population. The population follows a rather linear migration route from the Wood Buffalo National Park in Canada (northeastern Alberta and southern Northwest Territories) where it is found in the summer to the coastal marshes in Texas where it winters.

To avoid impacts to migratory whooping cranes, lights will be located throughout the Fractionation Facility Site so new structures are visible during low-light conditions (dawn, dusk, and nighttime hours). As a matter of standard lighting procedures at the existing OxyChem Facility, OxyChem will ensure the Fractionation Facility Site will be well lighted for aircraft safety and to accommodate maintenance needs during nighttime hours. New overhead power lines will be located adjacent to and at a similar height as existing overhead power lines at the Fractionation Facility Site, thereby avoiding creation of a new potential strike hazard to migrating whooping cranes. Finally, the new electrical substation will be located adjacent to the existing DuPont substation at the Fractionation Facility Site, and will be well lighted for clear visibility during low-light conditions (dawn, dusk, and nighttime hours). These actions particularly will avoid impacts to migrating whooping cranes that might use the Project Action Area or surrounding areas as stopping grounds.

We appreciate your assistance in the evaluation of the proposed Project. If you have any questions, please contact me by e-mail at Mark_Evans@oxy.com or by phone at (361)776-6169.

Sincerely,

Mark Evans
Environmental Manager - Projects
Occidental Chemical Corporation

cc: USEPA, A.C. Dumaual
Stephen Compton, Tetra Tech, Inc.

APPENDIX I

OXYCHEM
SENSITIVE SNAKE EDUCATION AND MANAGEMENT PLAN

OCCIDENTAL CHEMICAL CORPORATION FRACTIONATION FACILITY PROJECT
SENSITIVE SNAKE EDUCATION AND MANAGEMENT PLAN

This document outlines the protection guidelines that will be implemented during clearing operations for threatened and endangered (T&E) state-listed snakes and state-listed rare snakes which may be encountered during construction of the Occidental Chemical Corporation (OxyChem) Ingleside Fractionator Project. It identifies the role of a qualified biologist during clearing activity and provides educational material and guidelines for construction personnel to follow in case they encounter a listed or non-listed snake. The plan has been prepared in accordance with US Fish and Wildlife Service's request to ensure the Project avoids impacts to listed snakes and reduces non-listed snake fatalities during construction.

ON-SITE EDUCATION MATERIALS

Information pamphlets will be provided to individuals in charge of the clearing operation for distribution to all construction crews. The pamphlets will provide listed snake photographs, and brief background information on identification, habitats, and protection of such listed snakes. The pamphlets will state actions to take if a listed snake is sighted and the names and numbers of contact persons.

PAMPHLET INFORMATION

ACTIONS TO TAKE IF A LISTED SNAKE IS SIGHTED DURING CONSTRUCTION

If a listed snake is observed during construction, do not disturb it. Any disturbance of the snake's activity is prohibited. If a listed snake is sighted, construction should cease and the Project biologist should immediately be contacted. The snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the construction area or has been relocated by a qualified wildlife biologist.

Sightings of listed snakes should be reported immediately to the following:

1. **Tetra Tech, Inc. Project Biologist**
   Phone: _____

2. The qualified biologist will contact the following agency personnel

   U.S. Fish and Wildlife Service
   Ms. Mary Orms
   Corpus Christi Ecological Services Field Office
   6300 Ocean Drive, Unit 5837
   Corpus Christ, Texas 78412-5837
   Office Telephone: (361) 994-9005

   Texas Parks and Wildlife Department
   Mr. Russell Hooten
   NRC Building, Suite 2501
   6300 Ocean Drive, Unit 5846
   Corpus Christi, Texas, 78412
   Office Telephone: (361) 825-3240

ACTIONS TO TAKE IF A DEAD LISTED SNAKE IS SIGHTED DURING CONSTRUCTION ACTIVITY

1. Promptly notify the Project's on-site biologist:

   Tetra Tech, Inc. Project Biologist
   Phone: _____

2. The qualified biologist will contact the following agency personnel:

   U.S. Fish and Wildlife Service
   Ms. Mary Orms
   Corpus Christi Ecological Services Field Office
   6300 Ocean Drive, Unit 5837
   Corpus Christ, Texas 78412-5837
   Office Telephone: (361) 994-9005

Texas Parks and Wildlife Department
Mr. Russell Hooten
NRC Building, Suite 2501
6300 Ocean Drive, Unit 5846
Corpus Christi, Texas, 78412
Office Telephone: (361) 825-3240

The snake specimen should be thoroughly soaked in water and frozen immediately and provided to TPWD.

ACTIONS TO TAKE IF OTHER SNAKES ARE SIGHTED DURING CONSTRUCTION

Many species of snakes will bite (both venomous and non-venomous snakes), but usually only in circumstances in which they are threatened. This includes when they are handled, or cornered, or both. **The best way to avoid snake bites is to watch where you step and to not handle them.** Keeping a distance from snakes is recommended so they are allowed to leave the construction area where they are out of harm's way.

Additionally, snakes are known to rest on low hanging (at eye level) limbs/branches of trees or low branches of shrubs. If such features are encountered during construction, limbs and branches should be examined for presence of snakes.

A common myth is that juvenile venomous snakes aren't able to control their bites and are therefore more dangerous than adults. There are two things to consider in venomous snake bites: the potency of the venom and the amount of venom injected. Juveniles are small and produce very little venom. The components of a snake's venom can change from juvenile to adult, so a juvenile's venom has the potential to be more toxic, but the amount of venom injected is still small (personal communication with Curtis Schmidt, Zoologist at the Sternberg Museum in Hays, Kansas).

If you think you have been bitten by a venomous snake, it is best to remain calm and at rest to slow the spread of venom throughout your body. Also, not all venomous snake bites contain venom. Sometimes a venomous snake will bite in warning without injecting any venom. Bites that include venom are sometimes referred to as "hot" bites. Regardless, have someone transfer you to the nearest medical facility as soon as possible. You will have a few hours of buffer time before the wound becomes critical. If possible, identify the venomous snake that has bitten you to ensure quick administration of the most appropriate anti-venom.

DISCLAIMER

The pictures provided in this guide are illustrative of the snakes you might encounter, but keep in mind that **the appearance of these snakes can vary throughout their range**. Sometimes these variances are small changes in color or pattern, while other times the variances are quite noticeable. If you or a coworker is bitten but not sure of the identity of the snake, try and provide as complete of a description as possible to the doctor. This information could be very important at ensuring the most appropriate anti-venom is administered.

TEXAS LISTED SNAKES

State-listed T&E snakes with the potential to be encountered during construction of the Project include: the Texas Indigo Snake; the Texas Scarlet Snake, and the Timber (Canebrake) Rattlesnake. These snakes are protected under Title 5 Sections 67.001 – 68.021, Texas Threatened and Endangered (T&E) Species Regulations (amended 1977), Parks and Wildlife Code. **It is unlawful for anyone to injure, harm, harass, or kill these species. Persons who knowingly violate provisions of the Regulations that afford these species protection may be subject to fine and/or imprisonment.** Only the Project's qualified biologists may come in contact with or relocate listed snakes.

The Gulf Salt Marsh Snake, a state-listed rare species, may also be encountered during Project construction. A species is considered rare when it is at serious risk of becoming threatened or endangered. In the case of the Gulf Saltmarsh Snake, the main threat that could cause this species to become listed as a T&E species is loss of its coastal wetland habitat.

The below information provides a description/characteristics of each listed snake and the habitat in which it is typically found.

TEXAS INDIGO SNAKE

Description

The **Texas indigo snake** *(Drymarchon melanurus erebennus)* is a **non-venomous** state-listed threatened species. This species is predominantly black in color, with a high sheen which gives the scales a noticeable iridescence. The underside is often a salmon pink color. Texas indigo snakes are large, regularly attaining lengths beyond 6 feet (1.8 m), with specimens known up to 8 feet (2.4 m) long.

Photographs of non-venomous Texas Indigo Snake.

Habitat/Behavior

Texas indigo snakes prefer lightly vegetated areas not far from permanent water sources, but are also found in mesquite savannah, thornbrush-chaparral woodlands, open grassland areas, coastal sand dunes, and in suburban and irrigated croplands. They den in burrows left by other animals.

The Texas indigo snake is active during the day and spends most of its time actively foraging for prey. Because of its aggressive attacks on rattlesnakes, many farmers in

southern Texas consider it a useful ally. The Texas Indigo Snake is not typically aggressive toward humans; however, it may bite or release a foul smelling musk if handled or harassed. Although not a rattlesnake, the snake is known to shake its tail as a warning even though it does not possess a rattle.

Breeding takes place, generally yearly, in the winter. Clutches that average 10-12 eggs are laid in the spring, and hatch around 80 days later. Hatchlings can be up to 26 inches (66 centimeters) long.

Threat

During construction, Texas indigo snakes may be found in created brush piles, under rocks or logs, or on equipment in early morning hours where they sought a warm location upon shut-down of equipment the night before. If a Texas indigo snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated by a qualified biologist.

TEXAS SCARLET SNAKE

Description

The **Texas scarlet snake** (*Cemophora coccinea lineri*) is a **non-venomous** state-listed rare species. The species **resembles the venomous eastern coral snake** (*Micrurus fulvius*) and the **Texas coral snake** (*Micrurus tener*), but it has a red snout, whereas the coral snakes' snout is black. Its color is about the same as the coral snake; however the pattern of color is different. The Texas scarlet snake pattern is yellow adjacent to black instead of yellow adjacent to red as is true for coral snakes (hence the saying "when red meets yellow, you're a dead fellow" regarding the venomous coral snake). The Texas scarlet snake's pattern is similar to the Louisiana milk snake (*Lampropeltis triangulum amaura*), red-black-yellow-black. It has a gray or white background color, with distinct red blotches that have black borders. Unlike other subspecies, the black borders do not join on the sides. Its belly is a solid white or gray.

Habitat/Behavior

The Texas scarlet snake is a secretive burrower, spending most of its time underground. It prefers sandy thicket habitats along the Gulf of Mexico coastline. It also commonly inhabits pinewoods, dry prairies, salt grass prairie, maritime hardwood hammock, maritime hardwood hammock, and sandy areas or loamy well-drained soils. It is seldom seen above ground. Individuals are sometimes found under rocks or in or under logs and can reach 32 inches (81.3 centimeters) or 2.7 feet (0.8 meters) in length.

The snake is inactive in cold weather. It is most active at night, though diurnal (daytime) activity is known. This species of snake is active on aboveground from May to early August in northeastern Texas, where activity is stimulated by summer rains. Eggs are laid under moist humus or in other underground sites (in June-July, hatching in late summer).

Threat

Texas scarlet snakes are often mistaken for coral snakes (below) and killed. If a Texas scarlet snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated by a qualified biologist.


Photographs of the non-venomous Texas scarlet snake, which is often mistaken for a venomous coral snake (see below photographs) and killed.


Photographs of venomous coral snake. The yellow and red coloring on a coral snake is adjoining, whereas on a Texas scarlet snake, the yellow and red are separated by black (the red NEVER meets the yellow). Texas scarlet snakes have red color at the tip of their faces, whereas coral snakes have black color at the tip of their faces.

TIMBER (CANEBRAKE) RATTLESNAKE

Description

The **timber or canebrake rattlesnake** (*Crotalus horridus*) is a **venomous** pit-viper that is state-listed as threatened. These snakes have wide heads and narrow necks – a typical distinction of all venomous snakes except coral snakes. The timber rattlesnake has a pit on each side of its face between (but lower than) its eye and nostril. The pupil of its eye is vertical (similar to other venomous snakes) and its eye is typically bright yellow. The color pattern of this snake varies geographically, but almost always has dark crossbars (approximately 20 to 29 dark, V-shaped) with jagged edges that form a distinctive pattern across its back. In Texas, it has a heavy, light yellow, gray or greenish-white body with a rust-colored strip along the length of its back, and a black tail

tipped with rattles. A horny rattle or button exists on the end of its tail. Adult timber rattlesnakes reach a length of 36 to 40 inches (91.4 to 101.6 centimeters), and weigh 1.3 to 2 pounds (0.6 to 0.9 kilograms).

Photographs of timber (canebrake) rattlesnake.

Habitat/Behavior

Timber rattlesnakes prefer moist lowland forests and hilly woodlands or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge. They are found in upland woods and rocky ridges in the eastern third of Texas. Underground crevices provide retreats for overwintering, such as a fissure in a ledge, a crevice between ledge and ground, talus (rock slide) below a cliff, open skree slope (fallen rocks not associated with a cliff), or fallen rock (talus or skree) partly covered by soil. The snake is active during the day during spring and fall and becomes active at night during the oppressive heat of summer. In Texas, the snake spends 2-3 months at overwintering dens but occurs on the surface during warm periods throughout the winter.

Highly venomous, timber rattlesnakes are sometimes slow to defend themselves and rely on their ability to blend into their surroundings to avoid confrontation. They seek to escape rather than risking danger and will remain silent, and if possible, will hide before revealing their position to a predator. Despite their large size and reputation, they are difficult to provoke into rattling or biting. Still, it does happen. It is best not to take any chances with such a potentially deadly snake. If bitten by the timber rattlesnake, seek immediate medical attention.

Threat

Habitat destruction is the leading threat to timber rattlesnakes. Timber rattlesnakes are killed out of fear. The non-venomous Eastern hognose snake (*Heterodon platirhinos*) is commonly mistaken for the timber rattlesnake (see photograph below) and killed. The timber rattlesnake differs from non-venomous snakes of similar appearance by having a pit on each side of the face in front of and below the eye (see photographs below).


Photographs of the Eastern hognose snake (left) and the timber rattlesnake (right). The Eastern hognose snake does not have the vertical pupil nor does it have a pit in front and below the eye as is clearly visible on the timber rattlesnake. The timber rattlesnake photograph provides an example of how snakes can vary in appearance throughout their range (compare to photographs of timber rattlesnake on the previous page of this pamphlet).

If a timber rattlesnake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated.

GULF SALT MARSH SNAKE

Description

The **Gulf salt marsh snake** (*Nerodia clarkii clarkii*) is a **non-venomous** state-listed rare snake. It grows to a length of 15 to 30 inches (38.1 to 76.2 centimeters). Distinguishing characteristics of this snake include two longitudinal tan or yellow stripes on each side of the body, making up the top pattern of the snake. It has a reddish-brown or grayish-black bottom color with one to three rows of large pale spots along the center of the belly. This snake is flat headed.


Photographs of Gulf salt marsh snake.

Habitat/Behavior

This striped water snake occurs almost exclusively in salt-water habitat. Its markings are similar to those of the garter snake (*Thamnophis sirtalis*). Gulf salt marsh snakes

inhabit coastal salt marshes and brackish estuaries. They usually are not found in freshwater environments. These snakes are active primarily at night, and hide in wrack lines and vegetation during the day.

Threat

The Gulf salt marsh snake is often killed, along with other water snakes, out of fear of mistaken identity as cottonmouth snakes (*Agkistrodon piscivorus*). The Gulf salt marsh snake does not resemble the appearance of a cottonmouth snake (see photograph below). In addition to the threat of being killed due to mistaken identity, the Gulf salt marsh snake is also considered rare (high likelihood of becoming threatened or endangered) due to loss and degradation of coastal habitat.

Photograph of a venomous Cottonmouth Snake.

If a Gulf salt marsh snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated.

The best way to avoid the venomous cottonmouth snake is to watch where you step and to not handle them. If the venomous cottonmouth snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

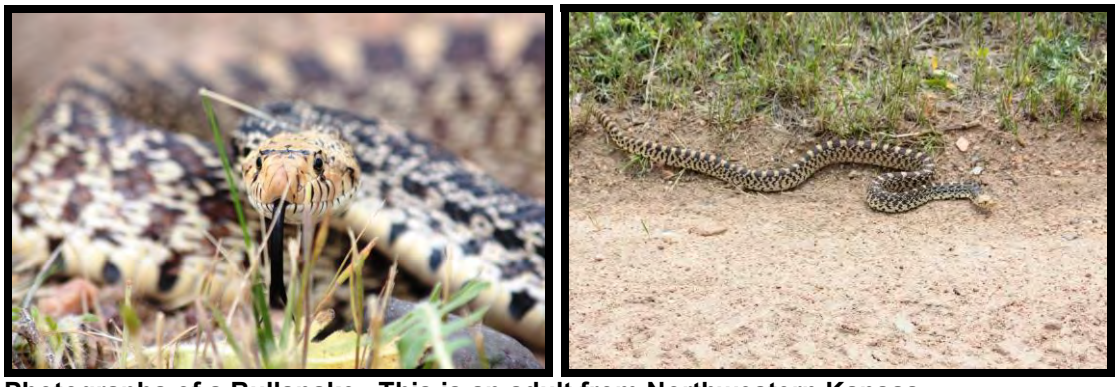
OTHER SNAKES OF INTEREST

The following snakes might also be encountered during the construction of the Project. Some of the snakes listed below are venomous. Other snakes listed below are non-venomous, but resemble and/or behave like venomous snakes. Please familiarize yourself with these snakes so that no harm comes to you or the snakes.

BULLSNAKE

Description

The **bullsnake/gopher snake** (*Pituophis catenifer*) is a **non-venomous** snake. These snakes are beige to light brown and they have dark brown or black blotches. The ventral (belly) side of this snake is yellow with black spots. Bullsnakes are heavy-bodied and can reach lengths of 3 to 5 feet (0.9 to 1.5 m).



Photographs of a Bullsnake. This is an adult from Northwestern Kansas.

Habitat/Behavior

Bullsnakes are found in brushlands, grasslands, and the sandy soils of fields. These snakes are active during the day, but become more active during the nights of the summer.

These snakes are known to be quite variable in temperament. Some are incredibly docile while others will act very defensively towards anyone who approaches too closely. They can hiss very loudly and even pose in an S-shaped curve. These displays can be very alarming, but they will not strike unless severely provoked. Their patterning and defensive postures might initially resemble a rattlesnake's, but they do not have the characteristic "triangular" shaped head, pits between the eyes and nostrils, or a rattle, nor do they contain venom.

Threat

Aside from being killed due to mistaken identity from their similarity in appearance and/or behavior like venomous snakes, bullsnakes tend to move slowly and bask on roadways. This results in an additional threat to this species through vehicular strikes and subsequent mortality.

COPPERHEAD

Description

The **copperhead** (*Agkistrodon contortrix*) is a **venomous** pit viper. An adult can reach 24 to 26 inches (61 to 66 centimeters) in length. Like many other venomous snakes, they have a wide head and a narrow neck. This species has yellow eyes with vertical pupils and heat sensing "pits" between the eyes and nostrils. The body is typically pale brown or light tan and many times will have a pinkish tint. This snake has a pattern of dark, hour glass-shaped bands across its dorsal (back) surface. This patterning helps the snake to blend well into areas with leaf litter. The copperhead has rough scales.

Photographs of a Copperhead. This individual is a juvenile from North Texas.

Habitat/Behavior

Copperheads prefer to hide in the leaf litter, logs, and branches of wooded lowlands and mixed pastures. They are usually found in river bottoms. They can also be found in wooded suburbs.

This snake is diurnal (active during the daytime) during the early spring and late fall. During the summertime, they are nocturnal (active during the nighttime) and prefer to hunt during the evening.

Threat

The copperhead is a venomous snake that blends well into its surroundings. The best way to avoid the venomous copperhead is to watch where you step and to not handle them. If the venomous copperhead is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

LOUISIANA MILK SNAKE

Description

The **Louisiana milk snake** is a **non-venomous** snake. The Louisiana Milk Snake reaches lengths of 16 to 24 in (40.6 to 61 centimeters). Like the Texas scarlet snake (see above) it mimics the appearance of the venomous coral snake. It has bands of red, black, and yellow, but unlike the coral snake, the bands are black-red-black-yellow-black. The red bands are solidly colored and wider than either the black or yellow bands. It has a slightly pointed black head and shiny scales.

Threat

Due to its similarity in appearance to coral snakes, Louisiana milk snakes are often killed. A helpful saying to distinguish between the non-venomous Louisiana milk snake and the coral snake is “Red and Black, Friend of Jack; Red and Yellow, Kills a Fellow”.


Photographs of the Louisiana milk snake. Compare to the photographs of the coral snake (see below photographs) and note that the milk snake has red touching black, NEVER red touching yellow.


Photographs of venomous coral snake. Texas scarlet snakes and Louisiana milk snakes are often mistaken for coral snakes. The yellow and red coloring on a coral snake is adjoining whereas on the Louisiana milk snake, the yellow and red are NEVER adjoining.

The best way to avoid the non-venomous Louisiana milk snake is to watch where you step and to not handle them. If this non-venomous snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

WESTERN DIAMOND-BACKED RATTLESNAKE

Description

The **Western diamond-backed rattlesnake** (*Crotalus atrox*) is a **venomous** pit viper. It has a wide head and a narrow neck. The snake can reach between 3.5 to 4.5 feet (1.1 to 1.4 m) long. It has brown diamond-shaped markings on its dorsal (back) surface and an alternating pattern of black and white bands before the rattle on its tail.

Photographs of a Western diamond-backed rattlesnake. This individual is a juvenile from North Texas.

Habitat/Behavior

Western diamond-backed Rattlesnakes can be found in a large variety of habitats. These include arid and semiarid regions, plains, mountains, sandy flats, rocky uplands, desert, grassland, shrubland, woodland, open pine forest, river bottoms, and coastal islands. It will utilize animal burrows, rock crevices, and cavities. It can also be found climbing vegetation or entering water.

This snake is diurnal during the cooler months and mostly crepuscular (active during dawn/dusk) and nocturnal during hot summer months.

Threat

Western diamond-backed rattlesnakes are killed out of fear because they are venomous snakes. The best way to avoid this snake, as with other snakes, is to watch where you step and to not handle them. If this snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

YELLOW-BELLIED KINGSNAKE

Description

The **yellow-bellied kingsnake/prairie kingsnake** (*Lampropeltis calligaster*) is a **non-venomous** snake. This medium-sized snake has smooth scales, a thick neck, and a cylindrical head. The color pattern is variable. The dorsal (back) surface can be tan, grayish-brown, or yellowish-brown and has black-edged, dark brown to reddish brown or greenish blotches along the back. It also has two alternating rows of smaller, less distinct blotches on the sides. The top of the head has a V-shaped marking. This snake typically reaches lengths of 30 to 42 inches (76.2 to 106.7 centimeters).

Photographs of the yellow-bellied kingsnake.

Habitat/Behavior

This snake can be found in a variety of open or semi-open areas. These can include farmland, pastures, prairies, open woodland, sandhills, barrier beaches, coastal salt-grass savannas, marshes, residential areas, rocky hillsides, and thickets. This species is crepuscular in the spring and fall and nocturnal in the summer.

Threat

The yellow-bellied kingsnake has coloration, patterning, and even behaviors similar to some rattlesnake species. This snake will even shake its tail in leaf litter if it feels threatened, giving a "rattle" sound. However, unlike the rattlesnakes it is trying to mimic, this species does not have the characteristic triangular head, pits between the eyes and nostrils, nor does it have a rattle.

REFERENCES CITED:

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Accessed September 17, 2012 and December 12, 2012. http://www.natureserve.org/explorer.

Schmidt, Curtis. 2012. Personal Electronic Mail Communication August 30, 2012. Zoologist at the Sternberg Museum. Hays, Kansas.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed September 17, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/gulfsnake/.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed September 17, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/timberrattlesnake/.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed December 10, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/bullsnake/.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed December 10, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/louisianamilksnake/.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed December 10, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/southerncopperhead/.

Texas Parks and Wildlife Department (TPWD). 2012. Accessed December 10, 2012. http://www.tpwd.state.tx.us/learning/junior_naturalists/safesnake.phtml.