



Draft Permittee Responsible Mitigation Plan

USACE Permit No. SWG-2014-00661

GT OmniPort Facility

Port Arthur, Jefferson County, Texas

May 2016

PREPARED FOR:

Golden Triangle Properties, LLC

Port Arthur, Texas

SPIRIT PROJECT: 15350.01

FOR SPIRIT ENVIRONMENTAL:

Handwritten signature of Richard Fontenot.

Richard Fontenot

Handwritten signature of Ryan Robol.

Ryan Robol

Handwritten signature of Erin V. Donato.

Erin V. Donato

OFFICE: 281-664-2490

FAX: 281-664-2491

20465 State Highway 249, Suite 300
Houston, TX 77070

spiritenv.com

Table of Contents

1.0	Introduction	1-1
1.1	Ownership and Sponsorship	1-2
2.0	Goals and Objectives	2-1
3.0	Site Selection	3-1
3.1	Mitigation Site Description	3-1
3.2	Driving Directions to the Site	3-2
4.0	Site Protection Instrument.....	4-1
5.0	Baseline Information	5-1
5.1	General Ecological Characteristics.....	5-1
5.2	Historical Ecological Characteristics.....	5-2
5.3	Current Ecological Characteristics.....	5-2
5.3.1	Site Topography	5-2
5.3.2	Site Hydrology	5-3
5.3.3	Site Soils.....	5-3
5.4	Threatened and Endangered Species	5-3
5.5	Cultural Resources	5-4
6.0	Determination of Credits	6-1
7.0	Mitigation Work Plan	7-1
7.1	Reference Site.....	7-1
7.2	Site Restoration Plan.....	7-1
7.2.1	Hydrology Restoration	7-1
7.2.2	Site Preparation	7-2
7.2.3	Palustrine Forest Restoration	7-2
7.2.4	Emergent Wetland Restoration.....	7-3
8.0	Maintenance Plan	8-1
9.0	Performance Standards	9-1

Table of Contents (continued)

9.1	PEM Wetlands.....	9-1
9.2	PFO Wetlands	9-1
10.0	Monitoring Requirements	10-1
10.1	Monitoring Methods	10-1
10.2	Monitoring Reports	10-1
10.3	Achievement of Performance standards.....	10-2
11.0	Long Term Management Plan	11-1
11.1	Force Majeure	11-1
11.2	Water Rights.....	11-1
11.3	Mineral Rights	11-2
11.4	Eminent Domain.....	11-2
12.0	Adaptive Management Plan.....	12-1
13.0	Financial Assurances.....	13-1
13.1	Applicability	13-1
13.2	Financial Assurance Instruments	13-1
13.2.1	Construction Security.....	13-1
13.2.2	Performance Security	13-2
13.2.3	Long Term Management Funding	13-2
13.3	Amount of Financial Assurances	13-3
13.3.1	Amount of Construction Security	13-3
13.3.2	Amount of Performance Security.....	13-3
13.3.3	Long Term Management Fund Amount.....	13-4
14.0	Attachments	14-1

List of Tables

Table 1-1	Summary of Wetland Impacts.....	1-1
Table 6-1	Summary of iHGM Results	6-1
Table 7-1	Potential Species Planting List for PFO Restoration	7-3
Table 7-2	Potential Species Planting List for PEM Restoration	7-4
Table 13-1	Amount of Performance Security.....	13-4
Table 13-2	Long Term Management Fund Amount.....	13-5



1.0 Introduction

In a letter dated August 14, 2014, Golden Triangle Properties, LLC (“GTP”) was informed by the United States Army Corps of Engineers (“USACE”) that fill material had been discharged into wetlands adjacent to Taylor Bayou without the proper authorization at a GT OmniPort (“GTO”) facility near Port Arthur, Jefferson County, Texas. The GTO facility was acquired by GTP in April 2010 to develop a multi-modal terminal for crude oil shipped via rail, barge, and truck. In 2012, construction began at GTO for the installation of a railroad infrastructure system and two associated lateral drainage canals to provide logistical support and increased terminal options.

USACE investigation determined that as a result of the railroad infrastructure construction project, approximately 48.4 acres of wetlands had been impacted. Under the guidance of USACE, GTP conducted voluntary restoration activities on the property resulting in the removal of fill from 34.4 acres of wetlands. Of the 34.4 acres, 29.2 acres are re-established palustrine emergent (“PEM”) wetlands and 5.2 acres are palustrine forested (“PFO”) wetlands that have re-established as PEM wetlands. Further, an additional 1.8 acres of temporarily impacted wetlands have naturally re-established as PEM wetlands.

Unauthorized fill deposited in the remaining 12.2 acres of wetlands (of which 2.7 acres are forested), as well as the above mentioned 5.2 acres of forested to herbaceous wetland habitat conversion, is the result of the constructed railroad project. Due to the extensive nature of the work and the integral operational functionality of the railroad, GTP seeks permission to retain the fill associated with the project by way of after-the-fact (“ATF”) permit authorization. In addition to the previously constructed railroad infrastructure, GTP proposes to include an additional 0.30 acres of impacts to jurisdictional PEM wetlands for a proposed 1,923-foot expansion of the railroad in the ATF permit authorization. The table below summarizes the impacts to jurisdictional wetlands the applicant will mitigate for using compensatory mitigation.

Table 1-1 Summary of Wetland Impacts

Impact Type	Acres
ATF Filled PEM Wetlands	9.5
Proposed Filled PEM Wetlands	0.3
ATF Filled PFO Wetlands	2.7
ATF PFO Converted to PEM	5.2
Total	17.7

The wetland impacts seeking authorization by way of the ATF permit occurred in the Sabine Lake watershed (8-digit Hydrologic Unit Code [“HUC8”] 12040201). Sabine Lake Mitigation Bank (“MB”) is the only mitigation in the primary service area and this bank currently does not have any active credits available for compensatory mitigation. The Daisetta Swamp MB has credits available in a secondary service area for forested wetland impacts, but only at a 1.5 to 1 basis and only 1.6 functional capacity units (“FCUs”) of biological credits are available at this time. Due to the absence of an approved mitigation bank or in-lieu fee program with the appropriate number and resource type of credits available at this time, this Permittee Responsible Mitigation (“PRM”) Plan is proposed as the environmentally preferable mitigation alternative.

GTP is purchasing a larger tract of land than is necessary for this mitigation project in order to facilitate the development of contiguous wetland restoration projects by various permittees, not inclusive of GTP and its partners. Additional industrial development projects are anticipated in HUC8 12040201, and the restoration achieved from this PRM Plan will be the first step towards meaningful wetland habitat restoration on a large scale. The general conceptual design of the consolidated mitigation project (not a part of this PRM Plan) is depicted on the figures in Attachment 1 and labeled as “Proposed Future Consolidated Mitigation Projects Site - 1,200 Acres”. The 18.2-acre proposed PRM project site is located within the proposed future consolidated mitigation projects boundary.

This PRM Plan details all actions proposed to compensate for the unavoidable impacts to wetlands and waters of the US resulting from construction activities in accordance with the 2008 Final Mitigation Rule (Title 33 Code of Federal Regulations [“CFR”] 332) (2008 Final Compensatory Mitigation Rule).

1.1 Ownership and Sponsorship

GTP will serve as the Property Owner and Sponsor. The Sponsor will oversee the construction and establishment of the mitigation project and will serve as the long-term manager and steward. The anticipated long-term management will consist of activities such as monitoring, invasive species control, prescribed burning, and boundary maintenance and protection. As a conservation area, the project site will be protected by a perpetual conservation easement described in Section 4.0.

2.0 Goals and Objectives

The goal of this PRM Plan is to restore¹ (re-establish² and rehabilitate³) PFO and PEM wetlands associated with the unavoidable and proposed impacts to wetlands described in Section 1.0. The restoration of PFO and PEM will provide additional wetland functions⁴ and values not currently realized under the existing conditions and land use (e.g. flood storage and attenuation, migratory wildlife, habitat for threatened and endangered species or priority conservation species, pollutant removal, etc.).

Wetland restoration will improve localized and downstream water quality by retiring the land from existing and future agricultural uses (i.e. rice cropland) and increasing surface-water retention. In addition, habitat will improve for native and migratory wildlife via afforestation⁵ and herbaceous cover by native herbaceous vegetation.

The ultimate goal of this project is to restore lost physical, chemical, and biological functions of PEM and PFO wetlands within the Sabine Lake watershed. Based upon a review of historic aerial imagery available on Google Earth, the proposed project site, as well as hundreds of acres of land in the surrounding area, was converted into agricultural rice fields prior to 1937. Additionally, significant acreage of riparian vegetation along bayous and creeks within the Sabine Lake watershed have been removed from the ecological system as a result of the extensive agricultural production in the area in the previous century.

Historic farming activities on the site, including disking, ditching, and berming, have altered the natural hydrology of the project site, degrading the historic ecological value and functions of the natural wetlands that preceded agricultural development. Implementation of the PRM Plan will help restore the physical structure of the vegetation within the on-site wetland, will decrease runoff

¹ Restore is defined in 33 CFR § 332.2 as *the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource areas, restoration is divided into two categories: re-establishment and rehabilitation.*

² 33 CFR § 332.2 states that *re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.*

³ 33 CFR § 332.2 states that *rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.*

⁴ Wetland function is defined in 33 CFR § 332 as *the physical, chemical, and biological processes that occur in ecosystems.*

⁵ According to the Society of American Foresters, afforestation is defined as *the establishment of a forest or stand in an area where the preceding vegetation or land use was not forest, whereas reforestation is the re-establishment of forest cover.*

velocity, and will thereby increase water detention time, increase sediment accretion, and decrease nutrient loads. The presence of a diverse cover of native vegetation will decrease pollutant concentrations, increase wildlife habitat, and restore nutrient cycles that have been disrupted by agricultural practices and urbanization. Re-established PEM and PFO communities will also increase floral and faunal biodiversity, increase overall species richness, improve habitat connectivity, and decrease fragmentation within the watershed. The expected result of this project will be improved overall ecological functions within the Sabine Lake watershed.

3.0 Site Selection

When evaluating properties that could be utilized for this PRM Plan, the applicant's preference was to identify lands considered prior converted ("PC") cropland and, as a result, the natural hydrology was altered in a way that diminished its natural functions and values. The project site has been continuously farmed since at least 1937 and, therefore, functions below its natural, undisturbed potential. Due to the agricultural use of the land and the tilled nature of the soils, it is unlikely that any cultural resources or important threatened and endangered species habitat would be disturbed by activities in the proposed mitigation area. Furthermore, given the site has a low aquatic functional capacity in its current state, the high functional lift potential associated with restoration and subsequent protection of this site makes it desirable as a location for compensatory mitigation.

Historic land cover conversion throughout the region has led to fragmentation and the loss of large expanses of hardwood wetlands and coastal wet prairie. In particular, comparing historic and recent aerial images of the Sabine Lake Watershed demonstrates that wetland forests have been degraded over the past several decades. The PRM Plan provides an opportunity to re-establish riparian wetland habitat and connectivity, restore highly degraded agricultural wetlands, and restore lost biodiversity.

3.1 Mitigation Site Description

The proposed mitigation site is located in west Jefferson County, Texas in the same HUC8 watershed and Level III Ecoregion, Western Gulf Coastal Plain⁶, of the impacts proposed to be permitted under the ATF permit. This site has been identified as PC Cropland, pending certification from the US Department of Agriculture ("USDA") Farm Service Agency ("FSA"). Attachment 1, Exhibit 1 depicts the location of the proposed PRM project site and the proposed impacts site.

⁶U.S. Environmental Protection Agency, 2013, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA - National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

3.2 Driving Directions to the Site

From the USACE Galveston District office, take Broadway Avenue J to I-45 North and continue for 32 miles. Take Exit 32 for Sam Houston Tollway East and continue for 12 miles. Take the exit for I-10 East and continue on I-10 for 24 miles. Take Exit 812 towards TX-61 and turn left onto TX-61. Continue down TX-61 for 15 miles. TX-61 will end at US-90. Turn right onto US-90 and continue for 6 miles. Turn right onto FM 1009 South and continue for 5 miles. Turn right onto County Road 101 and after a bend in the road, turn right onto County Road 1010. Project site is located 1 mile down County Road 1010.

4.0 Site Protection Instrument

The proposed wetland mitigation site will be placed into a conservation easement in perpetuity held by a third party land trust, the Bayou Land Conservancy (“BLC”). Per a preliminary meeting held with GTP, Spirit Environmental, LLC, and the BLC, the BLC has agreed to hold the conservation easement. The BLC is a well-respected land conservancy in the Texas Gulf Coast that works to permanently protect river and bayou corridors. BLC is accredited by the Land Trust Alliance as an organization that meets national standards for excellence, upholds public trust, and ensures that conservation efforts are permanent. Due to the proposed mitigation location’s position next to several bayous, including the Spindletop Bayou and North Fork Taylor Bayou, entering into a conservation easement with the BLC is beneficial to both parties.

The wetland mitigation site will be placed into a conservation easement within 180 days of permit issuance. The applicant will establish a non-wasting fund that will provide GTP, the sponsor, with the resources necessary to monitor and enforce the site protections in perpetuity. Management and stewardship by the BLC will prohibit all development and other activities except those outlined in this PRM Plan.

5.0 Baseline Information

5.1 General Ecological Characteristics

The proposed mitigation site is located in the Level III Ecoregion Western Gulf Coastal Plain⁷, which occupies approximately 9.5 million acres along the coast of Texas. Gulf Coast prairies are nearly level, slowly drained, less than 150 feet in elevation, and intersected by streams and rivers flowing into the Gulf of Mexico. Vegetation is primarily grassland, but oak scrub has become much more extensive at the expense of grassland. Most of the low-lying land in this region has been converted to rice cropland. It is estimated that as much as 99 percent of coastal prairies in Texas have been converted to agricultural land^{8,9}. The majority of contiguous land use in this region consists of row-crop agriculture, especially rice field, and improved pasture.

Coastal wetlands support a diversity of bird life, especially wading birds and migrating songbirds. The Sabine Lake watershed receives some of the highest rainfall amounts in the state, contributing a substantial amount of freshwater to Sabine Lake. Land surrounding Sabine Lake is characterized by immense areas of marshland. Providing additional hydrologic connectivity to Sabine Lake would be highly beneficial to this important ecological region.

By restoring PC cropland to the historic coastal wetland prairie ecosystem, this compensatory mitigation project will increase habitat complexity in the area allowing for additional wildlife refuge and the restoration of hydrologic connectivity of the land to major waterways.

⁷ U.S. Environmental Protection Agency, 2013, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA - National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

⁸Gould, F.W. 1975. Texas Plants-A Checklist and Ecological Summary. Texas Agricultural Experiment Station, Publication 585.

⁹McMahan, C.A., R.G. Frye, and K.L. Brown. 1984. The Vegetation Types of Texas Including Cropland, an Illustrated Synopsis to Accompany the Map. Texas Park and Wildlife Department. Austin, Texas.

5.2 Historical Ecological Characteristics

The project site has functioned as agricultural rice field since at least 1937. According to the National Resource Conservation Service (“NRCS”), prior to its conversion to agricultural land, the site functioned as coastal prairie with the following characteristic native plants¹⁰:

- Little Bluestem (*Schizachyrium scoparium*)
- Florida Paspalum (*Paspalum floridanum*)
- Yellow Indiangrass (*Sorghastrum nutans*)
- Big Bluestem (*Andropogon gerardii*)
- Brownseed Paspalum (*Paspalum plicatulum*)
- Switchgrass (*Panicum virgatum*)
- Eastern Gamagrass (*Tripsacum dactyloides*)
- Knotroot Bristlegrass (*Setaria parviflora*)

5.3 Current Ecological Characteristics

The site currently consists of PC cropland located within the 100-year floodplain of Pignut Gully. The main function is agricultural rice field. Exhibit 2 in Attachment 1 depicts land use of the project site according to the National Land Cover Database¹¹ data from 2011. Although the project site has been designated as PC cropland, the National Wetlands Inventory¹² identifies the project site as freshwater emergent wetland (Attachment 1, Exhibit 3).

5.3.1 Site Topography

According to a review of United States Geological Survey (“USGS”) topographic maps, the project site is flat and drainage flows gently to the north towards Pignut Gully. Refer to Attachment 1,

¹⁰ United States Department of Agriculture, Soil Conservation Service. 1976. National range handbook. Washington, DC.

¹¹ Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States- Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354

¹² U. S. Fish and Wildlife Service. Publication date (1993). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. <http://www.fws.gov/wetlands/>

Exhibit 4 for a topographic overview map of the project site. Exhibit 5 depicts additional elevation data for the project site.

5.3.2 Site Hydrology

The proposed mitigation site is located in the Sabine Lake watershed (HUC8 12040201), where several water conveyances (Pignut Gully, North Fork Taylor Bayou, and South Fork Taylor Bayou) drain surface runoff to Sabine Lake. According to the Federal Emergency Management Agency (“FEMA”) mapped 100-year floodplains, the northern section of the proposed mitigation site is within the Pignut Gully 100-year floodplain (Attachment 1, Exhibit 6). On-site hydrology has been modified with man-made ditches to support rice cropland.

5.3.3 Site Soils

According to a review of the NRCS Web Soil Survey database, there are two soil types on the proposed mitigation site (Attachment 1, Exhibit 7): Labelle silt loam (“LeA”) and Barnett silty clay loam (“BeA”). Historically, the soils in this area supported prairie and marsh ecosystems; however, the land currently functions as rice cropland. Although no mapped soils onsite are classified as hydric, the LeA and BeA soils are poorly drained and may exhibit hydric characteristics if a hydrologic regime is restored. Low surface runoff due to the clay soils and a seasonal high water table create conditions for water retention. These soils would be ideal for establishing habitat for a variety of mammals, birds, crustaceans, gastropods, and reptiles.

5.4 Threatened and Endangered Species

A review of the Texas Natural Diversity Database¹³ (“TXNDD”) maintained by Texas Parks and Wildlife and the US Fish and Wildlife Service indicate that no suitable habitat exists on-site for federally listed threatened or endangered species. The project presents an opportunity to provide refuge for terrestrial and aquatic plant and animal life, especially migratory birds and waterfowl, in an area that has reduced habitat complexity due to agriculture.

¹³ Texas Natural Diversity Database. (2015). Element Occurrence data export. Wildlife Diversity Program of Texas Parks & Wildlife Department. (5 November 2015).

5.5 Cultural Resources

A desktop review of the US Environmental Protection Agency's ("EPA") NEPAssist database¹⁴ indicated no known properties on the site that are listed on the National Register of Historic Places. Field reviews indicate no structures are present onsite.

¹⁴ <https://nepassisttool.epa.gov/nepassist/nepamap.aspx>

6.0 Determination of Credits

This PRM Plan will mitigate for unavoidable impacts to aquatic resources by providing functions and services similar to those provided by the impacted area. To ensure the function and value of impacted wetlands are adequately compensated for, the USACE Galveston District's interim hydrogeomorphic modeling ("iHGM") was used to calculate compensation requirements. The purpose of the HGM is to provide a rapid assessment of the current function of a given aquatic resource. The fundamental unit for evaluating impacts is the Functional Capacity Index ("FCI"). Four iHGM models exist, specific to different classifications of wetlands. The forested riverine iHGM and herbaceous riverine iHGM were used to determine the ecological value of services lost as a result of the project impacts and gained by construction of the proposed mitigation site.

The forested riverine iHGM and the herbaceous riverine iHGM use the following sub-indices to determine FCI values: biota, physical, and chemical. The FCI value of each sub-index is calculated by incorporating data obtained from several field variables into specific equations. The mean value of these FCIs for each wetland assessment area is multiplied by the acreage of the aquatic system to determine the FCU of the wetland. Based on the iHGM analysis, it was determined that the construction of 11.4 acres of PEM wetlands and 6.8 acres of PFO wetlands will fully compensate for wetland impacts. Proposed mitigation efforts will fully compensate for all wetland impacts per the table below. Detailed iHGM results are provided in Attachment 2.

Table 6-1 Summary of iHGM Results

Function Type	Impact/ Restoration FCU Δ		
	PEM Fill	PFO Fill	PFO Conversion
Physical Function	2.40	0.02	0.02
Biological Function	0.04	0.15	0.20
Chemical Function	0.98	0.35	1.41

7.0 Mitigation Work Plan

7.1 Reference Site

A due diligence effort was conducted to locate a nearby high quality reference area for reference to the mitigation work plan; however, no suitable reference areas were found in the watershed.

7.2 Site Restoration Plan

Ecological site restoration will be accomplished through cessation of all agricultural practices (e.g., artificial drainage, crops, interior fencing), returning the soil surface to natural topography, site planting preparation, and planting native wetland species. Exhibit 8 of Attachment 1 depicts the proposed conceptual mitigation design plan. Hydrologic restoration will increase surface water retention and soil saturation. The plant communities will be restored as PFO and PEM communities. The PFO mitigation area will be planted with an assemblage of native wetland tree and shrub species. The PEM mitigation area will be seeded with a mixture of commercially available coastal prairie species (i.e. grasses, graminoids, and forbs, see Section 7.2.4). Physical, chemical, or mechanical means will be used to eliminate existing pasture grasses and invasive/exotic vegetation (e.g., species currently listed by the Texas Invasives Database¹⁵). The mitigation sponsor anticipates that no short or long-term structural management requirements will be required to sustain wetland hydrology.

7.2.1 Hydrology Restoration

The majority of the site proposed for compensatory mitigation currently exhibits wetland hydrology. The site consists of small agricultural drainage ditches and small remnant levees. Hydrology restoration of the property will require filling agricultural drainages with in-situ earthen material and degrading any remnant agricultural levees to reconnect the natural drainage to Pignut Gully.

¹⁵ http://www.texasinvasives.org/invasives_database/.

7.2.2 Site Preparation

Preparation for seedling planting within the PFO will be accomplished by herbicide applications, prescribed burning, and sub-soiling¹⁶. Herbicides will be applied in accordance with state and federal law to control invasive species. During dry conditions in the late summer-fall, a tractor-pulled, sub-soiling device will cut 18-inch deep furrows into the soil surface at approximately 9-foot intervals. With the onset of typical late-fall, early-winter rains, the rows formed along the furrows will settle and create ideal seedling planting beds without interrupting surface sheet flow.

Site preparation for seeding of the PEM will include herbicide applications and prescribed fire to remove exotic/noxious pasture grasses. In order to allow the seeds to contact mineral soils and germinate, a heavy cultipacker will be passed through the property prior to and after seeding. Soil tests will be conducted to test for pH compatibility and soil amendments will be added if needed.

7.2.3 Palustrine Forest Restoration

The proposed plant species for afforestation have a wetland indicator status of facultative (“FAC”), facultative wetland (“FACW”), or obligate (“OBL”) per the Atlantic and Gulf Coastal Plain (“AGCP”) Region¹⁷. Species selected either occur in or have a native range encompassing Jefferson County or adjacent counties¹⁸. The planting effort will integrate fast-growing soft mast species with slower-growing hard mast species to allow for greater vertical structural diversity, which is a necessary habitat for forest breeding birds¹⁹. The exact species and quantities for planting will be determined by the availability of the species from commercial nurseries providing seedling. Seedling planting density will be at a rate of at least 538 stems per acre, utilizing 9’x9’ spacing, and seedlings will be planted utilizing raised beds to encourage survival.

Single stem planting of PFO species will occur the first planting season (December through February) following site preparation. Selected species will be site-appropriate for habitat design, soil-moisture regime, species richness, and commercially available. The table below summarizes

¹⁶ Allen, J.A., B.D. Keeland, J.A. Stanturf, A.F. Clewell, and H.E. Kennedy (2001 [rev. 2004]). A guide to bottomland hardwood restoration: US Geological Survey, Biological Resources Division Information and Technology Report USGS/BRD/ITR-2000-0011. USDA Forest Service, Southern Forest Research Station, General Technical Report SRS-40, 132 pp.

¹⁷Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X

¹⁸ <http://texastreeid.tamu.edu/content/>.

¹⁹ Twedt, D.J. & Loesch, C.R. (1999). Forest area and distribution in the Mississippi alluvial valley: implications for breeding bird conservation. *Journal of Biogeography*, 26, 1215-1224.

the potential species proposed for PFO restoration. No more than 20 percent of the total proposed seedling distribution will comprise of a single species.

Table 7-1 Potential Species Planting List for PFO Restoration

Scientific Name	Common Name	AGCP Wetland Indicator
Softwoods		
<i>Taxodium distichum</i>	Baldcypress	OBL
Hard Masts		
<i>Carya aquatica</i>	Water Hickory	OBL
<i>Carya illinoensis</i>	Pecan	FAC
<i>Quercus laurifolia</i>	Laurel Oak	FACW
<i>Quercus lyrata</i>	Overcup Oak	OBL
<i>Quercus nigra</i>	Water Oak	FAC
<i>Quercus nuttallii</i>	Nuttall Oak	OBL
<i>Quercus pagoda</i>	Cherrybark Oak	FACW
<i>Quercus phellos</i>	Willow Oak	FACW
<i>Quercus texana</i>	Texas Red Oak	FACW
Soft Masts		
<i>Diospyros virginiana</i>	Common Persimmon	FAC
<i>Fraxinus pennsylvanica</i>	Green Ash	FACW
<i>Ulmus americana</i>	American Elm	FAC
<i>Ulmus crassifolia</i>	Cedar Elm	FAC

For management and monitoring purposes, open space (e.g. access trails and a 40-foot wide perimeter buffer) and 40-foot fire lanes will be established between the PFO and PEM areas. The fire lanes could also be used for access. All access trails will be maintained at grade and will not interfere with surface hydrology. No mitigation credits will be generated from the access trails and no adverse effects are anticipated by the continued existence of these open space features.

7.2.4 Emergent Wetland Restoration

The proposed emergent plant species will have a wetland indicator status of FAC, FACW, or OBL²⁰. PEM will be restored by natural colonization and broadcast seeding with a mix of commercially available, herbaceous species common to coastal wet prairie. These grasses,

²⁰Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X

graminoids, and forb seeds are listed and/or described in published information^{21,22} and are summarized in the table below. If any of these species are not commercially available, species may be substituted with USACE approval.

Table 7-2 Potential Species Planting List for PEM Restoration

Scientific Name	Common Name	AGCP Wetland Indicator
Forbs/Herbs		
<i>Ambrosia psilostachya</i>	Cuman Ragweed	FAC
<i>Eryngium yuccifolium</i>	Rattlesnake Master	FAC
<i>Liatris acidota</i>	Sharp Blazing Star	FACW
<i>Linum medium</i>	Stiff Yellow Flax	FAC
<i>Physostegia intermedia</i>	Slender False Dragonhead	FACW
Graminoids		
<i>Andropogon gerardii</i>	Big Bluestem	FAC
<i>Andropogon glomeratus</i>	Bushy Bluestem	FACW
<i>Carex microdonta</i>	Littletooth Sedge	FACW
<i>Fimbristylis puberula</i>	Hairy Fimbry	OBL
<i>Muhlenbergia capillaris</i>	Gulf Muhly	FAC
<i>Panicum virgatum</i>	Switchgrass	FAC
<i>Paspalum floridanum</i>	Florida Paspalum	FACW
<i>Paspalum plicatulum</i>	Brownseed Paspalum	FAC
<i>Paspalum setaceum</i>	Thin Paspalum	FAC
<i>Rhynchospora colorata</i>	Whitetop Sedge	FACW
<i>Rhynchospora latifolia</i>	Tall Whitetop Sedge	FACW
<i>Tridens strictus</i>	Longspike Tridens	FACW
<i>Tripsacum dactyloides</i>	Eastern Gammagrass	FAC

The seed mix will be distributed evenly throughout the PEM mitigation areas. Seeds will be procured from commercially available seed producers in the Texas coastal prairie, in cases where desired species are not available in Texas, seeds may be obtained from southwest Louisiana. No more than 20 percent of the total proposed seed distribution will comprise of a single species. Within one year of seeding, prescribed burning will be applied to control woody growth and

²¹Diamond, D. D., & Smeins, F. E.. (1984). Remnant Grassland Vegetation and Ecological Affinities of the Upper Coastal Prairie of Texas. *The Southwestern Naturalist*, 29(3), 321–334. <http://doi.org/10.2307/3671363>

²²Allain, L., M. Vidrine, V. Grafe, C. Allen, and S. Johnson (2000) *Paradise Lost? The coastal prairie of Louisiana and Texas* (2nd edition). U.S. Fish and Wildlife Service and U.S. Geological Survey (with Coastal Conservation Initiative, Texas). 40 pp.

invasive herbaceous species. Spot-treating with herbicides may be used on colonies of herbaceous and scrub-shrub woody invasive species.

Fire will be the primary tool for establishing and maintaining a healthy PEM ecosystem. Fire disturbance regimes reduce invasive species competition, limits woody encroachment, and increases preferred prairie species²³. Common invasive species for the PEM habitat include Chinese Tallow tree (*Triadica sebifera*), Eastern Baccharis (*Baccharis halmifolia*), Bahiagrass (*Paspalum notatum*), and Brazilian Vervain (*Verbena brasiliensis*).

If needed, the first fire will be conducted during the first winter once the mitigation plan is implemented. Afterwards, burning will be conducted once more after the first year or as needed. Controlled burns will only occur during favorable conditions for safety and smoke management (e.g. wind direction and wind speed). Forty-foot wide fire lanes will be located along the edge of the PEM mitigation area and the PFO wetland. In the event a controlled burn cannot be conducted as scheduled, the site may be mowed in the dormant season in-lieu of fire management. As fire is applied and succession progresses, the desirable perennial native species will colonize and become dominant species.²⁴

²³Allain, L., M. Vidrine, V. Grafe, C. Allen, and S. Johnson (2000) Paradise Lost? The coastal prairie of Louisiana and Texas (2nd edition). U.S. Fish and Wildlife Service and U.S. Geological Survey (with Coastal Conservation Initiative, Texas). 40 pp.

²⁴Allain, L., M. Vidrine, V. Grafe, C. Allen, and S. Johnson (2000) Paradise Lost? The coastal prairie of Louisiana and Texas (2nd edition). U.S. Fish and Wildlife Service and U.S. Geological Survey (with Coastal Conservation Initiative, Texas). 40 pp.

8.0 Maintenance Plan

The applicant will be responsible for all maintenance and management activities. The applicant will consult a regional mitigation specialist and/or the USACE in the event adaptations or revisions to this PRM Plan are required. For the restoration of herbaceous wetlands, maintenance activities will be conducted annually for years 1-5 and in year 7. For the forested wetlands, maintenance activities will be conducted annually for years 1-10 and in year 15.

Should it be determined that natural establishment of vegetative communities is unsuccessful in mitigation areas that require replanting, mitigation site-replanting options will be evaluated. Invasive species will be monitored and controlled during all phases of construction, establishment, maintenance, and monitoring. Any Chinese Tallow trees found on the property will be sprayed with herbicide and/or mechanically cleared. The restored wetlands will be protected as needed by temporarily installed construction or wire fencing to prevent grazing of species such as nutria or other fauna. No vehicular traffic will be allowed to transverse the restoration areas preventing soil compaction, plant mortality, and/or seed dispersal. Fencing will be installed around the perimeter to prohibit people and vehicles from entering the restored wetlands. The fencing type to be installed will be chosen so that it would also exclude domestic animals from entering the wetlands and disturbing vegetation and native wildlife. Topographic features, such as streams, may also be utilized to control access in lieu of fencing. Additionally, a fire lane of bare ground will be installed around the mitigation area to prevent the spread of fire. Replanting will occur if any significant event occurs that prevents coverage of vegetation from meeting the predetermined performance standards.

If initial establishment of wetland vegetation and hydrology is unsuccessful, the applicant will follow contingencies outlined in Section 12.0 of this plan.

9.0 Performance Standards

9.1 PEM Wetlands

The PEM wetland restoration area will be considered successful if annually, and at the end of 7 years from planting activities, the following conditions are met:

- 80 percent areal coverage throughout the designated wetland restoration area
- Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species

If these requirements are not satisfied, additional planting of approved species and maintenance will be required. The area will then be monitored for one additional year to establish performance standards. This will be repeated until the wetland restoration area meets the required performance standards.

9.2 PFO Wetlands

The PFO restoration area will be considered successful if annually, and at the end of 15 years from planting activities, the following conditions are met:

- A survival rate of at least 56 percent (300 seedlings/trees per acre) for areas planted with bottomland hardwood species
- Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species

By year 15, the surviving seedlings/trees planted are expected to achieve tree-canopy closure and contain less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species. If these requirements are not satisfied, additional planting of approved species will be required to accomplish the requirements. The area will then be monitored for one additional year to establish performance standards. This will be repeated until the wetland restoration area meets the required performance standards.

10.0 Monitoring Requirements

10.1 Monitoring Methods

Monitoring requirements for the compensatory mitigation area will adhere to the 2008 Final Compensatory Mitigation Rule and the USACE Regulatory Guidance Letter 08-03.

For the herbaceous wetlands, monitoring will be conducted annually in years 1-5 and in year 7. For the forested wetlands, monitoring will be conducted annually in years 1-10 and in year 15.

Monitoring events will be conducted on an annual basis for years 1-5 after all mitigation activities are complete. Additional monitoring will occur in year 7 for PEM wetlands and years 6-10 and year 15 for PFO wetlands. Monitoring events will occur annually past the monitoring period only if the mitigation site does not meet performance standards during that time.

Performance standards of the compensatory mitigation area will be evaluated annually. The assessment of wetland vegetation establishment will be determined by a visual assessment of pre-established sample plots located in the restored wetlands. The location of each of these sample plots will be randomly determined, but will remain fixed for all subsequent monitoring events. This will allow for an accurate determination of the progress of the wetland as it matures, and will limit variation in assessment results due to site-specific differences.

10.2 Monitoring Reports

An as-built mitigation monitoring report, detailing the site conditions immediately after completion of construction, will include a project description, project history, aerial photographs, as-built drawings, and site photographs. The as-built mitigation monitoring report will be submitted to the USACE within three months after all construction and planting activities are complete. Thereafter, the site will be monitored annually for five years for PEM and PFO wetlands, in year 7 for PEM, and in years 6-10 and 15 for PFO wetlands.

All subsequent annual monitoring reports will include descriptions of the entire proposed mitigation site. The annual monitoring reports will describe the results of the quantitative assessment of vegetative cover, provide photographic documentation of the mitigation sites, discuss results in comparison to performance standards, and if needed, provide

recommendations for corrective actions that might be necessary to compensate for deficiencies. Annual monitoring reports will be submitted to the USACE by November 15th of each year.

10.3 Achievement of Performance standards

Once the proposed mitigation sites have been determined to have met the minimum performance standards, the USACE will be notified in writing within 30 days of the last monitoring event that the mitigation plan has met minimum success. If the performance standards are not met at the scheduled times after initial planting activities and during the first three years of monitoring of the restoration area, areas in need of rehabilitation will be improved via the methods outlined in Section 8.0 of this PRM Plan.

Should any condition be observed that is indicative of a problem at the proposed mitigation sites, the condition will be evaluated and a solution will be recommended in the annual monitoring reports. Solutions may include the installation of predator barriers, installation of additional vegetation, adjusting site elevations, or other solutions that are dependent on the site and situation. Should undesirable plant species threaten the proposed projects; these species will be removed manually or mechanically by industry-approved methods that will not harm wildlife or aquatic resources.

Should any corrective action be required during the monitoring and maintenance period, the applicant will implement the appropriate mitigation action in order to assure that project performance standards are achieved.

All monitoring reports will be submitted to:

United States Army Corps of Engineers
Galveston District – Compliance Division
2000 Fort Point Road
Galveston, TX 77550

The applicant is the responsible party for conducting the monitoring. The applicant may choose to hire an environmental consultant to perform the monitoring, analyze the data collected, and prepare a monitoring report in accordance with this PRM Plan. The applicant is the responsible party for providing the monitoring reports to the USACE, at the address listed above, unless otherwise directed by the USACE.

11.0 Long Term Management Plan

After performance standards have been achieved and the mitigation areas have met all performance standards, long-term management is needed to ensure the sustainability of the resource. GTP will be the responsible party for long-term management of the mitigation area and will provide the necessary funds for maintenance activities, such as controlling invasive species and providing security to the site. The Final Mitigation Monitoring Report for the proposed project will include a description of management needs and the funding mechanism that will be used to meet those needs. Additional details are located in Section 4.0 of this PRM Plan.

11.1 Force Majeure

Nothing herein shall be construed to authorize proceedings against the mitigation sponsor for any damages to the project site caused by acts of God such as earthquake, fire, flood, storm, war, civil disturbance, strike, or similar causes. In the event of a force majeure event, the mitigation sponsor will notify the USACE and work with the USACE to resolve the damages, if any, caused by the event. However, if the acts of God do not preclude the mitigation sponsor from resuming mitigation operations without unreasonable expense, then it shall not be relieved of its obligations under this document.

11.2 Water Rights

The mitigation activities associated with the restoration of functional PEM and PFO wetlands will not require the use of public water or a Texas Commission on Environmental Quality (“TCEQ”) Water Use Permit since the wetlands restored will not create a reservoir or off-channel reservoirs that artificially store, hold, retain, or divert water from state water sources (i.e., surface or subsurface). Furthermore, there will not be any construction features on the property that direct, divert, or cause the retention of flood waters (i.e. all berms, dikes, and ditches will be removed). The hydrologic restoration of the property includes filling and leveling of internal agricultural drainage to natural elevation. Any water that may naturally flow onto or through the property will not be diverted or retained by any constructed surface features. As such, long-term hydrology maintenance will not depend on the utilization of water captured from irrigation wells or a Texas public water system; therefore, water rights will not be required.

11.3 Mineral Rights

Valuable mineral resources may exist under the land proposed for mitigation in this PRM Plan; however, the sponsor, GTP, does not own any subsurface mineral rights for the property. Recognizing that surface landowners in the State of Texas cannot wholly control access to subsurface minerals, if a third party intends to explore for minerals within the proposed PRM project site, the third party will be requested to permit and compensate for any surface impacts to the PRM project and the relocation of the mitigation project under terms that will be outlined in the conservation easement.

11.4 Eminent Domain

In the event all or part of this property is taken by exercise of the power of Eminent Domain or acquired by purchase in lieu of condemnation, whether by public, corporate, or other authority, so as to terminate the conservation easement in whole or in part, the conservation easement sponsor is entitled to the fair market value of the property to recover the full value of the interests taken in order to replace lost wetland mitigation credits with in-kind mitigation credits.

12.0 Adaptive Management Plan

Adaptive management is a strategy to address unforeseen changes in site conditions (e.g. drought, natural disasters) or other components of the compensatory mitigation project. If the compensatory mitigation project cannot be constructed in accordance with the approved PRM Plan, or if performance standards are not being met as anticipated, the permittee must notify the USACE with approval required for any significant modification of the PRM Plan. Performance standards may be revised in accordance with adaptive management to account for measures taken to address deficiencies in the mitigation project.

For the proposed mitigation areas, adaptive management may include the following measures:

- Plant additional wetland vegetation species in areas where new growth is inadequate
- Adjust site conditions to improve hydrologic conditions
- Improve or enhance erosion control measures
- Provide for additional access restrictions and revise monitoring schedule if human or domestic animal disturbance is impacting the site

The Final Mitigation Monitoring Report for the proposed project will include additional adaptive management details and guidelines for implementation.

Adaptive management is a key component of this PRM Plan that provides for ongoing evaluation and changes to the mitigation measures, as needed, to satisfy required compensation for impacts to waters of the US, including wetlands. The applicant will be responsible for implementing adaptive management to achieve mitigation success.

13.0 Financial Assurances

Financial assurance for mitigation project success can be defined as a mechanism that ensures that a sufficient amount of money will be available for use to complete or replace a mitigation provider's obligations to implement a required mitigation project and meet specified ecological performance standards in the event that the mitigation provider proves unable or unwilling to meet those obligations. This financial assurance plan ensures that the mitigation project will be successfully completed and meet the USACE's established performance standards.

13.1 Applicability

GTP understands the risk associated with mitigation projects. Mitigation projects are complex and final outcomes can be uncertain even when mitigation providers fully implement approved mitigation plans. Because of the uncertainty that a mitigation project is completed, GTP proposes this financial assurance plan.

13.2 Financial Assurance Instruments

13.2.1 Construction Security

The permittee shall furnish to the USACE a Construction Security in the amount of 100 percent of a contract to restore wetlands on the permittee's property. The Construction Security shall be in the form of a letter of credit or a performance bond. The permittee shall ensure that the full amount of the Construction Security shall remain in effect throughout the performance of construction and planting to create, restore, or enhance wetlands on the permittee's property.

The letter of credit or performance bond shall be submitted to and approved by the holding agency before they satisfy any financial assurance requirement. Any letter of credit or performance bond shall be issued for a period of at least one year, and shall provide that the expiration date will be automatically extended for at least one year on each successive expiration date unless, at least 120 days before the current expiration date, the permittee and the holder have received notice from the issuing institution of its decision not to extend the expiration date, as evidenced by the return receipts. The letter of credit or performance bond shall provide that any unused portion shall be available for 120 days after the date the permittee and the holder have received such notice, as shown on the signed return receipts. If the issuer fails to extend the expiration date of

any letter of credit or performance bond, the permittee shall provide the holder with replacement security in the form of a letter of credit, performance bond, or cashier's check, as determined by the holder, within 60 days after receiving notice of the issuer's failure to extend. If the permittee does not provide such replacement security on or before the expiration of the 60-day period, then the holder shall have the right to immediately draw upon the letter of credit or performance bond for which the replacement security was required.

13.2.2 Performance Security

Upon completion of the initial construction and planting, the permittee shall set up and fund a foundation that will provide the USACE with a Performance Security mechanism. In the event that the permittee does not fulfill its responsibilities set forth in this plan, the USACE will have access to the monies in the foundation account to provide for the expected costs of maintenance and monitoring over the required 15-year period. If the required monitoring or maintenance is not conducted by the permittee as specified in Sections 8.0 and 10.0 of this plan, then the USACE shall request release of funds to a USACE agency or its designee from this foundation sufficient to cover the necessary monitoring or maintenance activities.

Over the first 15 years of the required maintenance and monitoring period, a portion of this fund, per Table 13-1, shall be released annually by the foundation to the permittee on January 1 of each year following the submission of the previous year's monitoring report that documents that part or all of the restoration portion of the project satisfies the plan's Performance standards.

13.2.3 Long Term Management Funding

The USACE intends that the project and its functions and values be self-sustaining and not require any more long-term maintenance and monitoring than similar areas occurring naturally. Following year 15, the permittee will provide the foundation with additional funds to allow for the perpetual management of the mitigation site. The itemized analysis of the necessary funds may include, but is not limited to, expected long-term management costs that are required after the initial 15-year monitoring period, such as posting, fencing, maintenance of structures, control of invasive species, and legal defense of any easements or restrictive covenants recorded to protect the permittee's property.

These funds shall be placed in a federally insured financial institution in an interest bearing account. It is expected that the interest generated in this account would provide a perpetual source of funding that would allow for the responsible conservancy to maintain the site in perpetuity. No Long-Term Management funds shall be used to finance any expense or activity other than those specified in the Long-Term Management Plan for long-term maintenance and management of the project unless approved by the USACE.

13.3 Amount of Financial Assurances

13.3.1 Amount of Construction Security

The permittee will take out a letter of credit or performance bond to complete the construction and planting phase of the project. The tasks required to complete this phase of the project includes the acquisition of land, background studies and planning (geotechnical survey, wetland delineation and functional assessment, topographical surveys, civil design), construction, planting, security and fencing, and the establishment of the conservation easement and associated legal fees. The total cost of these construction activities is estimated to be \$182,000.

13.3.2 Amount of Performance Security

The following table provides an estimate for the amount of the foundation account that the permittee will establish along with an itemized list of tasks that will be required to complete the required 15-year maintenance and monitoring phase of the project. It is assumed that invasive species maintenance along with annual monitoring in PFO wetlands will be required for Years 1 through 10. After Year 15, it is expected that canopy closure will have occurred and that the frequency of maintenance and monitoring events will be significantly reduced where one additional maintenance and monitoring event in Year 15 is anticipated to be necessary at the end of the required 15-year monitoring period.

For the PEM wetlands, the required monitoring period will be 7 years in length. It is anticipated that invasive species maintenance along with annual monitoring in emergent wetlands will be required for Years 1 through 5. After Year 5, it is expected that the coverage of native vegetation will have significantly limited the ability for invasive species to thrive and that the frequency of maintenance and monitoring events will be significantly reduced where one additional maintenance and monitoring event in Year 7 is anticipated to be necessary at the end of the required 7-year monitoring period.

Fence maintenance is not assumed to be required in the first 15 years following installation. Remedial Action costs to cover maintenance, repair, or other fine tuning of berms and/or replanting of vegetation is also included in the estimate. The permittee will provide the foundation with a donation of \$140,140 upon completion of the construction and planting. These funds will then be released back to the permittee on an annual basis.

Table 13-1 Amount of Performance Security

Year	Annual Inspection	Maintenance and Invasive Control	Monitoring and Reporting	Security and Remedial Actions	Amount to Be Released
Year 1	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 2	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 3	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 4	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 5	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 6	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 7	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 8	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 9	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 10	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Year 15	\$1,820	\$3,640	\$6,370	\$910	\$12,740
Totals	\$20,020	\$40,040	\$70,070	\$10,010	\$140,140

13.3.3 Long Term Management Fund Amount

The sponsor, GTP, will maintain a dedicated account in perpetuity. It is expected that the interest on this account would generate the necessary amount of annual funding required to manage the project in perpetuity. The permittee will immediately provide the foundation with a donation of \$106,167 upon completion of the year 15 monitoring report. The foundation will be allowed to access monies up to \$6,370 annually.

Table 13-2 Long Term Management Fund Amount

Item	Amount
Annual Inspection	\$1,820
Maintenance and Invasive Control	\$3,640
Security and Remedial Actions	\$910
Annual Total	\$6,370
Foundation Long-Term Management Amount	\$106,167*

* This amount represents the principal necessary to be maintained in perpetuity with a 6% rate of return and an annual withdrawal of \$6,370

14.0 Attachments

1. Figures
2. Impact and Mitigation iHGM Results

Figures





Legend

- EPA Level III Ecoregions
- USGS 8-Digit HUC

PROPOSED PRM PROJECT VICINITY MAP GT OMNIPORT JEFFERSON COUNTY, TEXAS



20465 State Highway 249, Suite 300
Houston, TX 77070

Exhibit No.: 1

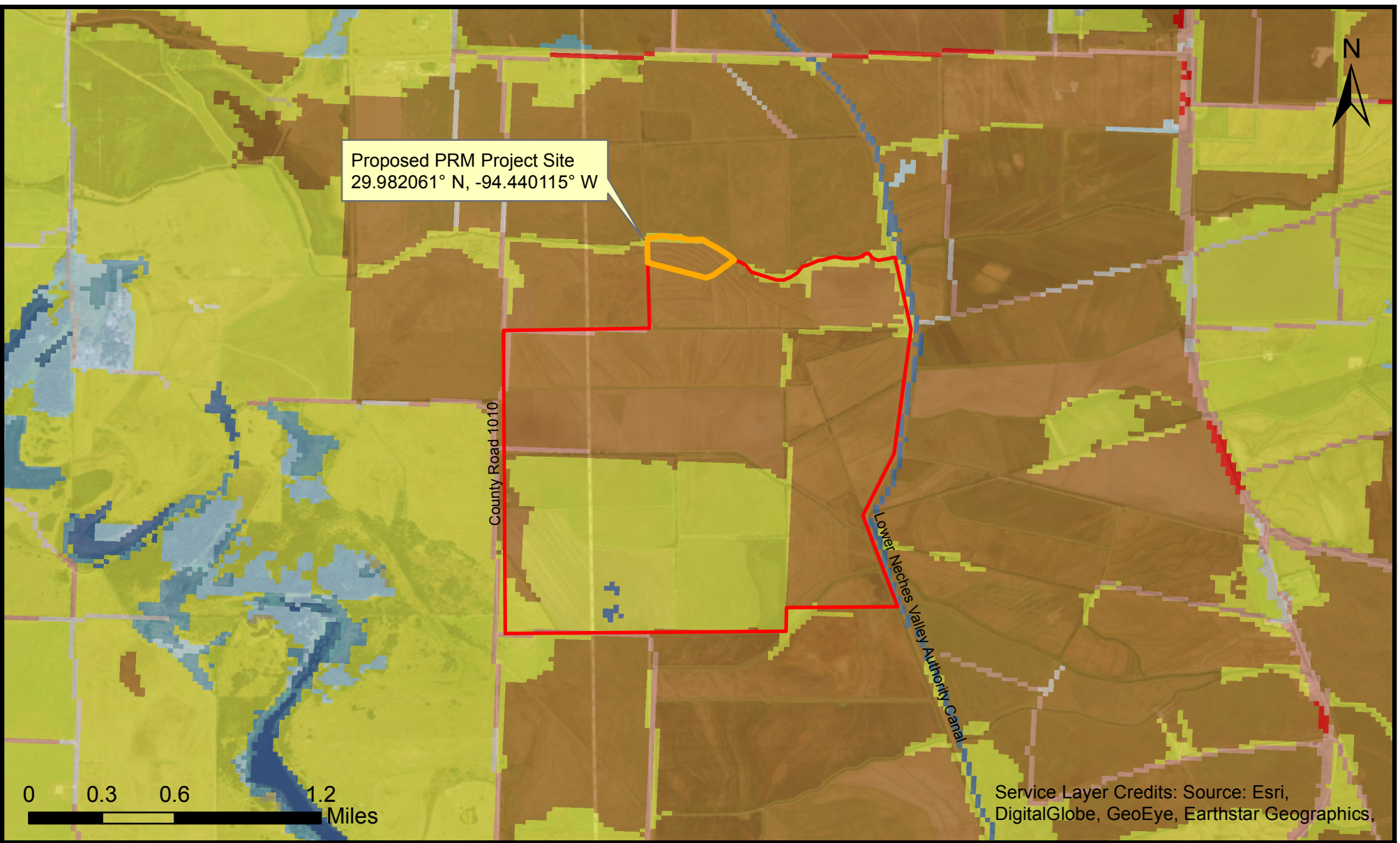
Date: 5/23/2016

Project No.: 15350.01

Drawn By: EVDDonato

Revision No.: 1

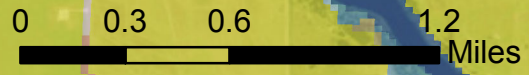
Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Proposed PRM Project Site
 29.982061° N, -94.440115° W

County Road 1010

Lower Neches Valley Authority Canal



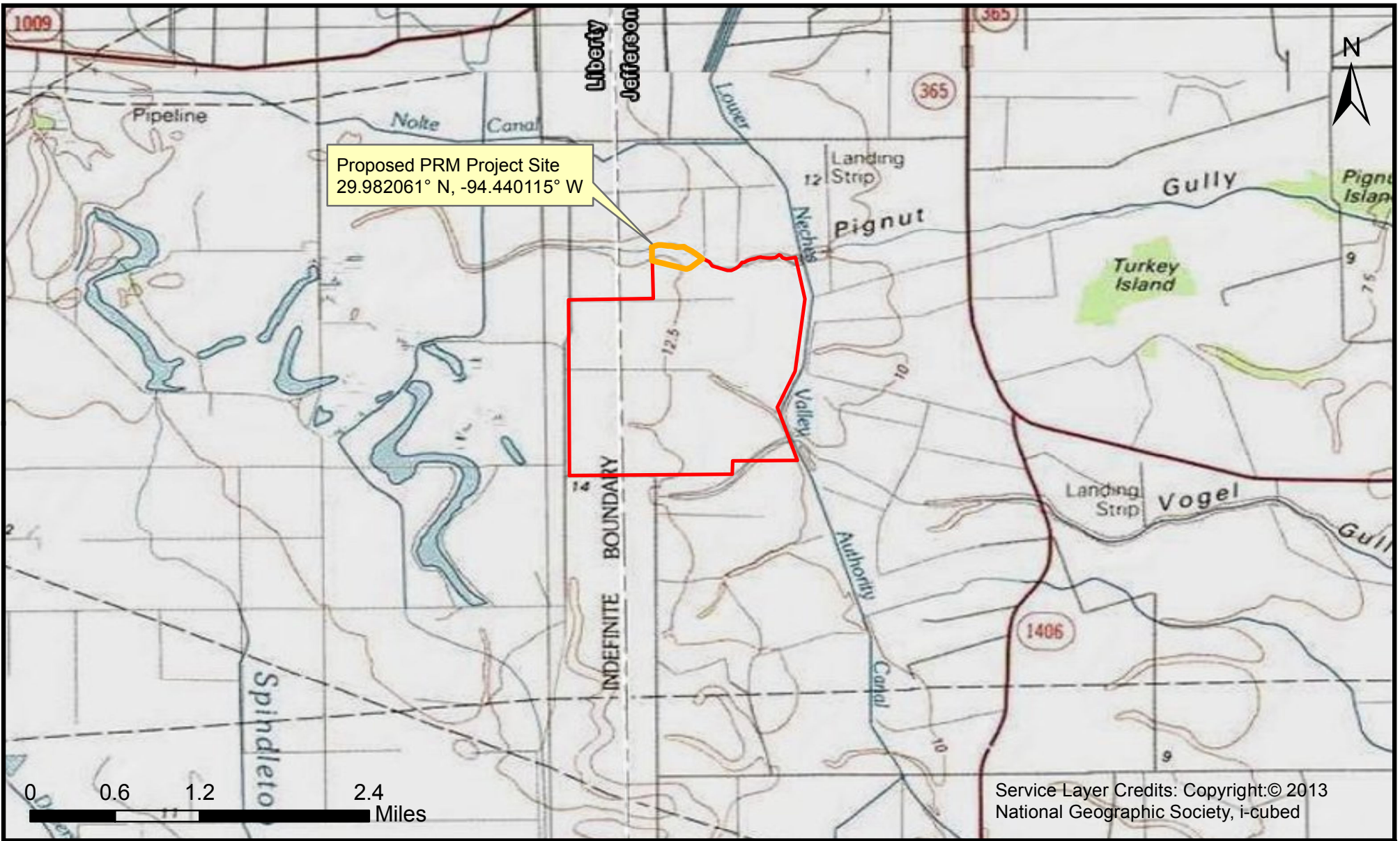
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

Legend	
Proposed PRM Project Site (± 18.2 AC)	Deciduous Forest
Proposed Future Consolidated Mitigation Projects Site (± 1,200 AC)	Evergreen Forest
Land Use	
Unclassified	Mixed Forest
Open Water	Shrub/Scrub
Developed, Open Space	Herbaceous
Developed, Low Intensity	Hay/Pasture
Developed, Medium Intensity	Cultivated Crops
Developed, High Intensity	Woody Wetlands
Barren Land	Emergent Herbaceous Wetlands

**PROPOSED PRM PROJECT
 LAND USE MAP
 GT OMNIPORT
 JEFFERSON COUNTY, TEXAS**

20465 State Highway 249, Suite 300
 Houston, TX 77070

Exhibit No.: 2
Date: 5/20/2016
Project No.: 15350.01
Drawn By: EVDDonato
Revision No.: 1
Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Proposed PRM Project Site
 29.982061° N, -94.440115° W

0 0.6 1.2 2.4 Miles

Service Layer Credits: Copyright:© 2013
 National Geographic Society, i-cubed

Legend

- Proposed PRM Project Site (± 18.2 AC)
- Proposed Future Consolidated Mitigation Projects Site (± 1,200 AC)

**PROPOSED PRM PROJECT
 TOPOGRAPHIC OVERVIEW MAP
 GT OMNIPORT
 JEFFERSON COUNTY, TEXAS**



20465 State Highway 249, Suite 300
 Houston, TX 77070

Exhibit No.: 4

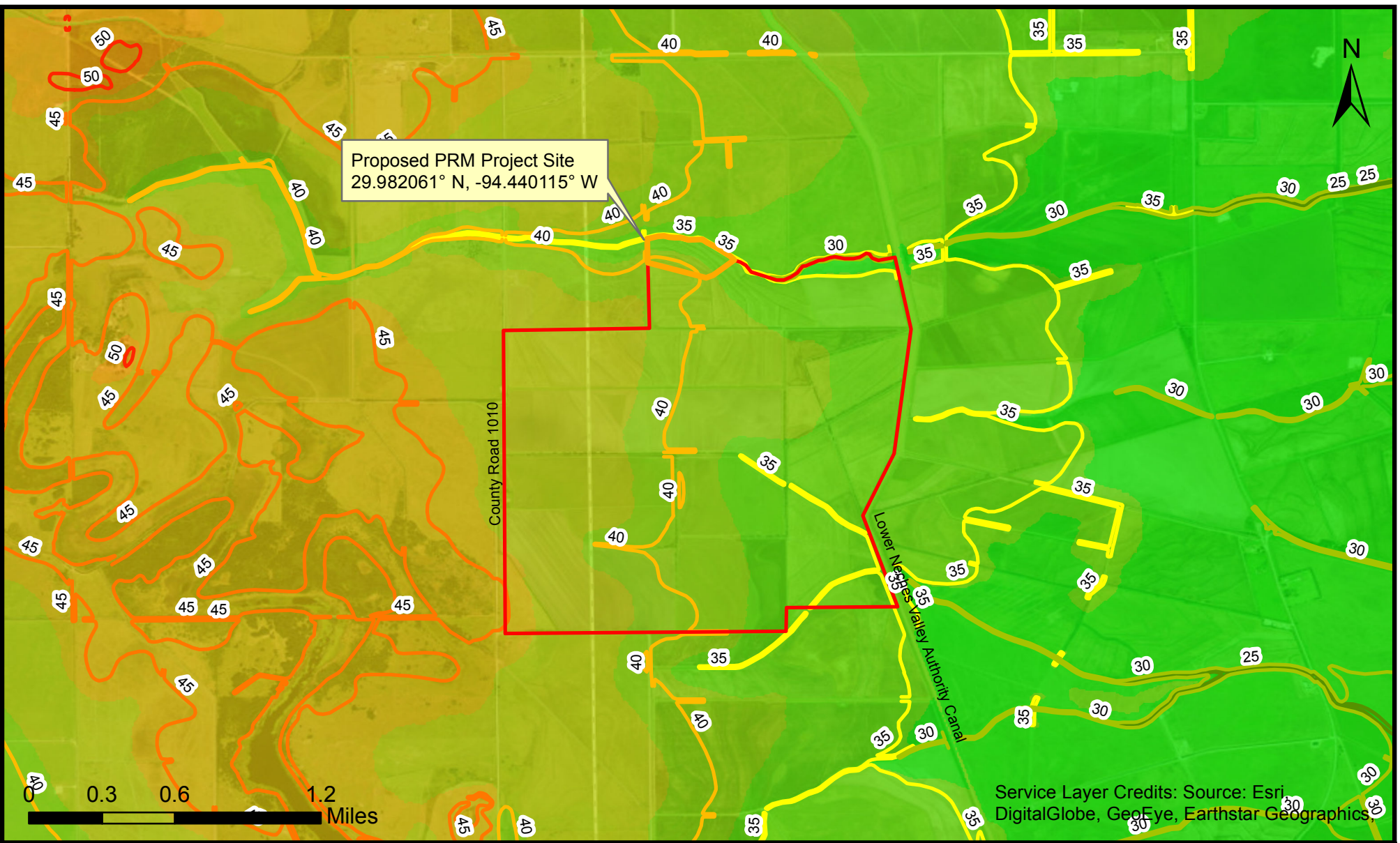
Date: 5/20/2016

Project No.: 15350.01

Drawn By: EVDDonato

Revision No.: 1

Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Proposed PRM Project Site
 29.982061° N, -94.440115° W



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

Legend

Proposed PRM Project Site (± 18.2 AC)
 Proposed Future Consolidated Mitigation Projects Site (± 1,200 AC)

Elevation Contours

20
 25
 30
 35
 40
 45
 50

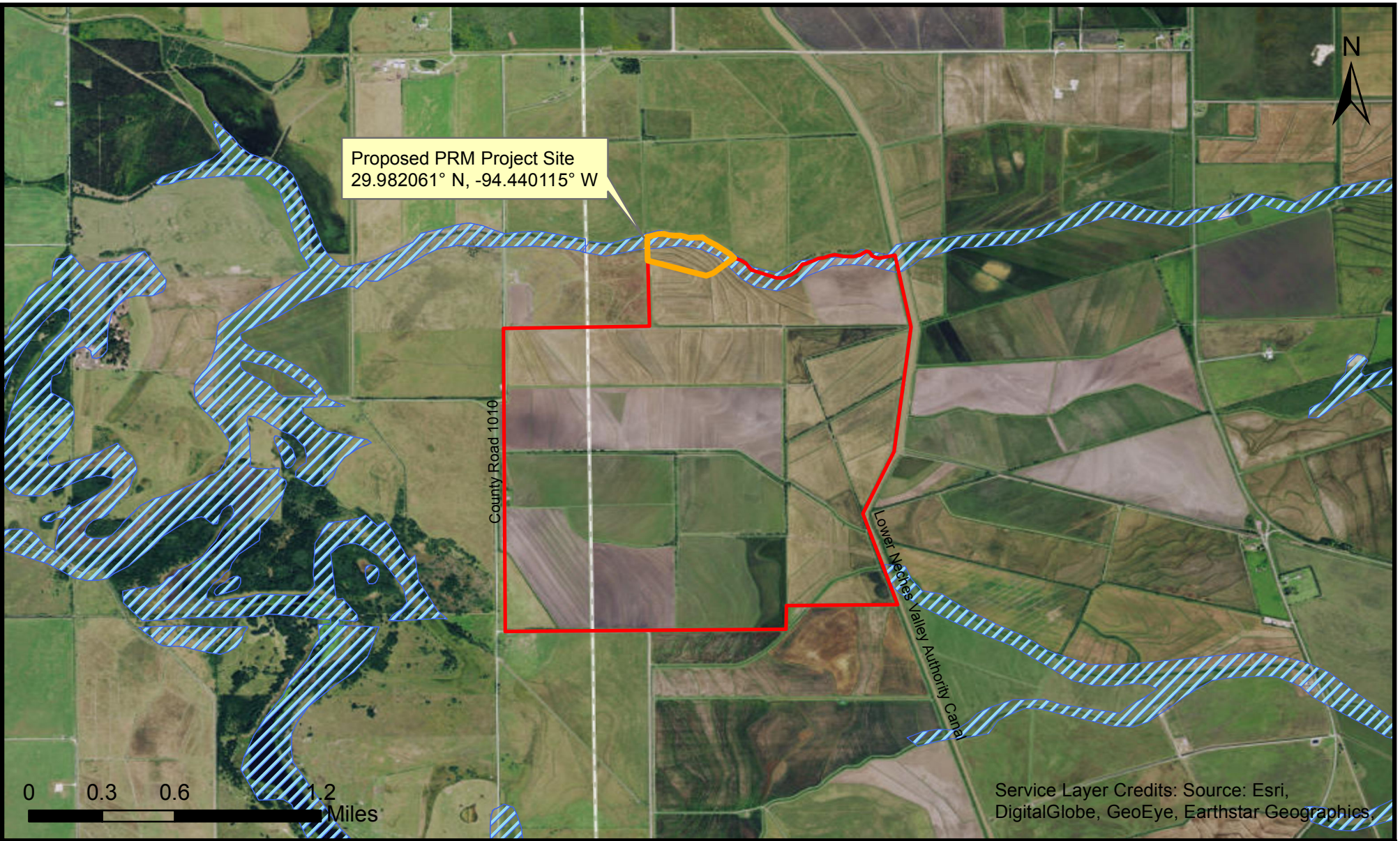
Slope Value

High : 20
 Low : 10

**PROPOSED PRM PROJECT
 ELEVATION MAP
 GT OMNIPOINT
 JEFFERSON COUNTY, TEXAS**

20465 State Highway 249, Suite 300
 Houston, TX 77070

Exhibit No.: 5
Date: 5/20/2016
Project No.: 15350.01
Drawn By: EVDonato
Revision No.: 1
Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Proposed PRM Project Site
29.982061° N, -94.440115° W




County Road 1010

Lower Neches Valley Authority Canal

0 0.3 0.6 1.2 Miles

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics

Legend

-  Proposed PRM Project Site (± 18.2 AC)
-  Proposed Future Consolidated Mitigation Projects Site (± 1,200 AC)
-  100 Year Flood Zone

**PROPOSED PRM PROJECT
FLOOD ZONE MAP
GT OMNIPOINT
JEFFERSON COUNTY, TEXAS**



20465 State Highway 249, Suite 300
Houston, TX 77070

Exhibit No.: 6

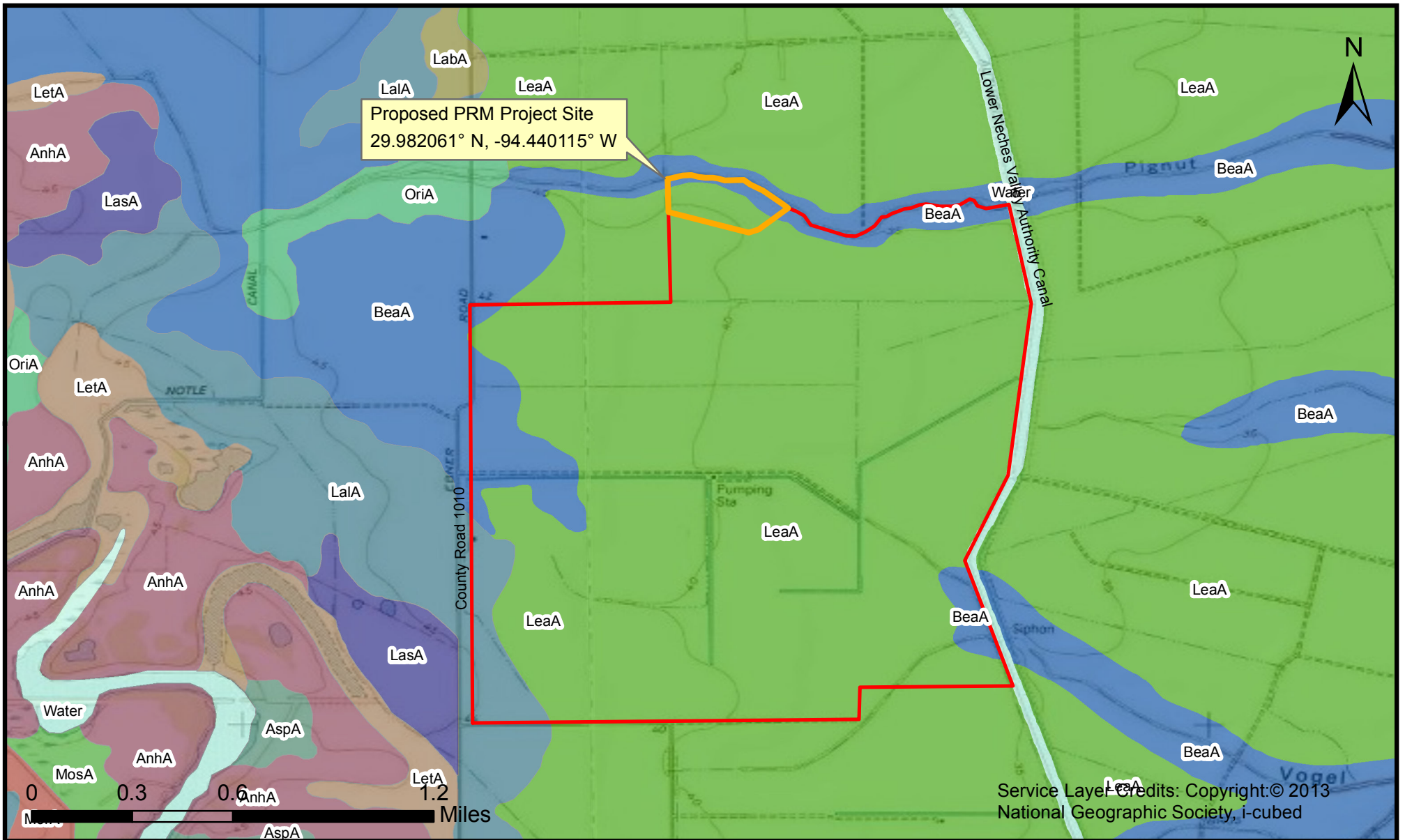
Date: 5/20/2016

Project No.: 15350.01

Drawn By: EVDonato

Revision No.: 1

Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Legend

- Proposed PRM Project Site (± 18.2 AC)
 - Proposed Future Consolidated Mitigation Projects Site (± 1,200 AC)
- NRCS Soil Units**
- | | |
|--|---|
| AnhA | LasA |
| AspA | LeaA |
| BeaA | MorA |
| LabA | MosA |
| LaIA | OriA |
| | Water |

**PROPOSED PRM PROJECT
NRCS SOILS MAP
GT OMNIPOINT
JEFFERSON COUNTY, TEXAS**



20465 State Highway 249, Suite 300
Houston, TX 77070

Exhibit No.: 7

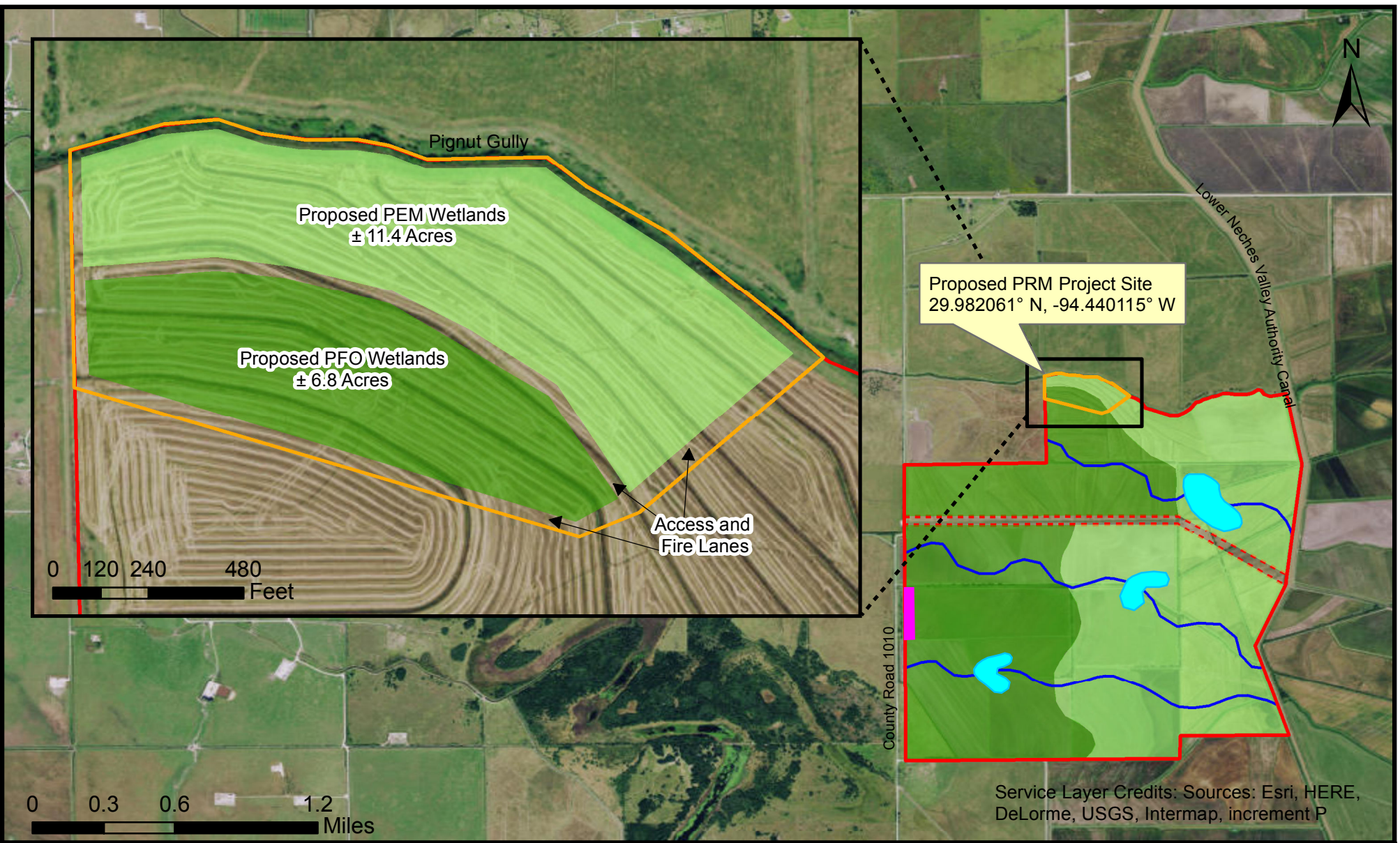
Date: 5/20/2016

Project No.: 15350.01

Drawn By: EVDDonato

Revision No.: 1

Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary is not a part of this PRM Plan and may change depending on approval of future mitigation projects.



Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P

Legend	
	Proposed PRM Project Site (±18.2 AC)
	Proposed Future Consolidated Mitigation Projects Site (±1,200 AC)
	Proposed Utility Corridor
	Maintenance Yard
	Proposed PFO Wetlands
	Proposed PEM Wetlands
	Proposed Other Waters
	Proposed Streams

PROPOSED PRM PROJECT
PROPOSED CONCEPTUAL
MITIGATION DESIGN
GT OMNIPORT
JEFFERSON COUNTY, TEXAS



20465 State Highway 249, Suite 300
 Houston, TX 77070

Exhibit No.: 8
Date: 5/20/2016
Project No.: 15350.01
Drawn By: EVDDonato
Revision No.: 1
Notes: This is not a property boundary survey. The proposed future consolidated mitigation projects site boundary and conceptual design is not a part of this PRM Plan and may change depending on approval of future mitigation projects.

Impact and Mitigation iHGM Results



ATF Filled PEM (9.5 Acres) and Proposed Filled PEM (0.3 Acres)

Impacts to PEM Wetlands

Pre-Construction Conditions			Post-Construction Conditions		
Acres	9.8		Acres	9.8	
Hectares	3.97		Hectares	3.97	
Variable	Subindex		Variable	Subindex	
Vdur	1		Vdur	0	
Vfreq	0.5		Vfreq	0	
Vtopo	0.1		Vtopo	0	
Vwood	0.1		Vwood	0	
Vmid	0.1		Vmid	0	
Vherb	1		Vherb	0	
Vdetritus	0.1		Vdetritus	0	
Vredox	1		Vredox	0	
Vsorpt	1		Vsorpt	0	
Vconnect	0.75		Vconnect	0	
Function Type	FCI	FCU	Function Type	FCI	FCU
Physical Function	0.48	4.70	Physical Function	0.00	0.00
Biological Function	0.62	6.04	Biological Function	0.00	0.00
Chemical Function	0.54	5.29	Chemical Function	0.00	0.00

PEM Wetlands Restoration Efforts

Pre-Construction Conditions			Post-Construction Conditions		
Acres	11.4		Acres	11.4	
Hectares	4.61		Hectares	4.61	
Variable	Subindex		Variable	Subindex	
Vdur	0		Vdur	1	
Vfreq	0		Vfreq	0.25	
Vtopo	0		Vtopo	1	
Vwood	0		Vwood	0.1	
Vmid	0		Vmid	0.1	
Vherb	0		Vherb	1	
Vdetritus	0		Vdetritus	0.1	
Vredox	0		Vredox	1	
Vsorpt	0		Vsorpt	1	
Vconnect	0		Vconnect	0.5	
Function Type	FCI	FCU	Function Type	FCI	FCU
Physical Function	0.00	0.00	Physical Function	0.62	7.10
Biological Function	0.00	0.00	Biological Function	0.53	6.08
Chemical Function	0.00	0.00	Chemical Function	0.55	6.27

Function Type	Impact/ Restoration FCU Δ
Physical Function	2.40
Biological Function	0.04
Chemical Function	0.98

ATF Filled PFO Wetlands (2.7 Acres)

Impacts to PFO Wetlands					
Pre-Construction Conditions					
Acres	2.7				
Hectares	1.09				
			Post-Construction Conditions		
			Acres	2.7	
			Hectares	1.09	
Variable	Subindex				
Vdur	1				
Vfreq	0.5				
Vtopo	0.1				
Vcwd	1				
Vwood	1				
Vtree	0.3				
Vrich	1				
Vbasal	0.4				
Vdensity	1				
Vmid	1				
Vherb	0.3				
Vdetritus	0.3				
Vredox	1				
Vsorpt	1				
Vconnect	0.75				
Function Type	FCI	FCU			
Physical Function	0.70	1.90			
Biological Function	0.73	1.98			
Chemical Function	0.79	2.14			
			Function Type	FCI	FCU
			Physical Function	0.00	0.00
			Biological Function	0.00	0.00
			Chemical Function	0.00	0.00

PFO Wetlands Restoration Efforts					
Pre-Construction Conditions					
Acres	3.1				
Hectares	1.25				
			Post-Construction Conditions		
			Acres	3.1	
			Hectares	1.25	
Variable	Subindex				
Vdur	0				
Vfreq	0				
Vtopo	0				
Vcwd	0				
Vwood	0				
Vtree	0				
Vrich	0				
Vbasal	0				
Vdensity	0				
Vmid	0				
Vherb	0				
Vdetritus	0				
Vredox	0				
Vsorpt	0				
Vconnect	0				
Function Type	FCI	FCU			
Physical Function	0.00	0.00			
Biological Function	0.00	0.00			
Chemical Function	0.00	0.00			
			Function Type	FCI	FCU
			Physical Function	0.62	1.92
			Biological Function	0.69	2.13
			Chemical Function	0.80	2.49

Function Type	Impact/ Restoration FCU Δ
Physical Function	0.02
Biological Function	0.15
Chemical Function	0.35

ATF PFO Converted to PEM (5.2 Acres)

Impacts to PFO Wetlands

Pre-Construction Conditions			Post-Construction Conditions		
Acres	5.2		Acres	5.2	
Hectares	2.10		Hectares	2.10	
Variable	Subindex		Variable	Subindex	
Vdur	1		Vdur	1	
Vfreq	0.5		Vfreq	0.5	
Vtopo	0.1		Vtopo	0.1	
Vcwd	1		Vcwd	0.1	
Vwood	1		Vwood	0.1	
Vtree	0.3		Vtree	0.1	
Vrich	1		Vrich	0.1	
Vbasal	0.4		Vbasal	0.1	
Vdensity	1		Vdensity	0.1	
Vmid	1		Vmid	0.1	
Vherb	0.3		Vherb	1	
Vdetritus	0.3		Vdetritus	0.3	
Vredox	1		Vredox	1	
Vsorpt	1		Vsorpt	1	
Vconnect	0.75		Vconnect	0.75	
Function Type	FCI	FCU	Function Type	FCI	FCU
Physical Function	0.70	3.66	Physical Function	0.27	1.38
Biological Function	0.73	3.81	Biological Function	0.28	1.47
Chemical Function	0.79	4.13	Chemical Function	0.49	2.57

PFO Wetlands Restoration Efforts

Pre-Construction Conditions			Post-Construction Conditions		
Acres	3.7		Acres	3.7	
Hectares	1.50		Hectares	1.50	
Variable	Subindex		Variable	Subindex	
Vdur	0		Vdur	1	
Vfreq	0		Vfreq	0.25	
Vtopo	0		Vtopo	1	
Vcwd	0		Vcwd	0.3	
Vwood	0		Vwood	1	
Vtree	0		Vtree	1	
Vrich	0		Vrich	1	
Vbasal	0		Vbasal	0.4	
Vdensity	0		Vdensity	1	
Vmid	0		Vmid	0.25	
Vherb	0		Vherb	1	
Vdetritus	0		Vdetritus	1	
Vredox	0		Vredox	1	
Vsorpt	0		Vsorpt	1	
Vconnect	0		Vconnect	0.5	
Function Type	FCI	FCU	Function Type	FCI	FCU
Physical Function	0.00	0.00	Physical Function	0.62	2.29
Biological Function	0.00	0.00	Biological Function	0.69	2.54
Chemical Function	0.00	0.00	Chemical Function	0.80	2.97

Function Type	Impact/ Restoration FCU Δ
Physical Function	0.02
Biological Function	0.20
Chemical Function	1.41