

**PERMITTEE RESPONSIBLE MITIGATION PLAN**

**FOR**

**BRIGGS PLANT SAND AND GRAVEL MINING EXPANSION PROJECT**

**IN**

**VICTORIA COUNTY, TEXAS**

**PREPARED FOR**

**FORDYCE HOLDINGS, INC.**

**June 26, 2020**

**PREPARED BY**



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## 1.0 Introduction

Delta Land Services, LLC (DLS) presents this Permittee Responsible Mitigation Plan (PRMP) to compensate for the potential impacts to approximately 59.24 acres of palustrine forested wetland (PFO) and 5.51 acres of native palustrine emergent wetlands (PEM) associated with the development of the proposed Briggs Plant Sand and Gravel Mining Expansion Project (Project), within the U.S. Army Corps of Engineers (USACE) Galveston District (SWG).

The Project wetland impacts are located in the Lower Guadalupe (Hydrologic Unit Code [HUC] 12100204) in Victoria County, Texas. Ecologically, the impacts are located within the Floodplains and Low Terraces Level IV Ecoregion of the Western Gulf Coast Plain Level III Ecoregion (Seaber et al. 1987, Griffith et al. 2007, EPA 2012). The Project location is shown on **Attachment A, Figure 1**.

The preparation of this PRMP was in accordance with USACE regulations for compensatory mitigation for losses of aquatic resources, codified in 33 CFR § 332. More specifically, the contents of the PRMP were designed to satisfy the requirements of 33 CFR § 332.4(c)(2)-(14). The applicant/permittee is Fordyce Holdings, Inc. DLS, acting as the mitigation provider for the Permittee, will implement, monitor, and provide long-term management of the Permittee Responsible Mitigation Area (PRMA) as described in 33 CFR § 332.3(l). Fordyce Holdings, Inc. is the PRMA landowner. Lastly, the Guadalupe-Blanco River Trust will hold the conservation easement. The assessment of unavoidable impacts and the proposed PFO / PEM PRMA utilized the USACE Galveston District (CESWG) Riverine Herbaceous / Shrub and Riverine Forested Interim Hydrogeomorphic models (iHGM).

A 1:1 ratio (i.e., impact function to mitigation function ratio) is utilized to determine the mitigation requirements for the impacts since the PRMA is located within the same watershed and property as the proposed impacts [**Attachment A, Figure 1**]. The mitigation restoration acreage, as determined by the iHGM, is approximately 67.5 acres of PFO / PEM cover type (**Table 2 - 4 and Attachment B**). By the end of Year 10, 61.5 acres of PFO wetlands and 6.0 acres of PEM wetlands will be restored and perpetually protected.

### 1.1 Mitigation Property Location

The 67.5-acre PRMA is adjacent to Blue Bayou and the PRMA is within the bayou's 100-year floodplain (**Attachment A, Figure 2**). The PRMA is located approximately 7.10 miles south of Victoria, Texas within the Lower Guadalupe Subbasin in the Northern Humid Gulf Coastal Plain Level IV Ecoregion within the Western Gulf Coast Plain Level III Ecoregion (Seaber et al. 1987, Griffith et al. 2007, EPA 2012). The approximate centerpoint of the PRMA is Latitude 28.696369° N and Longitude -96.988042° W (UTM 696556 E, 3176004 N).

To access the PRMA from the U.S. Highway (US) 59/ State Highway (SH) 185 interchange in Victoria, TX, proceed south on SH 185 for approximately 1.4 miles then turn west/right onto an unnamed caliche road and proceed 1.7 miles to the PRMA.

**1.2 Property Ownership**

Fordyce Holdings, LLC owns the PRMA and the property encompassing the PRMA. DLS has established a landowner agreement to restore wetlands on Fordyce Holdings’ property, including the PRMA. As the mitigation provider, DLS is a land management and restoration company whose technical staff includes Certified Wildlife Biologists, Professional Wetland Scientists, Certified Foresters, and Certified Ecological Restoration Practitioners. In addition, DLS has construction specialists experienced in wetland construction activities such as heavy equipment operation, vegetation establishment, herbicide application, and contractor management.

**1.3 Description of the Property**

The PRMA is a regularly formed land tract and is located within the Guadalupe River and Blue Bayou 100-year floodplains (**Attachment A, Figure 2**). The PRMA perimeter coordinates are shown in **Table 1** below beginning at the northwest corner of each area and proceeding clockwise.

**Table 1. PRMA Perimeter Coordinates**

<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>
-96.986018	28.693547	-96.983964	28.698138
-96.986074	28.693611	-96.983955	28.697865
-96.986092	28.693631	-96.983933	28.697177
-96.986169	28.693719	-96.983932	28.697142
-96.986199	28.693753	-96.983901	28.696194
-96.987192	28.694880	-96.983899	28.696132
-96.987222	28.694914	-96.983895	28.695997
-96.987830	28.695604	-96.984365	28.695356
-96.990246	28.694149	-96.984590	28.695049
-96.992487	28.696942	-96.984632	28.694992
-96.988735	28.699251	-96.984745	28.694838
-96.986218	28.696625	-96.985873	28.693383
-96.985270	28.697249	-96.986018	28.693547
-96.983995	28.698117		

**1.4 Recorded Liens, Encumbrances, Easements, Servitudes or Restrictions**

The PRMA is not encumbered by easements or rights-of-ways (ROW). There are no other recorded liens, encumbrances, easements, servitudes, or other surface restrictions applicable to the PRMA.

## 2.0 Goals and Objectives

The goal of this PRMP is to restore<sup>1</sup> (rehabilitate<sup>2</sup>) 0.7 acre of PFO wetlands, restore (re-establish<sup>3</sup>) 60.8 acres of PFO wetlands and restore (re-establish) 6.0 acres of PEM wetlands located in the Lower Guadalupe Watershed (Figure 4).

To meet the goals of PFO / PEM restoration, the objectives will consist of the following:

1. permanent cessation of mowing,
2. removal and control of pasture and invasive grasses (e.g., Bermuda grass [*Cynodon dactylon*] and deep-rooted sedge [*Cyperus entrerianus*]), invasive species (e.g., Chinese tallotree [*Triadica sebifera*],<sup>4</sup> and other species as listed by texasinvasives.org database,
3. control of low diversity inducing spiny aster (*Chloracantha spinosa*),
4. hydrology restoration consisting of reducing compaction and re-establishing terrain roughness to enhance wetland hydrology,
5. planting 67.5 acres with native tree and shrub species,
6. seeding 6.0 acre with native herbaceous species and use of herbicide to establish a successional plant community,
7. construct, establish, and provide long-term maintenance by establishing the appropriate financial escrow accounts, and
8. protect the PRMA under a perpetual conservation easement.

The PRMA will be restored to historic wetland conditions to offset impacts to aquatic resources associated with the permit described in **Section 1.0**. Due to industrial growth, residential development and historic agriculture uses, the watershed has experienced degraded water quality, loss of wildlife habitat and limited conservation lands, which define the needs of the watershed.

The following functions would be improved and/or restored at the PRMA and contribute to the health of the ecologically significant Lower Guadalupe Bay watershed:

- re-establish native vegetation, providing sustainable food sources for wildlife,
- provide increased native bird and pollinator habitat through the restoration of 67.5 acres of PFO / PEM wetlands;

<sup>1</sup> Restoration 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 tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.*

<sup>2</sup> Rehabilitate is defined in 33 CFR §332.2 as *the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource.* Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area.

<sup>3</sup> Re-establishment 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 aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.*

<sup>4</sup> The aforementioned and subsequent plant scientific nomenclature is from Lichvar et al. (2018).

- improve natural biological diversity through native plant restoration; and
- improve nonpoint source pollution through vegetation restoration of 67.5 acres of PFO / PEM wetlands.

### **3.0 Site Selection**

No mitigation banks service the Lower Guadalupe watershed. Therefore, since no approved bank with in-kind credits or an approved in-lieu fee program exists, the Permittee proceeded with a strategy of pursuing an onsite PRM under and in accordance with 33 CFR § 332.3(b)(5).

The sustainability of PRMA is primarily driven by rainfall runoff and overbank flooding from Blue Bayou and the Guadalupe River, site specific rainfall, floodplain landform, and soil-water holding capacity associated with clayey soils. The PRMA is appropriate because hydrologic restoration will utilize these natural processes and will not rely on active water management (i.e., pumping, diversion, or removal of water through artificial means from a river, stream, or reservoir).

The Guadalupe River is an important source of freshwater inflow for San Antonio Bay and its associated marshes. Restoration and protection of the PRMA will aid in the goal of providing ecosystem connectivity with the Guadalupe River Delta.

### **4.0 Site Protection Instrument**

Fordyce Holdings, Inc. (Landowner) will allow Blanco-Guadalupe River Trust to place a perpetual conservation easement covering the PRMA to a Conservation Easement Holder (Holder) in accordance with Chapter 183, Subchapter A of the Texas Natural Resources Code. Pursuant to 33 CFR § 332.7(a)(5), the Landowner, acting through the Permittee, will seek CESWG approval of the conservation easement instrument.

As contemplated in 33 CFR § 332.7(a)(1), the conservation easement instrument will establish the right of the Holder to enforce site protections and provide the resources necessary to monitor and enforce these site protections to the extent practicable. In addition, pursuant to 33 CFR § 332.7(a)(2), to the extent appropriate and practicable, the conservation easement instrument will prohibit incompatible uses that might otherwise jeopardize the objectives of the compensatory mitigation project. Furthermore, in accordance with 33 CFR § 332.7(a)(3).

The Blanco-Guadalupe River Trust has been identified as the preliminary Holder for the conservation easement. Blanco-Guadalupe River Trust is a non-profit conservation organization that is accredited by the National Land Trust Alliance and is a member of the Texas Land Trust Council. Texas Land Conservancy will conduct annual inspections to verify that there are no activities occurring on the PRMA which are inconsistent with the purpose of preserving the conservation values of the restored area.

After recordation in the real property records of Victoria County, a copy of the recorded conservation easement, clearly showing the book, page, and date of filing, will be provided to the

CESWG, typically within six (6) months of permit issuance. In addition to the regular reporting, compliance with the terms and conditions of the easement will be verified by the Holder annually by field monitoring and reporting. Upon execution of the conservation easement previously described, the Holder will hold and enforce the conservation easement placed on the PRMA, protecting the site in perpetuity as a wetland mitigation conservation site.

## **5.0 Mitigation Area Baseline Information**

The PRMA and impacts are located within the ecologically important Guadalupe River watershed, which lie in the Coastal Plain physiographic province in the subtropical climate zone. The watershed in which the impacts and the PRMA are situated has experienced tremendous industrial and residential growth in recent years due to the close proximity to the City of Victoria. The last 20 years Victoria has experienced a 11% population growth (World Population Review 2018). Additionally, the site restoration is consistent with the Clean Rivers Program Basin Summary Report and its goals to improve water quality and reduce non-native species (Texas Council of Environmental Quality 2018).

The PRMA areas currently consist of grazing pasture along Blue Bayou. Following the guidelines of the U. S. Army Corps of Engineers 1987 Wetland Delineation Manual (USACE 1987) and U.S. Army Corps of Engineers Regional Supplement for the Atlantic and Gulf Coastal Plain (AGCP Regional Supplement; USACE 2010), wetland delineation data was collected from the entire 6,871.4-acre tract. The wetland verification for the entire tract (SWG-2017-00120) is included in Attachment C. Six jurisdictional wetlands were verified within the PRMA boundary (WETV59, WETV60, WETV61, WETV62, WETV63, WETV64, WETV66, WETV69, and WETV72). Once wetlands are re-established, the PRMA would be considered jurisdictional due to its adjacency to Blue Bayou and location within Blue Bayou's and the Guadalupe River 100-year floodplain (**Attachment A, Figure 3**).

### **5.1 Land Use**

#### **5.1.1 Historical Land Use**

The PRMA area was historically forested with herbaceous openings within a forested riparian ecosystem (Attachment A, Figures 2 – 4). Sometime prior to 1995, the PRMA area was cleared and maintained as open land, potentially for cattle grazing.

#### **5.1.2 Current Land Use**

Currently the land use is open and maintained bottomland. The PRMA areas are regularly mowed, but no other activities occur within the PRMA. Opportunistic herbaceous wetland species (spiny aster) dominates the PRMA with scattered hardwood trees and shrubs.

### **5.2 Soils**

The PRMA area soil consists of Trinity clay, frequently flooded (Tr), which is a soil located in clayey bottomlands along floodplains of major streams. The soils are listed as having a 90% hydric



component and are typically wooded under natural conditions (NRCS 2020). During the wetland delineation, six data points (DPA077\_U, DPA079\_U, DPA080, DPA081\_U, DPHT018\_PFO, and DPHT019\_PEM) were collected within the PRMA. Two wetland data points DPHT018\_PFO and DPHT019\_PFO contained hydric soil indicators; the hydric soil indicators included Depleted Matrix; F3 and Redox Dark Surface; F6 [**Attachment C**]. The non-wetland datapoints lacked hydric soil indicators likely due to landscape modifications that have removed the PRMA's ability to store water.

### 5.3 Hydrology

The average annual rainfall in Victoria County is approximately 41.2 inches (NOAA, National Weather Service 2020) and the primary hydrological influences are rainfall and overbank flooding. The PRMA is located along the western bank of Blue Bayou and east of the Guadalupe River. These two drainages located on each side of the PRMA creates a depressional basin, which frequently creates inundation (caused by overbank flooding) within the PRMA, which is evident by water marks, drift deposits, and rack lines. The PRMA has been cleared and mowed for the last 25 plus years. Additionally, it appears the PRMA was root plowed, removing the majority of the micro-depressional areas that pond water; thus, removing the PRMA's ability to store floodwater and maintain wetland hydrology and hydric soils (**Attachment A, Figure 3**).

### 5.4 Vegetation

The dominant vegetation within the PRMA consists primarily of facultative (FAC) or wetter plant species due to the frequency of overbank flooding. Common species observed include the following: spiny aster, cedar elm (*Ulmus crassifolia*), green ash (*Fraxinus pennsylvanica*), eastern baccharis (*Baccharis halimifolia*), and sand spikerush (*Eleocharis montevidensis*).

## 6.0 Determination of Compensatory Mitigation Requirement

The Permittee and DLS used the hydrogeomorphic (HGM) approach to assess the functions of impacted wetlands versus the functions restored wetlands associated with the Project. Specifically, the SWG Riverine Forested iHGM and SWG Riverine Herbaceous/Shrub iHGM models were used to calculate the number of lost functions of the impacted wetlands and the number of functions proposed to be generated at the PRMA. This model uses several variables to assess three main functions that best describe and measure herbaceous/shrub wetland health in the region:

1. Physical - Temporary Storage and Detention of Surface Water (TSSW)
2. Biological - Maintenance of Plant and Animal Communities (MPAC)
3. Chemical - Removal and Sequestration of Elements and Compounds (RSEC)

SWCA, the Permittee's agent, provided iHGM summary data for the impact site shown below in **Table 2**. DLS provided the baseline iHGM data and proposed functional lift for the PRMA, which is provided in **Attachment B**. For each impacted wetland and the wetland restoration portion of the PRMA (67.5 acres), the model variables were scored to determine the functional

capacity index (FCI) and then multiplied by the acreage to determine functional capacity units (FCU). The restoration areas were assessed a baseline iHGM FCI score; then, the FCI scores were projected (“the lift”) for Year 5 for PEM wetlands and Year 10 for PFO wetlands based on the proposed restoration activities. Wetland impacts will be offset at a 1:1 ratio since the impacts and proposed PRMA are in the same watershed. The highest calculated acreage was used to determine the number of mitigation acres required to offset the Project impacts.

**Table 2. Wetland Impacts by Acreage and Function**

Function	Wetland Impact Acreage	Project Impact FCUs	Required Mitigation FCUs Rounded to 0.01
<b>PEM Impacts</b>			
TSSW	5.51	3.212	3.22
MPAC	5.51	3.731	3.74
RSEC	5.51	3.086	3.09
<b>PFO Impacts</b>			
TSSW	59.24	36.331	36.34
MPAC	59.24	39.767	39.77
RSEC	59.24	37.806	37.81

**Table 3. Wetland Mitigation by Acreage and Function**

Function	Restoration Acreage	Restored Functional Capacity Index (FCI) Lift	Restored Functional Capacity Units (FCUs)
<b>PFO Re-establishment</b>			
TSSW	60.8	0.639	38.852
MPAC	60.8	0.704	42.813
RSEC	60.8	0.620	37.696
<b>PFO Rehabilitation</b>			
TSSW	0.7	0.412	0.288
MPAC	0.7	0.454	0.318
RSEC	0.7	0.353	0.247
<b>PEM Re-establishment</b>			
TSSW	6.0	0.536	3.217
MPAC	6.0	0.667	4.000
RSEC	6.0	0.520	3.120
<b>PRM Acreage Total</b>			<b>67.5</b>

Per **Table 3** above the PRMA will provide an overall increase in each function and a net increase in acreage of restored wetland. The PFO / PEM iHGM workbooks include the iHGM model spreadsheets for the total PRMA lift (**Attachment B**).

Per **Table 4** below and consistent with the national “no net loss” policy, the PRMA will provide overall net increase in each wetland function.

**Table 4. Wetland Impacts and Wetland Mitigation Summary by Function and Acreage**

<b>Impact/Restoration</b>	<b>Acreage</b>	<b>TSSW FCUs</b>	<b>MPAC FCUs</b>	<b>RSEC FCUs</b>
<b>PFO Impacts and Mitigation Summary</b>				
PFO Impacts	-59.24	-36.331	-39.767	-37.806
PFO Restoration	61.5	39.140	43.131	37.943
<b><i>Net Gain in Acreage and Function</i></b>	<b><i>2.26</i></b>	<b><i>2.809</i></b>	<b><i>3.364</i></b>	<b><i>0.137</i></b>
<b>PEM Impacts and Mitigation Summary</b>				
PEM Impacts	-5.51	-3.212	-3.731	-3.086
PEM Restoration	6.00	3.217	4.00	3.12
<b><i>Net Gain in Acreage and Function</i></b>	<b><i>0.49</i></b>	<b><i>0.005</i></b>	<b><i>0.269</i></b>	<b><i>0.034</i></b>

## 7.0 Mitigation Work Plan

### 7.1 Hydrology Restoration

Prior to the commencement of mitigation work, all mowing and grazing activities will cease. In the current condition, the PRMA has self-sustaining wetland hydrology source as indicated by the evidence of overbanking flooding (rack lines, sediment deposits, location in floodway, etc.); however, root-plowing has eliminated the PRMA’s ability to store/pond the overbank flooding. Following the cessation of mowing activities, the PRMA will be disked multiple times to reduce surface compaction and eliminate competition from pasture grasses and spiny aster. Additionally, two water attenuation features will be constructed in the re-establishment areas of the PRMA (**Attachment A, Figures 5 and 6**). The water attenuation features will aid in increasing both the frequency and duration of ponding on the PRMA, which will allow the establishment of wetland hydrology. These features will be constructed to allow water to act as a pass-through system prior to runoff entering Blue Bayou; these features will only temporarily hold water back, which will aid in floodwater attenuation and sediment dropout (**Attachment A, Figure 6**).

The soil surface will be subsoiled (i.e., ripped) to a depth of 14 to 16 inches using a straight shank Eco-Till™ ripper. Allen et al. (2000) suggests ripping of compacted soils will increase water infiltration. Ripped furrows will be spaced 10 feet apart to correspond with plant spacing. The straight shank minimizes surface soil disturbance as opposed to a parabolic shank, which may leave air pockets below the surface. The ripper will have an attachment immediately behind the shank, which will create a slightly elevated row of loose soil no greater than 6 inches above grade. This loose soil will settle back into the rip to ensure the rip seals and minimizes the risk of root exposure to air. Ripping will be conducted in the late summer-fall (i.e., August through October). Immediately following subsoiling, a pre-emergent herbicide will be applied in a four-foot band along each ripped furrow. Due to inherent problems of ripping and disking during wet

periods on heavy clay soils, this work is planned during dry periods in the late summer and fall.

## 7.2 Restoration of Plant Community

### Forested Restoration

The PRMA's historic PFO wetland community will be restored by planting a mixture of native bottomland hardwood seedlings (i.e., hard mast, and soft mast) and eastern cottonwood (*Populus deltoides*) cuttings. The selection of planting species was based on species observed within the adjacent bottomland area located along Blue Bayou and the Guadalupe River. With the slightly alkaline soils, some oak species will not survive; thus, plantings will be based on species that can tolerate alkaline soils. The integration of eastern cottonwood cuttings between the hard and soft mast species will enhance the survival and growth rate of late-successional hard mast species (i.e., *Quercus* spp. and *Carya aquatica*), particularly with the highly aggressive growth of spiny aster. Spiny aster is a prolific seeder and can outcompete hardwood seedlings. This integrated technique has been successfully used to restore wetland sites on similar physiographic settings within the Lower Mississippi Alluvial Valley.

At approximately Year 5, cottonwood trees will be individually treated with an herbicide to reduce the stem density and release the desired, targeted hard and soft mast species. The deadened cottonwood stems will remain standing to serve as snags or felled to serve as coarse woody debris on the forest floor. Deadwood and coarse woody debris will provide reproductive, nesting and resting sites, feeding platforms, runways and sources of forage for invertebrates, amphibians, reptiles, and mammals and serve an important role in the recycling of nutrients in temperate terrestrial forests.

During the planting season (January–February), an aggregate of 436 hardwood seedlings (i.e., hard and soft mast) and 150 cottonwood cuttings will be planted per acre. Hard and soft mast seedlings will be pre-mixed and planted at approximately 10 by 10-foot intervals down the ripped furrows. The cottonwoods will be interplanted with the hardwood seedlings. While eastern cottonwood is a soft mast species, it is not included in the aggregate hard and soft mast planting mix described in **Attachment D**. Eastern cottonwood is not intended to be a dominant species in the forest composition at crown closure.

For herbaceous and grass species control after planting, a pre-emergent herbicide and/or disking may be used to reduce plant competition. Following stem planting but prior to the planted seedlings breaking dormancy (i.e., visible signs of budding), a second application of a pre-emergent herbicide may be applied. Side disking may be utilized to reduce herbaceous competition within 8 to 10 inches along each seedling row. A second disking between the seedling rows may be employed in year two.

### PEM Restoration

Species will be native to Victoria or adjacent counties. Tallow and other invasive species will be spot treated as necessary during the interim and long-term periods. Potential species to be planted are listed in **Attachment D**. Additionally, eastern cottonwoods will also be planted to help and

enhance shrub growth, while serving as a “shelter crop” to aid in the establishment of the PEM community and reduce competition of spiny aster. At approximately Year 3 in the PEM restoration area, cottonwood trees will be individually treated with an herbicide to reduce the stem density and release the desired, targeted shrub species. Site preparation will be similar to PFO restoration, utilizing disking and pre-emergent herbicide.

## **8.0 Maintenance Plan**

The PRMA will be monitored and maintained by the Permittee. The Permittee will commit to restore the wetland functions and maintain wetland habitats in accordance with the provisions in this PRMP. Invasive species will be controlled in the PRMA. During the establishment phase for the PRMA, which is 5 years for PEM and 10 years for PFO, herbicide will be applied to invasive species bi-yearly, beginning one full year after restoration. After long-term performance standards have been met, herbicide application will be applied on a 3 to 5 year cycle, dependent on invasive species presence. Woody species, including tallow, will be controlled with triclopyr, and for invasive herbaceous species, a glyphosate and halosulfuron-methyl based mixture will be applied. Individual stems/plants will be targeted so that desirable species are not affected by the herbicide treatment. The easement holder will conduct annual site inspections to ensure the conditions within the conservation easement are being met.

## **9.0 Performance Standards**

The following outlines the performance standards for the PRMA with a native, facultative or wetter, PFO and PEM community and the control of invasive species within the PRMA.

### **9.1 Initial Success Criteria (Year 1)**

#### **9.1.1 Hydrology**

##### **PFO and PEM Re-establishment**

Ground surface elevations must be conducive to the re-establishment of PFO / PEM vegetation and the maintenance of hydric soil characteristics. All alterations of the natural topography that have affected the duration and coverage of surface water will have been removed or otherwise rendered ineffective and attenuation features along with a monitoring well will have been installed, as discussed in Section 7.1.

#### **9.1.2 Vegetation**

##### **PFO Rehabilitation and Re-establishment**

A minimum of 200, planted seedlings per acre must survive through the end of the second spring following the planting (i.e., year 1) for both PFO rehabilitation and re-establishment. Those surviving seedlings must be representative both in species composition and percentage identified in **Section 7.2**. This criterion will apply to initial plantings, as well as any subsequent replanting implemented to meet this requirement.

## PEM Restoration

By Year 1, vegetative monitoring data will establish the following criteria:

- the PRMA is seeded with appropriate, commercially available, facultative or wetter herbaceous species;
- herbaceous vegetation will exhibit a minimum of 50% absolute cover of facultative or wetter species;
- shrub vegetation will exhibit a minimum of 5% absolute cover of facultative or wetter species;
- invasive species cover will represent less than 5% of absolute cover; and tree strata will represent less than 5% absolute cover of the PEM restoration areas.

### 9.2 Interim Success Criteria (Year 3 and Year 5)

#### 9.2.1 Hydrology

##### PFO and PEM Re-establishment

By Year 3, or two years following attainment of the one-year performance criteria, site hydrology for the re-establishment mitigation area will be restored such that the PRMA meets the wetland hydrology criterion as described in the 1987 Manual and AGCP Regional Supplement. Re-establishment areas will be reanalyzed in Year 5 to ensure these areas are still meeting wetland hydrology criterion. The rehabilitation area will continue to meet wetland hydrology criterion. Data demonstrating the presence of wetland hydrology will be collected and submitted to the CESWG in the monitoring report.

#### 9.2.2 Vegetation

##### PFO Rehabilitation and Re-establishment

For PFO rehabilitation and re-establishment, a minimum of 151 seedlings/saplings per acre must be present at the end of the second year (i.e., year three) following successful attainment of the one-year survivorship criteria. Trees, saplings, and seedlings established through natural recruitment may be included in this tally. Surviving hard mast seedlings should be representative of the species composition and percentage identified in **Section 7.2**. Introduced/exotic species may not be included in this tally.

By Year 5, four years following successful attainment of the Year 1 survivorship criteria, the PRMA will be virtually free of introduced/invasive vegetation (i.e., approximately 5% or less on an acre-by-acre basis). Developing plant community must exhibit characteristics and diversity indicative of a viable native PFO community commensurate with stand age and site conditions by Year 5. Achievement of wetland vegetation dominance is defined as a vegetation community where more

than 50% of all dominant species are facultative (“FAC”) or wetter as determined by the appropriate test per the Atlantic and Gulf Coastal Plain Regional Supplement.

### **PEM Re-establishment**

By Year 3, vegetation monitoring data will establish the following criteria:

- exclusive of invasive species, herbaceous plants will exhibit a minimum of 60% absolute cover;
- 40% of restored vegetation will exhibit FACW or obligate wetland plant indicator status;
- shrub vegetation will exhibit a minimum of 10% absolute cover;
- invasive species cover will represent less than 5% absolute cover; and
- tree strata will represent less than 5% absolute cover of the PEM restoration areas.

### **9.3 Long-term Success Criteria (Year 5 PEM and Year 10 PFO)**

#### **PFO Rehabilitation and Re-establishment**

By Year 10, crown cover should be approximately 80% and the PRMA will be essentially void of exotic/nuisance trees. Exotic/nuisance trees will be removed from the site and comprise less than 5% of the PRMA on a per acre basis. Furthermore, an active treatment program for invasive species will continue as part of the long-term maintenance program. If the CESWG determines that thinning is necessary to maintain or enhance the ecological value of the PRMA, the Permittee will develop and implement a thinning plan in coordination with approval by the CESWG.

#### **PEM Re-establishment**

By Year 5 and beyond, four years following successful attainment of the Year 1 performance criteria, the PRMA will meet the wetland criteria for site vegetation, soils and hydrology as described in the 1987 Manual (USACE 1987) and the AGCP Regional Supplement (USACE 2010). Vegetative monitoring data must indicate the following:

- exclusive of invasive species, herbaceous plants will exhibit a minimum of 80% absolute cover;
- 50% of restored vegetation will exhibit FACW or obligate wetland plant indicator status;
- shrub vegetation will exhibit a minimum of 10% absolute cover;
- invasive species cover will represent less than 5% absolute cover; and
- tree strata will represent less than 5% absolute cover of the PEM/PEM restoration areas.

## 10.0 Monitoring and Reporting Protocols

### 10.1 Monitoring

The following describes the field methods and data collection that will occur during monitoring. The reporting protocol, including content, frequency, and timing is discussed in **Sections 10.2** and **10.3**.

The Permittee agrees to perform all work necessary to monitor the site to demonstrate compliance with the success criteria established in Section 9.0. The Permittee will monitor the site in Year 1, Year 3, Year 5, Year 8, and Year 10 during the growing season through achievement of the long-term success criteria using monitoring protocols described in this Section. The Permittee will collect data on the percent cover and type of forested, shrub, and herbaceous vegetation to ensure successful establishment of a hydrophytic plant community and collect data on hydrologic conditions as necessary to document evidence of wetland hydrology in accordance with the performance standards listed in **Section 9.0**. Hydrology will be monitored based on the methods described in the 1987 Manual and 2010 AGCP Regional Supplement. Wetland hydrology conditions will be documented on a monitoring datasheet and presented in the subsequent monitoring report. Documentation will include descriptions of the upper 12 inches of the soil profile sufficient to demonstrate hydric soil properties and the presence of hydric soil indicators.

Immediately after initial construction, baseline plot data will be collected. DLS will establish approximately six, 1/10<sup>th</sup>-acre continuous monitoring plot (**Attachment A, Figure 3**). Thereafter, the plot will be surveyed for 5 years in the shrub areas and 10 years in the forested areas or until the PRMA successfully meets or exceeds established long-term criteria. The location of each monitoring plot will be identified, recorded, and reported by Global Positioning System (GPS) coordinates for each plot center. A map depicting the location of the monitoring stations with a listing of the station coordinates will be provided with the as-built report.

Station sampling will occur following vegetative plantings to establish baseline data and then annually through Year 5. If Year 5 monitoring indicates the site is not meeting success criteria, annual monitoring will continue until the Year 5 criteria is met. After achieving the Year 5 interim success criteria, monitoring will occur at Year 8 and Year 10 (targeted long-term success). If long-term success criteria are not met at Year 10, the PRMA will then be monitored every 3 years until the long-term success criteria is achieved. If thinning is required after successfully achieving the long-term success criteria, the site will be surveyed prior to and following the first thinning operation following plantings.

### 10.2 As-built Report

The As-built Report will be submitted to the CESWG within 120 days following completion of all the work required to restore the PRMA. In detail, the As-built Report will describe the completed hydrologic work within the re-establishment area and an estimated tally of planted stems by species within the rehabilitation area. Species re-establishment (seed distribution) will be reported and include the following information: species list, seed source, existing percent ground cover by species, and total percent ground cover. No significant deviation from the mitigation work plan



described in **Section 7.0** will occur without prior approval from the CESWG. If deviation does occur, the As-built Report will include a summary of the CESWG coordination and a description of and reasons for any approved deviation.

### **10.3 Initial and Interim Success Criteria Reporting**

Monitoring reports will be submitted to the CESWG by December 15 of the year performance / success criteria monitoring is required (i.e., as-built report, Year 1, Year 3, and Year 5). Each monitoring report will include data sufficient for comparison to the performance standards. The Permittee should also include a discussion of all activities, which took place at the site since the previous monitoring effort. At a minimum, monitoring reports should include the following:

- 1) Purpose and goals of mitigation site.
- 2) Mapping of the monitoring stations.
- 3) Brief summary of mitigation strategy/actions.
- 4) Date mitigation action commenced
- 5) Dates of site inspections and summary of any issues of note
- 6) Dates and description of maintenance activities
  - a) identify measures to eradicate exotic/invasive species and document results of these efforts
- 7) Summary of observations and measurements
  - a) digital images taken from ground level at the monitoring station to document the overall conditions
  - b) a description of the general condition of the plant community and a discussion of likely causes for deficiency
  - c) a general discussion of hydrologic conditions at the monitoring stations
  - d) a description of wildlife usage at the monitoring stations, including any herbivory problems if applicable
  - e) a description of the generalized degree and distribution of exotic/invasive species
- 8) Assessment of success toward the performance standards or success criteria

### **11.0 Long-term Management Plan**

To ensure the long-term sustainability of the resource, the Permittee will perform maintenance and long-term management of the site. These activities will be minimal as the project is anticipated to be a self-sustaining wetland with management activities limited primarily to items such as inspections, controlling invasive species (e.g., spot herbicide treatments), and boundary maintenance. Long-term management will generally consist of spot-treating with herbicides to control species such as Chinese tallow on a three to five-year schedule to control woody and herbaceous invasive species.

The Owner will be the Long-term Steward charged with management and maintenance responsibilities once long-term success criteria in **Section 9.0** are achieved. The Owner requests the option of appointing a different Long-term Steward in accordance with 33 CFR 332.7(d)(1). The appointment of such an entity shall be approved by the CESWG.

## **12.0 Adaptive Management Plan**

An adaptive management plan for a compensatory mitigation project is generally described as a management strategy to address unforeseen changes in site conditions or other mitigation components of the mitigation project. Adaptive management plans facilitate the decision-making process for revising mitigation plans and instituting measures to address both foreseeable and unforeseeable circumstances that adversely affect mitigation success. An adaptive management plan, contingencies, and remedial responsibilities will be implemented if the compensatory mitigation project cannot be implemented in accordance with the approved mitigation plan or if monitoring or other information indicates that the compensatory mitigation project is not progressing towards meeting its performance standards as anticipated. If such circumstances arise, the Permittee must notify the CESWG as soon as possible. The notice will include an explanation for the changes or potential deficiency and will outline proposed specific practices and measures that will guide decisions for revising the PRMP if needed.

An adaptive management plan will consist of activities that are not normally performed as general maintenance. As the PRMA matures, the Permittee/DLS will monitor as required to ensure the project is meeting the performance standards. However, as the body of ecological restoration knowledge advances, novel methods may be incorporated to improve the overall project quality. Prior to implementation of a new technique or method, it will first be approved by the CESWG.

If monitoring reveals that initial, interim, or long-term success criteria have not been met or do not continue to be met after initially being satisfied, an adaptive management plan with contingencies and remedial responsibilities will be developed and implemented. In the event of a deficiency such as poor planting survival, hydrology construction repairs, or invasive species encroachment, the Permittee shall provide a report that includes the implemented adaptive management plan to the CESWG. The report will provide an explanation for the deficiency, outline the implemented adaptive management practices, and outline the implemented adaptive management practices.

If success criteria for a given monitoring period are not met, the Permittee will evaluate and implement adaptive management actions such as those outlined below. The listed potential management activities are not fully inclusive of suitable corrective measures to address any identified deficiencies at the site and do not consist of general maintenance activities such as routine, invasive species control. The potential deficiencies described below are those most likely to occur on projects of this type and scale. Identification of these potential deficiencies and the timely application of adaptive management strategies is the Permittee's effort to remain in compliance with terms set in the PRMP and work plan. The Permittee will provide the CESWG with a report detailing the deficiency, strategy, and implemented techniques.

- Invasive species - If during routine monitoring or general observations, an invasive species such as Chinese tallow is encroaching on an area, the Permittee will implement an adaptive management strategy to remove / control the invasive species.
- Hydrology construction repairs - If during routine monitoring or general observations, wetland re-establishment areas are not meeting hydrology standards on account of erosion issues, the Permittee will take appropriate corrective measures for erosion abatement.

If the CESWG determines that the PRMA is at risk of not achieving the terms and intent of this PRMP, the CESWG will provide written notice to the Permittee that includes a detailed description of the non-compliance determination. The Permittee shall submit a written adaptive management plan to the CESWG for review and approval within forty-five (45) days of receiving written notice of non-compliance. The adaptive management plan shall identify the cause of the non-compliance, the necessary remedial measures, and a timeline for implementing said measures to bring the PRMA into compliance. To the extent practicable, the CESWG shall approve or disapprove the adaptive management plan, provided sufficient information and acceptable measures are contained in the plan.

### **13.0 Financial Assurances**

#### **Short-term and Establishment**

The total financial exposure for construction and establishment of the PRMA is \$56,291.46; the unit costs are presented in **Attachment E, Table 1**, and the construction and establishment costs are presented in **Attachment E; Table 2**. The construction and establishment financial assurances will be provided by a cash escrow. The PFO / PEM construction cost estimates with 5% contingency adjustments at Year 0 are \$31,990.61 (**Attachment E; Table 2**). The PFO / PEM establishment cost estimate for Year 1 through Year 10 is \$24,300.85 (**Attachment E; Table 3**). To provide financial assurance protection during construction (Year 0) and establishment (Year 1 through Year 10) and per 33 CFR 332.3(n), Fordyce Holdings Inc., as the Responsible Party shall establish a cash escrow to protect the PRMA's mitigation assets in the event of non-compliance or PRMA failure ensuring that sufficient funds are available to a third party. As interim success and long-term success criteria are met, release milestone monies will be released to the Permittee or its designated agent, per the Establishment Cost Table in **Attachment E; Table 3**.

#### **Long-term**

Once the long-term criteria are achieved, the estimated long-term, annual cost to maintain the PRMA is \$3,599.60 per year (**Attachment E; Table 4**). The long-term cost worksheets are presented in **Attachment E; Table 4**. To ensure sufficient long-term funding is available for perpetual maintenance and protection of the PRMA, the Permittee will establish a cash escrow "Long-term Land Management and Maintenance" (LTMM) endowment in the approximate amount of \$102,845.71. The National Fish and Wildlife Foundation (NFWF) will manage the LTMM endowment. To structure the LTMM, the mitigation provider will enter a PRM Endowment Agreement with NFWF. Accrued interest of the account shall be used for the administration, operation, maintenance, and/or other purposes that directly benefit the PRMA.

## 14.0 References

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<http://worldpopulationreview.com/us-counties/tx/victoria-county-population/>.

Attachment A. Figures

Figure 1. Vicinity, Watershed, and Ecoregion Map

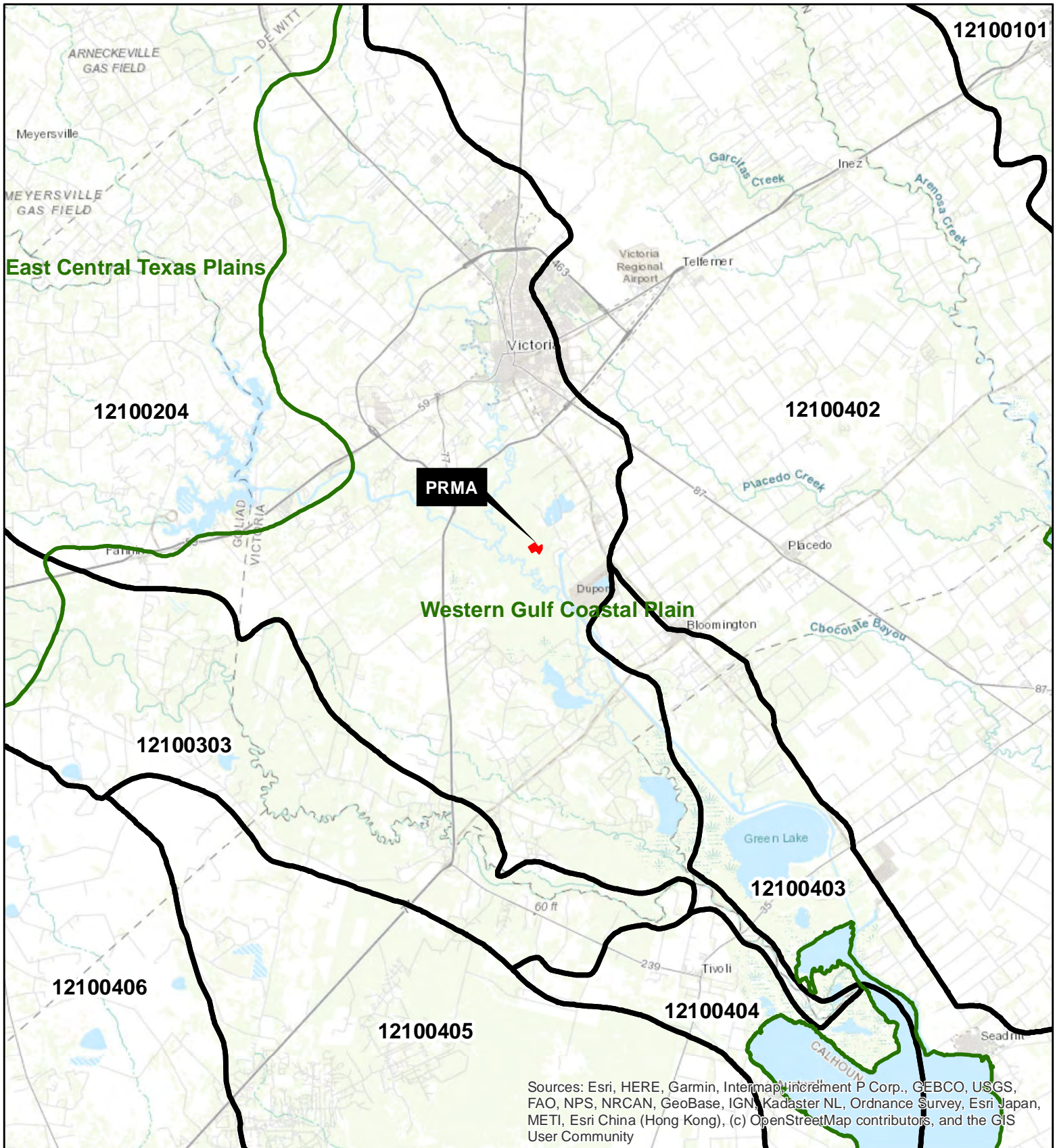
Figure 2. Topographic map with soils

Figure 3. Floodplain map

Figure 4. Mitigation Features Map

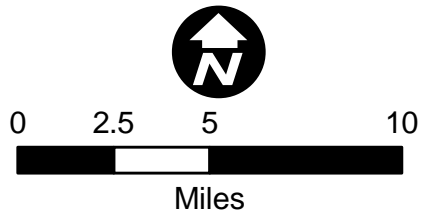
Figure 5. Pre-construction Hydrology Map

Figure 6. Post-construction Hydrology Map



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

- PRMA (67.5ac)
- Ecoregion III -Western Gulf Coastal Plain
- USGS 8 DIGIT HUCs

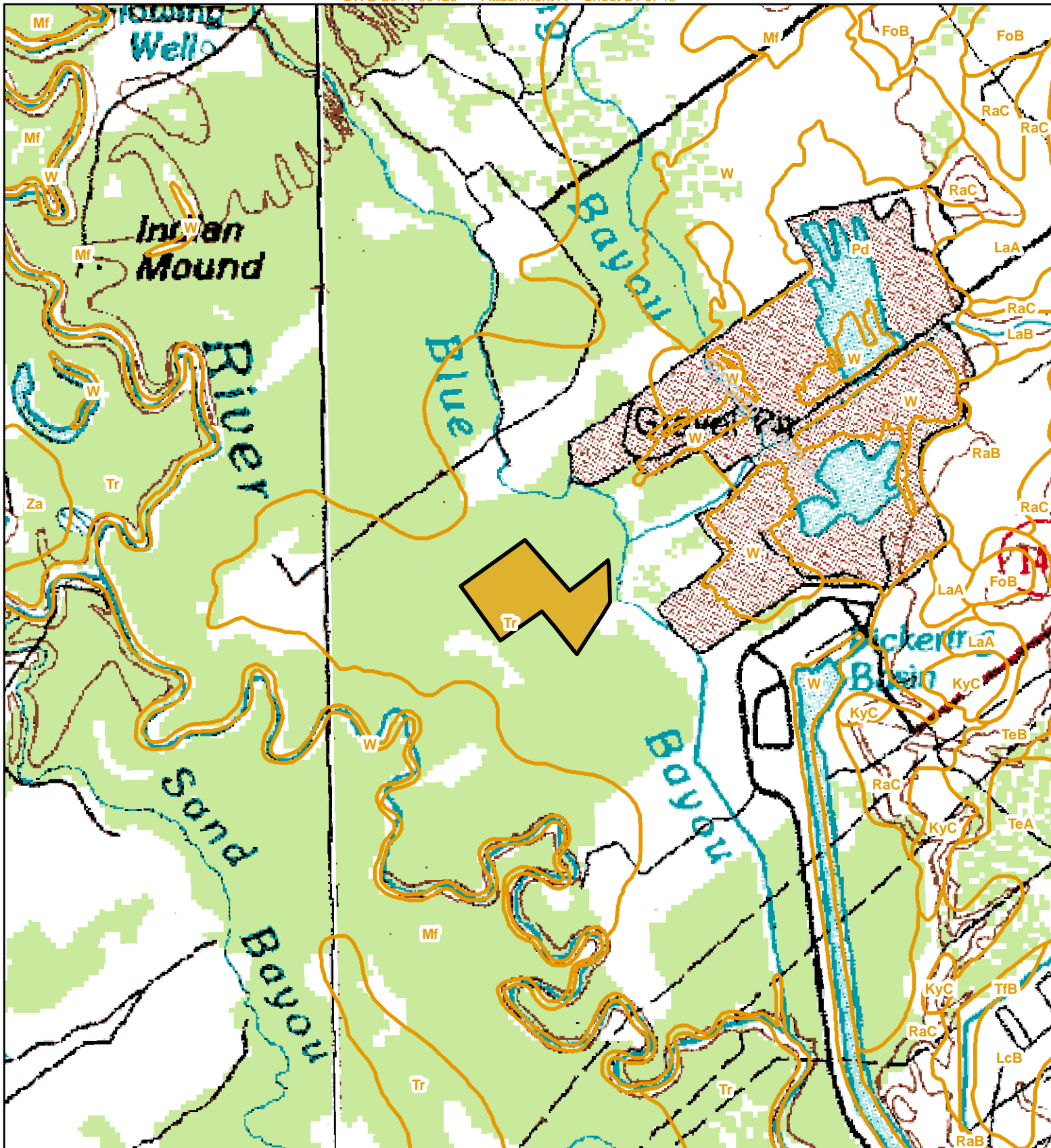


**BRIGGS PLANT SAND AND GRAVEL MINING EXPANSION PROJECT VICINITY, WATERSHED AND ECOREGION MAP Victoria County, TX**

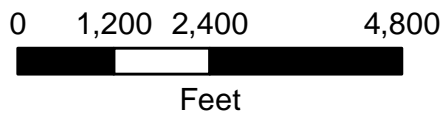
Created : TSC/ARCVIEW  
 Approved: SR  
 Date : 6/9/2020  
 Map No. : F01\_VicinityMap



**FIGURE 1**



- PRMA (67.5ac)
- Tr: Trinity clay, frequently flooded



**BRIGGS PLANT SAND AND GRAVEL  
MINING EXPANSION PROJECT  
TOPOGRAPHIC WITH SOILS MAP**

Victoria County, TX

Created : TSC/ARCVIEW

Approved: SR

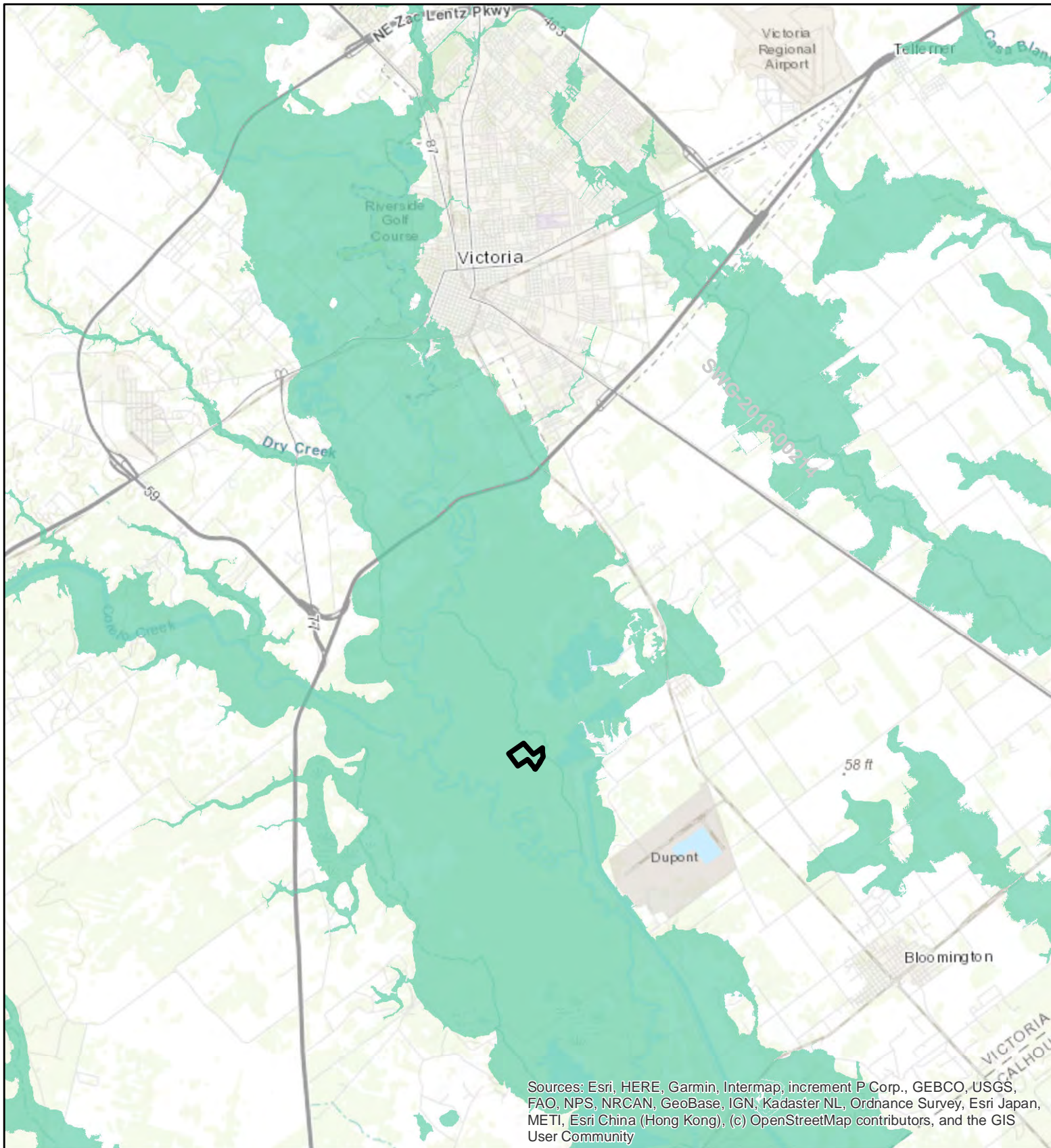
Date : 6/9/2020

Map No. : F02\_TopoSoils.mxd





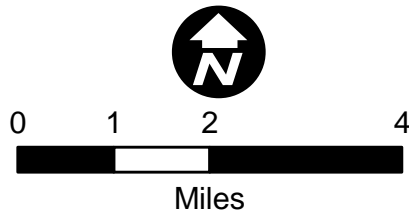
**FIGURE 2**





Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

 PRMA (67.5ac)  
 FEMA Floodzone



**BRIGGS PLANT SAND AND GRAVEL  
 MINING EXPANSION PROJECT**

**FLOODPLAIN MAP**

**Victoria County, TX**

Created : TSC/ARCVIEW

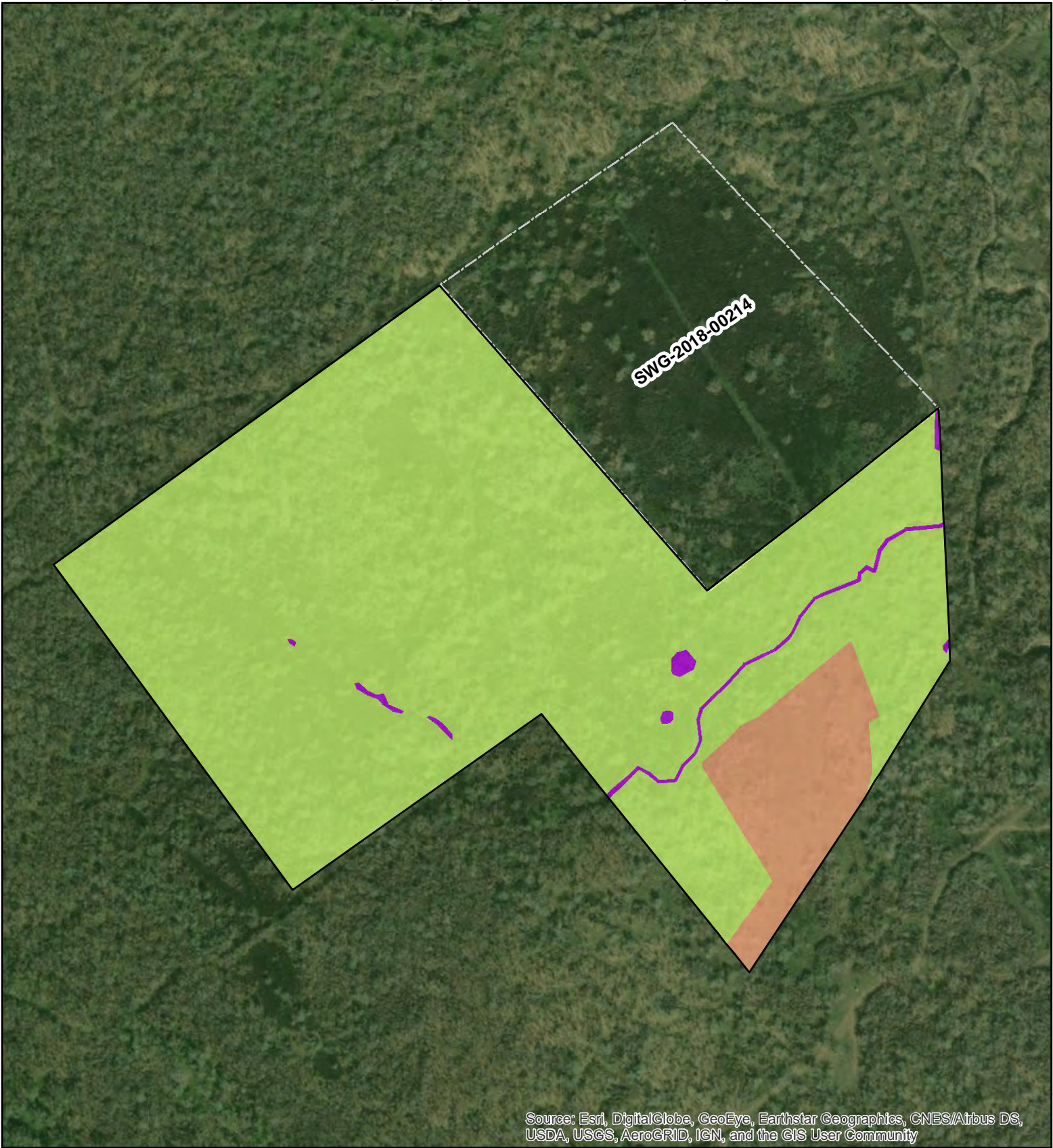
Approved: SR

Date : 6/9/2020





Map No. : F03\_Floodplain

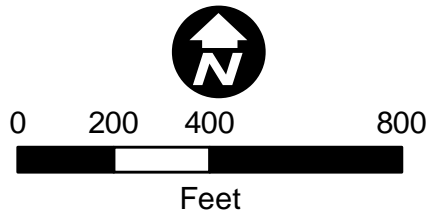


**FIGURE 3**



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

-  PRMA (67.5ac)
-  PFO Re-establishment (60.8 ac)
-  PFO Rehabilitation (0.7 ac)
-  PEM Re-establishment (6.0 ac)



**BRIGGS PLANT SAND AND GRAVEL  
MINING EXPANSION PROJECT**

**MITIGATION FEATURES**

**Victoria County, TX**

Created : TSC/ARCVIEW

Approved: SR






Date : 6/9/2020

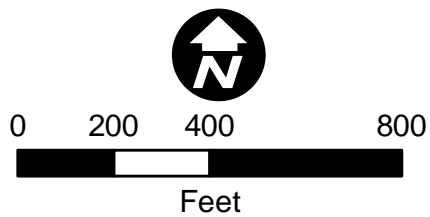
Map No. : F04\_MitigationFeature



**FIGURE 4**



-  PRMA (67.5ac)
-  PFO Re-establishment (60.8 ac)
-  PFO Rehabilitation (0.7 ac)
-  PSS Re-establishment (6.0 ac)
-  Water Flow



**BRIGGS PLANT SAND AND GRAVEL  
MINING EXPANSION PROJECT  
PRE-CONSTRUCTION HYDROLOGY**

**Victoria County, TX**

Created : TSC/ARCVIEW

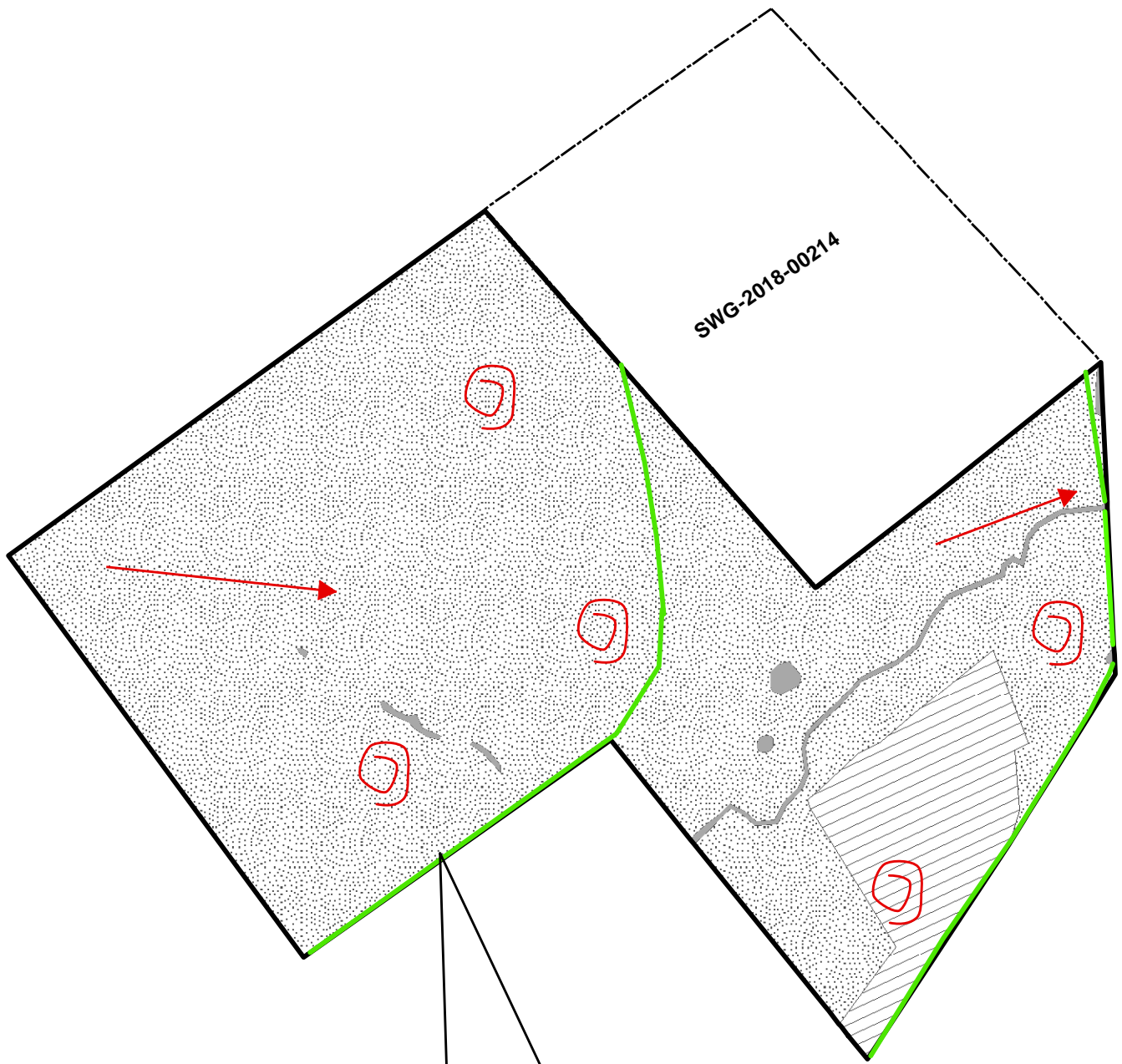
Approved: SR

Date : 6/9/2020

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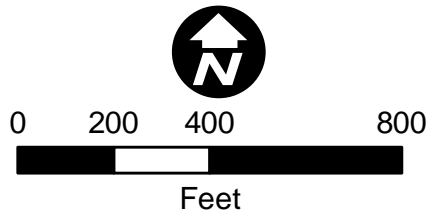


**FIGURE 5**



Water attenuators placed at 1 foot above the surrounding elevation will be placed to slow water across the site.

- PRMA (67.5ac)
- PFO Re-establishment (60.8 ac)
- PFO Rehabilitation (0.7 ac)
- PSS Re-establishment (6.0 ac)
- Water Flow
- Water Attenuators



**BRIGGS PLANT SAND AND GRAVEL MINING EXPANSION PROJECT**

**POST CONSTRUCTION HYDROLOGY**

**Victoria County, TX**

Created : TSC/ARCVIEW	
Approved: SR	
Date : 6/9/2020	
Map No. : F06_PostConstHydro	

**FIGURE 6**

Attachment B. Riverine Herbaceous/shrub Hydrogeomorphic Interim Model  
Workbooks (Tables 1 – 9)

**Table 1. Summary of Predicted Functional Capacity Unit (FCU) Lift by Year for the 61.5-acre PFO Restoration Areas and the 6.0-acre PSS re-establishment Areas**

<b>PFO PRM Rehabilitation 0.7-Acre</b>	<b>Year 0 Baseline</b>	<b>Year 4 Lift</b>	<b>Year 10 Lift</b>	<b>Net FCU Lift by Function</b>
Physical FCU	0.111	0.09	0.20	0.29
Biological FCU	0.117	0.14	0.18	0.32
Chemical FCU	0.163	0.05	0.20	0.25
<b>PFO PRM Re-establishment 60.5 Acre</b>	<b>Year 0 Baseline</b>	<b>Year 4 Lift</b>	<b>Year 10 Lift</b>	<b>Net FCU Lift by Function</b>
Physical FCU	0.00	17.11	21.74	38.85
Biological FCU	0.00	22.04	20.77	42.81
Chemical FCU	0.00	18.65	19.05	37.70
<b>PSS PRM Re-establishment 6.0-Acres</b>	<b>Year 0 Baseline</b>	<b>Year 5 Lift</b>		<b>Net FCU Lift by Function</b>
Physical FCU	0.000	3.217		3.22
Biological FCU	0.000	4.000		4.00
Chemical FCU	0.000	3.120		3.12

**Table 2. SWG-2017-00120 PRM Site Year 0  
Riverine Herbaceous-Shrub iHGM**

**Table 2. iHGM herbaceous/shrub Wetland Rehabilitation Baseline FCI Score**

<b>WAA ID:SWG-2017-00120 PRM Site</b>		
<b>Acreage</b>	<b>6.00</b>	
<b>Variable</b>	<b>Index Value</b>	
Vdur: Duration of flooding	0.00	
Vfreq: Frequency of flooding	0.00	
Vtopo: Topography	0.00	
Vwood: Woody vegetation	0.00	
Vmid: Midstory (Shrub/sapling/woody vines)	0.00	
Vherb: Herbaceous layer	0.00	
Vconnect: Connectivity to other habitat types	0.00	
Vdetritus: Detritus	0.00	
Vredox: Redoximorphic process	0.00	
Vsorpt: Sorptive Soil Properties	0.00	

Physical FCI: Temporary Storage & Detention of Storage Water	0.000
Biological FCI: Maintain Plant and Animal Community	0.000
Chemical FCI: Removal & Sequestration of Elements & Compounds	0.000
Physical FCU: Temporary Storage & Detention of Storage Water	0.000
Biological FCU: Maintain Plant and Animal Community	0.000
Chemical FCU: Removal & Sequestration of Elements & Compounds	0.000

**Table 3. SWG-2017-00120 PRM Site Year 5  
Riverine Herbaceous-Shrub iHGM**

<b>Table 3. iHGM herbaceous/shrub Wetland Rehabilitation Year 5 FCI Score</b>	
<b>WAA ID:SWG-2017-00120 PRM Site</b>	<b>6.00</b>
<b>Acreage</b>	<b>Index Value</b>
Vdur: Duration of flooding	0.50
Vfreq: Frequency of flooding	0.50
Vtopo: Topography	0.40
Vwood: Woody vegetation	0.50
Vmid: Midstory (Shrub/sapling/woody vines)	0.50
Vherb: Herbaceous layer	1.00
Vconnect: Connectivity to other habitat types	0.50
Vdetritus: Detritus	0.30
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00

Physical FCI: Temporary Storage & Detention of Storage Water	0.536
Biological FCI: Maintain Plant and Animal Community	0.667
Chemical FCI: Removal & Sequestration of Elements & Compounds	0.520
Physical FCU: Temporary Storage & Detention of Storage Water	3.217
Biological FCU: Maintain Plant and Animal Community	4.000
Chemical FCU: Removal & Sequestration of Elements & Compounds	3.120

**FCI Lift Year 5 - Year 0**

0.536

0.667

0.520



**Table 4. iHGM Forested Wetland Rehabilitation Baseline (Year 0) FCI Score for SWG-2017-00120**

<b>PFO PRM Rehabilitation Baseline Year 0</b>	<b>PFO</b>
<b>Acreage</b>	<b>0.70</b>
<b>Variable</b>	<b>Baseline</b>
Vdur: Duration of flooding	0.25
Vfreq: Frequency of flooding	0.25
Vtopo: Topography	0.10
Vcwd: Course woody debris	0.10
Vwood: Woody vegetation	0.10
Vtree: Tree species	0.10
Vrich: Tree richness/diversity	0.10
Vbasal: Tree basal area	0.10
Vdensity: Tree density	0.10
Vmid: Midstory (Shrub/sapling/woody vines)	0.10
Vherb: Herbaceous layer	0.10
Vdetritus: Detritus	0.30
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00
Vconnect: Connectivity to other habitat types	0.50
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.158</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.167</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.233</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.111</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>0.117</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.163</b>
<b>Baseline Physical FCU</b>	<b>0.111</b>
<b>Baseline Biological FCU</b>	<b>0.117</b>
<b>Baseline Chemical FCU</b>	<b>0.163</b>

**Table 5. iHGM Forested Wetland Rehabilitation Projected 4-Year FCI Score for SWG-2017-00120**

<b>PFO PRM Rehabilitation Interim Year 4</b>	<b>PFO</b>
<b>Acreage</b>	<b>0.70</b>
<b>Variable</b>	<b>Year 4</b>
Vdur: Duration of flooding	0.25
Vfreq: Frequency of flooding	0.25
Vtopo: Topography	0.40
Vcwd: Course woody debris	0.30
Vwood: Woody vegetation	0.25
Vtree: Tree species	0.30
Vrich: Tree richness/diversity	0.40
Vbasal: Tree basal area	0.40
Vdensity: Tree density	0.40
Vmid: Midstory (Shrub/sapling/woody vines)	0.25
Vherb: Herbaceous layer	0.30
Vdetritus: Detritus	0.30
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00
Vconnect: Connectivity to other habitat types	0.50
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.281</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.363</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.307</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.197</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>0.254</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.215</b>
<b>Physical FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>0.086</b>
<b>Biological FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>0.137</b>
<b>Chemical FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>0.051</b>

**Table 6. iHGM Forested Wetland Rehabilitation Projected 10-Year FCI Score for SWG-2017-00120**

<b>PFO PRM Rehabilitation Long-term Year 10</b>	<b>PFO</b>
<b>Acreage</b>	<b>0.70</b>
<b>Variable</b>	<b>Year 10</b>
Vdur: Duration of flooding	0.50
Vfreq: Frequency of flooding	0.50
Vtopo: Topography	0.70
Vcwd: Course woody debris	0.50
Vwood: Woody vegetation	0.75
Vtree: Tree species	0.80
Vrich: Tree richness/diversity	0.60
Vbasal: Tree basal area	0.40
Vdensity: Tree density	1.00
Vmid: Midstory (Shrub/sapling/woody vines)	0.25
Vherb: Herbaceous layer	1.00
Vdetritus: Detritus	0.50
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00
Vconnect: Connectivity to other habitat types	0.50
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.570</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.621</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.587</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.399</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>0.435</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.411</b>
<b>Physical FCI lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.412</b>
<b>Physical FCI lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.454</b>
<b>Physical FCI lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.353</b>
<b>Physical FCU lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.288</b>
<b>Physical FCU lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.318</b>
<b>Physical FCU lift from year 0 to year 10 (year 10 minus year 0)</b>	<b>0.247</b>

**Table 7. iHGM Forested Wetland Re-establishment Baseline (Year 0) FCI Score for SWG-2017-00120**

<b>PFO PRM Re-establishment Baseline Year 0</b>	<b>PFO</b>
<b>Acreage</b>	<b>60.80</b>
<b>Variable</b>	<b>Baseline</b>
Vdur: Duration of flooding	0.00
Vfreq: Frequency of flooding	0.00
Vtopo: Topography	0.00
Vcwd: Course woody debris	0.00
Vwood: Woody vegetation	0.00
Vtree: Tree species	0.00
Vrich: Tree richness/diversity	0.00
Vbasal: Tree basal area	0.00
Vdensity: Tree density	0.00
Vmid: Midstory (Shrub/sapling/woody vines)	0.00
Vherb: Herbaceous layer	0.00
Vdetritus: Detritus	0.00
Vredox: Redoximorphic process	0.00
Vsorpt: Sorptive Soil Properties	0.00
Vconnect: Connectivity to other habitat types	0.00
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.000</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.000</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.000</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.000</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>0.000</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.000</b>
<b>Baseline Physical FCU</b>	<b>0.000</b>
<b>Baseline Biological FCU</b>	<b>0.000</b>
<b>Baseline Chemical FCU</b>	<b>0.000</b>

**Table 8. iHGM Forested Wetland Re-establishment Projected 4-Year FCI Score for SWG-2017-00120**

<b>PFO PRM Re-establishment Interim Year 4</b>	<b>PFO</b>
<b>Acreage</b>	<b>60.80</b>
<b>Variable</b>	<b>Year 4</b>
Vdur: Duration of flooding	0.25
Vfreq: Frequency of flooding	0.25
Vtopo: Topography	0.40
Vcwd: Course woody debris	0.30
Vwood: Woody vegetation	0.25
Vtree: Tree species	0.30
Vrich: Tree richness/diversity	0.40
Vbasal: Tree basal area	0.40
Vdensity: Tree density	0.40
Vmid: Midstory (Shrub/sapling/woody vines)	0.25
Vherb: Herbaceous layer	0.30
Vdetritus: Detritus	0.30
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00
Vconnect: Connectivity to other habitat types	0.50
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.281</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.363</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.307</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>17.107</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>22.040</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>18.645</b>
<b>Physical FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>17.107</b>
<b>Biological FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>22.040</b>
<b>Chemical FCU lift from baseline to year 4 (year 4 minus baseline)</b>	<b>18.645</b>

**Table 9. iHGM Forested Wetland Re-establishment Projected 10-Year FCI Score for SWG-2017-00120**

<b>PFO PRM Re-establishment Long-term Year 10</b>	<b>PFO</b>
<b>Acreage</b>	<b>60.80</b>
<b>Variable</b>	<b>Year 10</b>
Vdur: Duration of flooding	0.50
Vfreq: Frequency of flooding	0.50
Vtopo: Topography	0.70
Vcwd: Course woody debris	1.00
Vwood: Woody vegetation	0.75
Vtree: Tree species	0.80
Vrich: Tree richness/diversity	0.60
Vbasal: Tree basal area	0.40
Vdensity: Tree density	1.00
Vmid: Midstory (Shrub/sapling/woody vines)	0.25
Vherb: Herbaceous layer	1.00
Vdetritus: Detritus	0.50
Vredox: Redoximorphic process	0.10
Vsorpt: Sorptive Soil Properties	1.00
Vconnect: Connectivity to other habitat types	0.50
<b>Physical FCI: Temporary Storage &amp; Detention of Storage Water</b>	<b>0.639</b>
<b>Biological FCI: Maintain Plant and Animal Community</b>	<b>0.704</b>
<b>Chemical FCI: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>0.620</b>
<b>Physical FCU: Temporary Storage &amp; Detention of Storage Water</b>	<b>38.852</b>
<b>Biological FCU: Maintain Plant and Animal Community</b>	<b>42.813</b>
<b>Chemical FCU: Removal &amp; Sequestration of Elements &amp; Compounds</b>	<b>37.696</b>
<b>Physical FCU lift from year 4 to year 10 (year 10 minus year 4)</b>	<b>21.745</b>
<b>Biological FCU lift from year 4 to year 10 (year 10 minus year 4)</b>	<b>20.773</b>
<b>Chemical FCU lift from year 4 to year 10 (year 10 minus year 4)</b>	<b>19.051</b>

**PRM Project Planting List**

Common Name <sup>2</sup>	Scientific Name	AGCP Wetland Indicator <sup>3</sup>
<b>PFO Re-establishment/Rehabilitation</b>		
<i>Hard Mast</i>		
water hickory	<i>Carya aquatica</i>	OBL
water oak	<i>Quercus nigra</i>	FAC
<i>Soft Mast</i>		
sugarberry	<i>Celtis laevigata</i>	FACW
green ash	<i>Fraxinus pennsylvanica</i>	FACW
common persimmon	<i>Diospyros virginiana</i>	FAC
American elm	<i>Ulmus americana</i>	FAC
cedar elm	<i>Ulmus crassifolia</i>	FAC
<b>PEM Re-establishment</b>		
buttonbush*	<i>Cephalanthus occidentalis</i>	OBL
possumhaw	<i>Ilex decidua</i>	FACW
green hawthorn	<i>Crataegus viridis</i>	FACW
red mulberry	<i>Morus rubra</i>	FACU

<sup>1</sup> The exact species and quantities for planting will be determined by the availability of such species from commercial nurseries providing localized ecotype seedlings.

<sup>2</sup> The above-referenced and subsequent scientific plant names are from NRCS 2020.

<sup>3</sup> The wetland plant indicator status for the Atlantic and Gulf Coastal Plain per the 2018 National Wetland Plant List (Lichvar et al)

\* Only planted in the areas expected to be inundated frequently

**Costs Analysis  
COE SWG-2017-00120**

<b>Item</b>	<b>Units</b>	<b>Unit Values</b>	<b>Price Per Unit</b>	<b>Total Cost</b>
Boundary Maintenance	Mile	1.0	\$ 300.00	\$ 300.00
PFO/PEM Invasive Species Control	Acre	67.5	\$ 40.00	\$ 2,700.00
PFO/PEM Invasive Species Control Mobilization	Fixed	Fixed	Fixed	\$ 200.00
PFO/PEM Inspections (rate and per diem)	Day	1.0	\$ 800.00	\$ 800.00
Taxes on PRMA Acreage <sup>^</sup>	Acre	67.5	\$ -	\$ -
PFO/PEM Planting Acreage	Acre	60.5	NA	NA
Site Prep per Acre (disking and ripping)	Acre	60.5	\$ 40.00	\$ 2,420.00
Site Prep per Acre (herbicides)	Acre	67.5	\$ 40.00	\$ 2,700.00
Seedling Planting Rate*	Trees/Acre	550.0	NA	NA
Seedling Cost	Seedling	33275	\$ 0.22	\$ 7,320.50
Seedling Installation Rate	Seedling	33275	\$ 0.17	\$ 5,656.75
Seedling and Planting Cost	Seedling	33275	\$ 0.39	\$ 12,977.25
Hydrology Restoration (Earth Moving; blade/disk)	Cubic Yard	17500	\$ 0.50	\$ 8,750.00
Site Prep and Pre-emergent Spray (PFO)	Acre	60.5	\$ 100.00	\$ 6,050.00
Total Credit Acreage	Acre	67.5	NA	NA
Conservation Easement Acreage	Acre	67.5	NA	NA
PFO/PEM Mitigation Acres	Acre	67.5	100%	

\* Used the higher planting rate per/acre including cottonwoods

<sup>^</sup> Taxes will be paid by landowner



**PFO/PEM Construction Costs  
COE SWG-2017-00120**

**PFO/PEM Construction Costs**

<b>Item</b>	<b>Units</b>	<b>Unit Values</b>	<b>Price Per Unit</b>	<b>Percent</b>	<b>Cost</b>
Hydrology Restoration	Cubic Yards	17500	\$ 0.50	100%	\$ 8,750.00
PFO/PEM Invasive Species Control	Herbicide	3500	-	100%	\$ 3,500.00
PFO/PEM Invasive Species Mobilizati	Application	400	-	100%	\$ 400.00
PFO/PEM Site Prep (disking, ripping, and pre-emergent herbicide)	Acres	60.5	\$ 80.00	100%	\$ 4,840.00
Planting (Seedlings and Installation)	Seedlings	33275	\$ 0.39	100%	\$ 12,977.25
<b>PFO/PEM Subtotal</b>					<b>\$ 30,467.25</b>
<b>PFO/PEM Construction Cost with 5% Contingency</b>					<b>\$ 31,990.61</b>

**Total PFO/PEM Construction \$ 31,990.61**

**Total PFO/PEM Construction and Establishment \$ 56,291.46**

**Establishment Costs for  
COE SWG-2017-00120**

Year	Event	Event Cost	Percent	Occurrences /Year	Year 0 Cost	Inflationary Adjustment from Year 0	Percent of Cost	Release Milestone
1	Monitoring/ Inspection	\$ 800.00	100%	2	\$ 1,600.00			
1	Replant (30%)	\$ 12,977.25	30%	1	\$ 3,893.18			
1	Invasive Species Control (100%)	\$ 2,700.00	100%	1	\$ 2,700.00			
1	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
1	Property Taxes	\$ -	100%	1	\$ -			Initial Success
<b>1</b>	<b>Subtotal</b>	<b>\$ 16,477.25</b>			<b>\$ 8,393.18</b>	<b>\$ 8,598.81</b>	<b>38.0%</b>	<b>\$ 8,598.81</b>
2	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
2	Replant (10%)	\$ 12,977.25	10%	1	\$ 1,297.73			
2	Invasive Species Control (25%)	\$ 2,700.00	25%	1	\$ 675.00			
2	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
2	Property Taxes	\$ -	100%	1	\$ -			
<b>2</b>	<b>Subtotal</b>	<b>\$ 16,677.25</b>			<b>\$ 2,972.73</b>	<b>\$ 3,120.17</b>	<b>13.5%</b>	
3	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
3	Invasive Species Control (20%)	\$ 2,700.00	20%	1	\$ 540.00			
3	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
3	Property Taxes	\$ -	100%	1	\$ -			Interim Success
<b>3</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,540.00</b>	<b>\$ 1,655.99</b>	<b>7.0%</b>	<b>\$ 4,776.16</b>
4	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
4	Invasive Species Control (10%)	\$ 2,700.00	10%	1	\$ 270.00			
4	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
4	Property Taxes	\$ -	100%	1	\$ -			
<b>4</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,399.11</b>	<b>5.7%</b>	
5	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
5	Invasive Species Control (5%)	\$ 2,700.00	10%	1	\$ 270.00			
5	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
5	Property Taxes	\$ -	100%	1	\$ -			Interim Success
<b>5</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,433.39</b>	<b>5.7%</b>	<b>\$ 2,832.50</b>
6	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
6	Invasive Species Control (5%)	\$ 2,700.00	10%	1	\$ 270.00			
6	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
6	Property Taxes	\$ -	100%	1	\$ -			
<b>6</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,468.51</b>	<b>5.7%</b>	
7	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
7	Invasive Species Control (5%)	\$ 2,700.00	10%	1	\$ 270.00			
7	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
7	Property Taxes	\$ -	100%	1	\$ -			
<b>7</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,504.48</b>	<b>5.7%</b>	
8	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
8	Invasive Species Control (5%)	\$ 2,700.00	10%	1	\$ 270.00			
8	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
8	Property Taxes	\$ -	100%	1	\$ -			
<b>8</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,541.34</b>	<b>5.7%</b>	
9	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
9	Invasive Species Control (5%)	\$ 2,700.00	10%	1	\$ 270.00			
9	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
9	Property Taxes	\$ -	100%	1	\$ -			
<b>9</b>	<b>Subtotal</b>	<b>\$ 3,700.00</b>			<b>\$ 1,270.00</b>	<b>\$ 1,579.11</b>	<b>5.7%</b>	
10	Monitoring/ Inspection	\$ 800.00	100%	1	\$ 800.00			
10	Invasive Species	\$ 2,700.00	10%	1	\$ 270.00			
10	Invasive Species Mobilization	\$ 200.00	100%	1	\$ 200.00			
10	Property Taxes	\$ -	100%	1	\$ -			
10	Boundary Maintenance	\$ 300.00	100%	1	\$ 300.00			Long-term Success
<b>10</b>	<b>Subtotal</b>	<b>\$ 4,000.00</b>	<b>100%</b>		<b>\$ 1,570.00</b>	<b>\$ 1,999.95</b>	<b>7.1%</b>	<b>\$ 8,093.39</b>
	<b>Inflationary rate (2001-2011)</b>		<b>2.45%</b>					
	<b>Total Establishment Cost</b>				<b>\$ 22,095.90</b>	<b>\$ 24,300.85</b>	<b>100.0%</b>	<b>\$ 24,300.85</b>

**Total PFO/PEM Construction and Establishment Cost      \$ 56,291.46**

**PFO/PEM, Long-Term Annualized Cost Summary  
COE SWG-2017-00120**

<b>Item</b>	<b>Units</b>	<b>Unit Values</b>	<b>Price Per Unit</b>	<b>Unit Percent</b>	<b>Cost</b>	<b>Years</b>	<b>Annualized Cost</b>
Boundary Maintenance (5-year event)	Miles	1.66	\$ 300.00	100.0%	\$ 498.00	5	\$ 99.60
Annual Invasive Species Control	Acre	67.50	\$ 40.00	100.0%	\$ 2,700.00	1	\$ 2,700.00
Annual Inspection	Day	1.00	\$ 800.00	100.0%	\$ 800.00	1	\$ 800.00
<b>Average Annual Cost (Starting at Year 10)</b>							<b>\$ 3,599.60</b>
<b>Long-term Land Management and Maintenance Endowment (cap rate 3.5%)</b>							<b>\$ 102,845.71</b>