

**PALUSTRINE EMERGENT WETLAND  
AND PALUSTRINE SCRUB-SHRUB WETLAND  
PERMITTEE RESPONSIBLE MITIGATION PLAN  
SWG-2018-00613**

**INEOS Bayport Facility ESPN PROJECT  
Brazoria COUNTY, TEXAS**

PREPARED FOR  
**INEOS STYROLUTION AMERICA, LLC.**



**February 14, 2019**

PREPARED BY:  
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## 1.0 Introduction

Delta Land Services, LLC (DLS) presents this palustrine emergent wetland (PEM) and palustrine scrub-shrub wetland (PSS) Permittee Responsible Mitigation Plan (PRMP) for the compensation of unavoidable, permanent impacts to approximately 0.457 acre of PEM/PSS wetlands associated with U.S. Army Corps of Engineers (“USACE permit application no. SWG-2018-00613 [Permit]). INEOS Styrolution America, LLC. (Permittee) is seeking the Permit for the proposed Bayport Facility ESPN project (Project).

The Permittee is proposing the construction of the Acrylonitrile Styrene Acrylate (ASA) polymer unit at the existing Styrene Monomer (SM) production facility (Bayport Facility) will create jobs within Harris County and result in significant cost savings for INEOS. The ASA product is currently produced primarily in Mexico. Instead of shipping SM product produced at the Bayport facility to Mexico, INEOS will construct a short pipeline within the existing Bayport facility to the new unit. Wetlands located within the project area were avoided and minimized to the extent practicable during engineering and design. Of the 11.97 acres of wetlands and 0.35 acre of open water located on site, INEOS will impact approximately 0.457 acre of wetlands and 0.023 acre of open water. All other wetlands on site will be avoided during construction activities.

The Project wetland impacts are located in the West Galveston Bay Subbasin (Hydrologic Unit Code [HUC] 12040204) in Harris County, Texas. Ecologically, the impacts are located within the Northern Humid Gulf Coastal Plain Level IV Ecoregion of the Western Gulf Coast Plain Level III Ecoregion (Seaber et al. 1987, Griffith et al. 2007, EPA 2012) [Attachment A, Figure 1]. More specifically, the Project is located at centerpoint latitude 29.594546° North and longitude 95.015349° West (North American Datum [NAD83]).

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). 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). The assessment of unavoidable impacts and the proposed PEM/PSS PRMA utilized the USACE Galveston District (CESWG) Riverine Herbaceous/Shrub interim Hydrogeomorphic Model (iHGM).

A 1:1 ratio (i.e., impact function to mitigation function ratio) was utilized to determine the mitigation requirements as the impacts and PRMA are both located in the West Galveston Bay HUC (Attachment A, Figure 1). The mitigation restoration acreage, as determined by the iHGM and additional temporal loss acreage is 1.0 acres (Table 1 and Attachment B); the PRMA acreage consists of 1.0 acre of PEM/PSS restoration. By the end of Year 5, 1.0 acre of PEM/PSS wetlands will be restored and perpetually protected.



## **1.1 Mitigation Property Location**

The 1.0-acre PRMA (Attachment A, Figure 2) is adjacent to Halls Bayou and is hydrologically connected to the 100-year floodplain (Attachment A, Figure 2). The PRMA is located approximately 5.1 miles southwest of Santa Fe, Texas within the West Galveston Bay 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).

To access the PRMA from the U.S. Interstate Highway (IH) 45 / U.S. Highway 59 interchange in Houston, TX, proceed south on IH 45 for approximately 26.8 miles then turn right/west onto Farm-to-Market (FM) 517. Travel west for approximately 1.0 mile, turn left/south onto FM 646, proceed south for 3.5 miles then turn right/west onto FM 1764, proceed west for 1.6 miles then turn south/left onto State Highway (SH) 6 for 0.3 mile, and then turn south/left onto Avenue T. Continue approximately 2.8 miles southwest on Avenue T and turn south/right onto Vacek Street, then proceed 2.3 miles to the access gate of the property.

## **1.2 Property Ownership and Responsible Party Qualifications**

Per 33 CFR § 332.8(d)(2)(vi.), this section describes DLS's qualifications to successfully complete the proposed PRMA. Ironwood Holdings, LLC owns the PRMA and the property encompassing the PRMA. Established in 2009, DLS is a land management and restoration company whose technical staff includes Certified Ecological Restoration Practitioners, Certified Foresters, Certified Wildlife Biologists, and Professional Wetland Scientists. In addition, DLS has construction specialists on staff experienced in wetland construction activities such as heavy equipment operation, vegetation establishment, herbicide application, and contractor management. The complete biography of DLS and personnel biographies are available at [www.deltaland-services.com](http://www.deltaland-services.com).

DLS currently operates 15 approved wetland mitigation banks (Banks) and 4 approved amendments within four USACE Districts totaling 7,743.9 acres which include 43,044.9 linear feet of stream restoration. These Districts include Vicksburg (MVK), New Orleans (MVN), Fort Worth (SWF), and SWG. In addition to the Banks referenced above, DLS serves as the responsible party for the establishment and maintenance of 3,381.5 acres of wetlands and 8,251.0 linear feet of stream on twenty-one (21) approved PRMAs within the MVN, MVK, and SWG.

In addition to mitigation banking, Delta serves as the responsible party for the establishment and maintenance of 19 permittee responsible mitigation (PRM) sites consisting of 3,303.6 mitigation acres and 8,251.0 linear feet of stream within the MVN, MVK, and SWG. In total, Delta has restored 11,052.6 acres of wetlands and 51,295.9 linear feet of stream in the Gulf Coastal region.

## **1.3 Description of the Property**

The PRMA is a regularly formed land tract and is located within a broad wetland that connects to the Halls Bayou 100-year floodplain. The PRMA perimeter coordinates are as follows beginning at the northwest corner and proceeding clockwise.

Latitude		Longitude	
29.30122	° N	95.1472	° W
29.3018	° N	95.1475	° W
29.30205	° N	95.1463	° W

#### 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 Goal and Objective

The goal of this PRMP is to restore<sup>1</sup> (rehabilitate<sup>2</sup>) 1.0 acre of PEM/PSS wetlands located in the West Galveston Bay Watershed within the Northern Humid Gulf Coastal Prairies Level IV Ecoregion.

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

- permanent cessation of agricultural practices and mowing,
- removal and control of pasture grasses (e.g., Bermuda grass [*Cynodon dactylon*]<sup>3</sup>) and invasive species (e.g., Chinese tallowtree [*Triadica sebifera*]),
- hydrology restoration consisting of leveling of agricultural berms and plugging of agricultural ditches,
- re-establish a jurisdictional connection to Halls Bayou and adjacent CESWG approved PRM wetlands via the removal of agricultural berms,
- adding water attenuation features promoting the retention of surface flow emanating from higher elevations,
- seeding 1.0 acre with native herbaceous species and use of herbicide and/or fire to manage undesirable species and establish a fire successional plant community
- construct, establish, and provide long-term maintenance by establishing the appropriate financial escrow accounts, and
- protect the PRMA under a perpetual conservation easement.

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<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> The aforementioned and subsequent plant scientific nomenclature is from Lichvar et al. (2016).

## **2.1 Aquatic Resource Type and Functions Restored**

Implementation of the proposed PRMA will rehabilitate 1.0 acre of PEM/PSS wetland within the West Galveston Bay watershed. Additionally, a connection to Halls Bayou and its adjacent wetlands will be re-established via the removal of relic agricultural berms and drainage features (ditching and associated spoil bank). The PRMA will be restored to historic PEM/PSS wetland conditions to offset impacts to aquatic resources associated with the permit described in Section 1.0.

1. Physical - Temporary Storage and Detention of Surface Water (TSSW) – the restored wetlands will provide temporary water storage during rainfall events.
2. Biological - Maintenance of Plant and Animal Communities (MPAC) – the restored wetlands will serve as habitat for native wildlife and Nearctic-Neotropical migratory species.
3. Chemical - Removal and Sequestration of Elements and Compounds (RSEC) – the restored wetlands will remove sediments from surface water during periods of rainfall and runoff.

## **2.2 Watershed and Ecological Contributions**

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 Houston. Houston-Galveston Area Council projects over a 40% population increase in Galveston and Brazoria Counties by 2025 (DallaRosa and Pulich 2005) and Brazoria and Galveston Counties comprise the majority of the West Galvest Bay watershed. The PRMA and impacts are located within the ecologically important Galveston Bay watershed, which lies in the Coastal Plain physiographic province in the subtropical climate zone.

From 1950-2002, over 46,900 acres of freshwater and estuarine wetlands have been lost in the Galveston Bay watershed (DallaRosa and Pulich 2005). As a result, the Galveston Bay Estuary Program (GBEP) is focusing on a more comprehensive watershed management and realizing the importance of inland resources on the Galveston Bay estuary (DallaRosa and Pulich 2005). The West Bay watershed is over 900,000 acres, of which 600,000 acres are agricultural or rangeland use. The PRMA is located in the West Bay Watershed Protection Project Target Area, which was identified by the GBEP. Restoration of the PRMA will provide for contributions to water quality, stormwater retention, and habitat for fish, wildlife, and migratory birds. The shores of the Gulf of Mexico provide critical stopover habitat for approximately 296 nearctic-neotropical migratory species. The Gulf Coast Bird Observatory has documented the importance of migratory bird habitat and the need to protect and enhance stopover areas near the Gulf Coast (Gulf Coast Bird Observatory 2016). The restoration of this PRMA will ensure long-term conservation and protection of the resource associated with this landscape ecosystem.

## **3.0 Site Selection**

Initially, the Permittee investigated the use of existing mitigation banks relative to the location of the Project site. According to the Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS), the proposed wetland impacts were not located in the service area of any mitigation bank that provides PEM/PSS wetland offsets. Gulf Coastal Plains Mitigation Bank (SWG-2008-01091) provides tidal and non-forested wetland credits. At the time of development of this PRM,

Gulf Coastal Plains could not demonstrate sufficient credits to offset this impact. 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 offsite PRM under and in accordance with 33 CFR § 332.3(b). An onsite PRM is not feasible due to the lack of available land; the Permittee has future plans of full site development, and no adjacent undeveloped land is available for purchase.

The Halls Bayou Mitigation Area (HBMA) was identified as a suitable PRMA for the following reasons:

1. It is located along forested riparian buffer of Halls Bayou, which provides connectivity to an existing forested riparian area, thus the restored site would not be an isolated herbaceous-shrub wetland (Figures 2 and 3).
2. It is partially located in the 100-year floodplain and includes existing forested riparian non-wetland buffer that extends to the Halls Bayou channel providing a direct connection to the navigable water.
3. It is entirely adjacent to Halls Bayou, which is a Navigable Waterway (jurisdictional under Section 10 of the Rivers and Harbors Act); and is located approximately 13 river miles north of Halls Lake. Halls Bayou is listed by the District as a Navigable Water from its confluence with Halls Lake for approximately 14 miles upstream.
4. The western boundary is bordered by a tidally influenced stream (Halls Bayou). At this location, Halls Bayou is considered a Tidal Segment (TCEQ 303d list 2014) and is tidally influenced from its confluence with Chocolate Bay for approximately 20 miles upstream. The HBMA is approximately 13.7 river miles upstream of Chocolate Bay.

Furthermore, the HBMA is a contiguous tract removed from both road and industrial activities making it a suitable site for the reintroduction of native flora and fauna. A large portion of the HBMA is underlain by Bacliff soils, which are 90% hydric. The HBMA will be connected to the San Bernard National Wildlife Refuge Tract (U.S. Fish and Wildlife Service; USFWS) via the Halls Bayou riparian corridor. The USFWS tract is located approximately 1.3 miles north of HBMA.

The nature and location of the PRMA within the landscape provides a high degree of confidence for successful restoration. The PRMA is highly suitable and restorable as functional PEM/PSS habitats. The sustainability of the restored PRMA will be driven by rainfall and localized watershed runoff (re-established sheetflow from the northeast). Therefore, hydrologic rehabilitation will utilize natural processes (passive water flow) and will not rely on active water management (i.e., pumping, diversion, impoundment or removal of water through artificial means from a river, stream or reservoir). Additionally, the hydrological work in the PRMA will re-establish a jurisdictional connection to Halls Bayou and its adjacent wetlands through the removal of relic agricultural berms and drainage features.

#### **4.0 Site Protection Instrument**

Ironwood Holdings LLC (Land Owner) will 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 Owner, acting through the Permittee, will seek CESWG approval of the conservation easement either in advance of or concurrently with the commencement of the permitted activity. Furthermore, in accordance with 33 CFR § 332.7(a)(3), the conservation easement will contain a provision requiring 60-day advance notification to the CESWG district engineer before any action is taken to void or modify the easement, including the transfer of title to another party.

Texas Land Conservancy has been identified as the Holder for the conservation easement. Texas Land Conservancy 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 Brazoria County, a copy of the recorded conservation easement, clearly showing the book, page, and date of filing, will be provided to the CESWG. 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 conservation site. The Permittee will also be responsible for protecting lands contained in the PRMA in perpetuity in accordance with the terms of the conservation easement and PRMP, unless the lands are transferred or sold to a state or federal resource agency or non-profit conservation organization pursuant to 33 CFR § 332.7(d)(1).

## **5.0 Mitigation Area Baseline Information**

The PRMA currently consists of fallow wet agricultural fields. Following the guidelines of the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual (1987 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 434-acre tract. The appropriate data sheets and jurisdictional determination (JD) are included in Attachment C. DLS received the JD from CESWG on March 1, 2018 (SWG-2016-00700). The JD stated the subject property contains 75.6 acres of waters of the United States, and an additional 264.3 acres of isolated wetlands. Additionally, the JD verified that Halls Bayou is a traditional navigable waterway (TNW). The PRMA is located in isolated Wetland 12. Wetland 12 is considered isolated based on separation from Halls Bayou and jurisdictional Wetland Mosaic 19; the isolated wetlands are separated by relic agricultural berms and drainage features (Attachment A, Figure 3).

## **5.1 Land Use**

### **5.1.1 Historical Land Use**

The PRMA has been in agricultural production since the early 1900's and in rice cultivation or other crops from circa 1945 through 2014. Since 2014, the PRMA has remained fallow.

### **5.1.2 Current Land Use**

The majority of the open or scrub-shrub land in Brazoria County, including the PRMA, is used for agricultural production (e.g., rice, livestock, etc.). The PRMA has remained fallow since 2014, when it was taken out of rice production. Opportunistic herbaceous wetland species have colonized the rehabilitation portion of the PRMA.

## **5.2 Soils**

The PRMA soils consist of Bacliff clay, 0 to 1 percent slopes (Ba), which is a poorly drained soil with a 90 percent hydric component and Bernard clay loam, 0 to 1 percent slopes (Be), which is a somewhat poorly drained soil with a 1 percent hydric component (NRCS 2018). The tract is underlain by Lake Charles clay, Bernard clay loam, Edna fine sandy loam, and Bacliff soils. During the wetland delineation, one data point was collected adjacent to the PEM/PSS rehabilitation area (DP 21). This data point contained hydric soil indicators (Depleted Matrix; F3) [Attachment C].

## **5.3 Hydrology**

The average annual rainfall in Brazoria County is approximately 52 inches (NRCS 2015), and the the primary hydrological influences are rainfall and ponding. The PRMA is located along the edge of an existing agricultural ditch and pipeline. The ditch collects and removes runoff from the PRMA, and thus, reduces the hydrologic functions of the site. A complex berm system has been constructed throughout the property, including the PRMA. The berms have severed hydrological connection to Halls Bayou, a TNW, and the adjacent riparian wetlands. These berms have been removed for another project; thus, increasing surface flow and providing a direct hydrological connection to the jurisdictional wetlands that abut Halls Bayou. The adjacent data point (DP 21) had at a minimum of one primary hydrology indicator, which consisted of Oxidized Rhizospheres along Living Roots (C3). DLS biologists also observed multiple secondary wetland hydrology indicators. The secondary indicators observed were Surface Soil Crack (B6) and the FAC-Neutral Test (D5).

## **5.4 Vegetation**

The dominant vegetation observed within the PRMA consist of annual sumpweed (*Iva annua*), spikerush (*Eleocharis* spp.), seedbox (*Ludwigia alterniflora*), Hooker's eryngo (*Eryngium hookeri*), and swamp sunflower (*Helianthus angustifolius*).

## 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 Herbaceous/Shrub iHGM models were used to calculate the number of lost functions at the impact site 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 both forested and herbaceous wetland health in the region:

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

iHGM summary data for the impact site is provided in Table 1. DLS provided the baseline iHGM data and proposed functional lift for the PRMA (Attachment B). For each impacted wetland and the restoration portion of the PRMA (1.0 acre), the model variables were scored to determine the functional capacity index (FCI) and functional capacity unit (FCU). The impact site and the PRMA are located within the same watershed, so a 1:1 ratio was applied to the mitigation requirements. To determine the restoration acreage required for the impacts, the sum of each individual impacted function/FCU was divided by the corresponding restoration PRMA FCI, which calculated the mitigation acres required for each individual function lost (Table 1). The highest calculated acreage was used to determine the number of mitigation acres required to offset the Project impacts. Based on these calculations, the restoration of a minimum of 0.77 acre is required to compensate for the .457 acre of PEM/PSS wetland impacts. The PRMA is 1.0-acre due contractual obligations and should not be considered pre-mitigation for other intents and purposes.

**Table 1. PEM/PSS Wetland Impacts and Mitigation by Function, SWG-2018-00613.**

Function	Impact Functional Capacity Unit (FCU)	Rehabilitated Functional Capacity Index (FCI) Lift	Calculated Mitigation Acres by Function	Watershed Multiplier	Total Mitigation Acres Required	Total Required Mitigation Acres
TSSW <sup>1</sup>	0.291	0.376	0.774	1.00	0.774	0.77
MPAC <sup>2</sup>	0.267	0.500	0.533	1.00	0.533	
RSEC <sup>3</sup>	0.225	0.303	0.743	1.00	0.743	

<sup>1</sup>TSSW (Temporary Storage and Detention of Storage Water [Physical])

<sup>2</sup>MPAC (Maintain Plant and Animal Communities [Biological])

<sup>3</sup>RSEC (Removal and Sequestration of Elements and Compounds [Chemical])

The PEM/PSS iHGM workbooks include the spreadsheet models for the total PRMA Lift. The PEM/PSS workbook includes PRMA baseline (Year 0) and PRMA Year 5 lift (Attachment B).

## **7.0 Mitigation Work Plan**

### **7.1 Hydrology Enhancement**

#### **PEM/PSS Restoration**

In the current condition, the PRMA rehabilitation area has self-sustaining hydrology as indicated by the data collected from the wetland datapoints. A relic agricultural berm that crosses the southwestern portion of the 434-acre tract was removed to re-establish a hydrologic connection with Halls Bayou to a previously approved PRM (SWG-2017-00019) [Appendix A, Figure 3]. This PRMA is located immediately adjacent to the previous PRM; thus, the hydrologic connection was re-established during construction of SWG-2017-00019. Additionally, the ditch along the northern boundary of the PRMA will be filled, bladed, and leveled with *in-situ* material (Figure 3). Prior to the commencement of mitigation work, all agricultural activities will cease. Following the cessation of agriculture, the PRMA will be disked multiple times to 1) reduce surface compaction, 2) eliminate competition from pasture grasses, and 3) level small lateral drains/remnant berms. 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. 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. Ripping will be conducted in the late summer-fall (i.e., August through October). 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. The removal of the agricultural berms, drainage features will re-establish the jurisdictional connection to Halls Bayou and its adjacent wetlands.

### **7.2 Restoration of Plant Community**

#### **PEM/PSS Restoration**

To supplement the existing herbaceous cover, a seed mixture of native herbaceous species will be purchased from local plant material producers located in southeast Texas. The seed planting mix will consist of commercially available facultative or wetter herbaceous species (e.g., switchgrass [*Panicum virgatum*], eastern gamagrass [*Tripsacum dactyloides*], brownseed paspalum [*Paspalum plicatulum*], rattlesnake master [*Eryngium yuccifolium*], slender blazing star [*Liatris acidota*], etc.). After the Year 2 growing season, the PRMA will be treated with prescribed fire or herbicide to remove invasive woody species and select for fire successional species. By Year 5, long-term management will consist of spot-treating with herbicides to control species such as Chinese tallowtree or prescribed fire on a three to five year schedule to control woody and herbaceous fire-intolerant, invasive species.

## **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. If required, the CESWG will review and provide comments on all project plans, annual monitoring reports, and adaptive management contingencies for the PRMA. The Permittee shall perform measures to control the encroachment of exotic/invasive vegetation after operation as needed.

## **9.0 Performance Standards**

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

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

#### **9.1.1 Hydrology**

Ground surface elevations must be conducive to the re-establishment of PEM / PSS vegetation and the maintenance of hydric soil characteristics. All alterations of the natural topography that have affected the duration and coverage of surface water have been removed or otherwise rendered ineffective as discussed in Section 7.1.

#### **9.1.2 Vegetation**

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

- The PRMA is seeded with appropriate, commercially available, facultative or wetter herbaceous species;
- Invasive species cover will represent less than 10% of the PRMA; and
- No tree strata<sup>4</sup> will be present in the PRMA.

### **9.2 Interim Success Criteria (Year 3)**

#### **9.2.1 Hydrology**

By Year 3, or two years following attainment of the one-year performance criteria, site hydrology will be restored such that the PRMA meets the wetland criterion as described in the 1987 Manual (USACE 1987) and AGCP Regional Supplement (USACE 2010). Data demonstrating the presence of wetland hydrology will be collected and submitted to the CESWG in the monitoring report.

#### **9.2.2 Vegetation**

By Year 3, two years following successful attainment of the Year 1 performance criteria, vegetative monitoring data must indicate the following:

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<sup>4</sup> All references to strata are as defined in the AGCP Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Plan Region (Version 2.0). USACE 2010.

- Exclusive of invasive species, native, herbaceous, PEM/PSS cover is greater than 80 percent within the PRMA;
- Invasive species cover will represent less than 5% within the PRMA; and
- No tree or sapling strata will be present in the PEM/PSS portion of the PRMA.

### **9.3 Long-term Success Criteria (Year 5)**

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, native, herbaceous, emergent cover is greater than 90 percent within the PRMA;
- Invasive species cover will represent less than 1% within the PRMA; and
- No tree or sapling strata will be present in the PRMA.

## **10.0 Monitoring and Reporting Protocols**

### **10.1 Monitoring**

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 annually in the growing season of each monitoring year through achievement of the long-term success criteria using established monitoring protocols. One monitoring station will be established in PRMA. A plant species survey will occur immediately prior to seeding to establish baseline (as-built report) and then in Years 1, 3, and 5. The herbaceous emergent plant community will be sampled utilizing one (1) 1/100th-acre, monitoring plot (radius = 11.7 feet). The Permittee will also collect data on hydrologic conditions as necessary to document evidence of wetland hydrology in accordance with the performance standards listed in Section 9.0. Documentation will include descriptions of the upper 12 inches of the soil profile sufficient to demonstrate hydric soil properties. The monitoring plot will be identified with GPS coordinates recorded at plot center. A map depicting the location of the plot and a listing of the plot coordinates is to be provided to CESWG.

In addition, an ocular, floristic survey will be completed within the PRMA. The floristic survey will estimate species diversity and percent cover by species, which will include a tally of invasive species. Invasive species will not be included in the diversity or percent cover parameters. Species observed throughout the site but not present within the monitoring plot will be recorded for documenting total species richness.

Data collected for initial, interim and long-term monitoring will use the same sample plot as established in the as-built report. For each monitoring report, the Permittee will provide digital images taken from ground level in each cardinal direction from monitoring plot center and from elevated positions to document overall conditions.

After achieving the long-term success criteria (Year 5), permanent monitoring plot sampling will cease. Thereafter, for five years, annual inspections will occur only for monitoring and controlling invasive species. The monitoring station will provide a fixed location to monitor invasive species, native plant cover, hydrologic conditions, and to monitor woody encroachment.

## **10.2 As-built Report**

The As-built Report will be submitted to the CESWG within 60 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 rehabilitation area, establish baseline data, and demonstrate site restoration. The Permittee will perform a floristic survey in the monitoring plot. 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 deviation from the mitigation work plan described in Section 7.0 may 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) digital images taken from ground level at the monitoring station to document the overall conditions;
- 2) a description of the general condition of the plant community and a discussion of likely causes for deficiency;
- 3) a description of the generalized degree and distribution of exotic/invasive species;
- 4) identify measures to eradicate exotic/invasive species and document results of these efforts;
- 5) a general discussion of hydrologic conditions at the monitoring station; and
- 6) a description of wildlife usage at the monitoring station, including any herbivory problems if applicable.

## **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.

The Owner and DLS 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.

Once the long-term criteria are achieved, the estimated long-term, annual cost to maintain the PRMA is \$232.50 per year (Attachment D). 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 \$6,642.86. 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. The principal shall not be used and shall remain as part of the PRMA’s assets to ensure that sufficient funds are available should perpetual maintenance responsibilities be assumed by a third party.

## **12.0 Adaptive Management Plan**

An adaptive management plan, contingencies, and remedial responsibilities will be implemented in the event that monitoring reveals certain performance criteria have not been met. In the event of a deficiency, the Permittee shall provide a notice to the CESWG. The notice will include an explanation for the deficiency and will outline specific practices and measures that will guide decisions for revising the PRMP if needed. If the CESWG determines that the PRMA is not in compliance with 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 within forty-five (45) days of receipt, provided sufficient information and acceptable measures are contained in the plan.

## **13.0 Financial Assurances**

The total financial exposure for construction and establishment is \$2,146.70. The construction and establishment financial assurances will be provided by a casualty insurance policy. The construction cost estimate with 5% contingency adjustment at Year 0 is \$768.60 (Attachment D). The PEM/PSS establishment cost estimate for Year 1 through Year 5 is \$1,378.10. To provide financial assurance protection during construction (Year 0) and establishment (Year 1 through Year 5) and per 33 CFR 332.3(n), the mitigation provider shall purchase a casualty insurance policy or establish a cash escrow account to protect the PRMA’s mitigation assets in the event of non-compliance or PRMA failure and to ensure that sufficient funds are available to a third party.

If the casualty insurance policy is purchased, it will be purchased for a non-cancellable period of 5 years and a certificate of insurance coverage will be submitted to the CESWG. The casualty policy will provide the operative language that the insurance company will pay necessary funds to a third party to complete the compensatory mitigation obligation for the credits sold. The third party(s) and any solution will be subject to approval by the CESWG. For coverage under the

policy, a claim must be made by the CESWG during the policy period. The PRMA's insurer will be Ecosystems Insurance Associates, LLC ([www.eco-ins.com](http://www.eco-ins.com)), which has provided coverage in that district. Ecosystems Insurance Associates, LLC is rated by AM Best Rating Service with an A-XV rating, which is defined as an excellent rating with \$2 billion or more in assets.

## 14.0 References

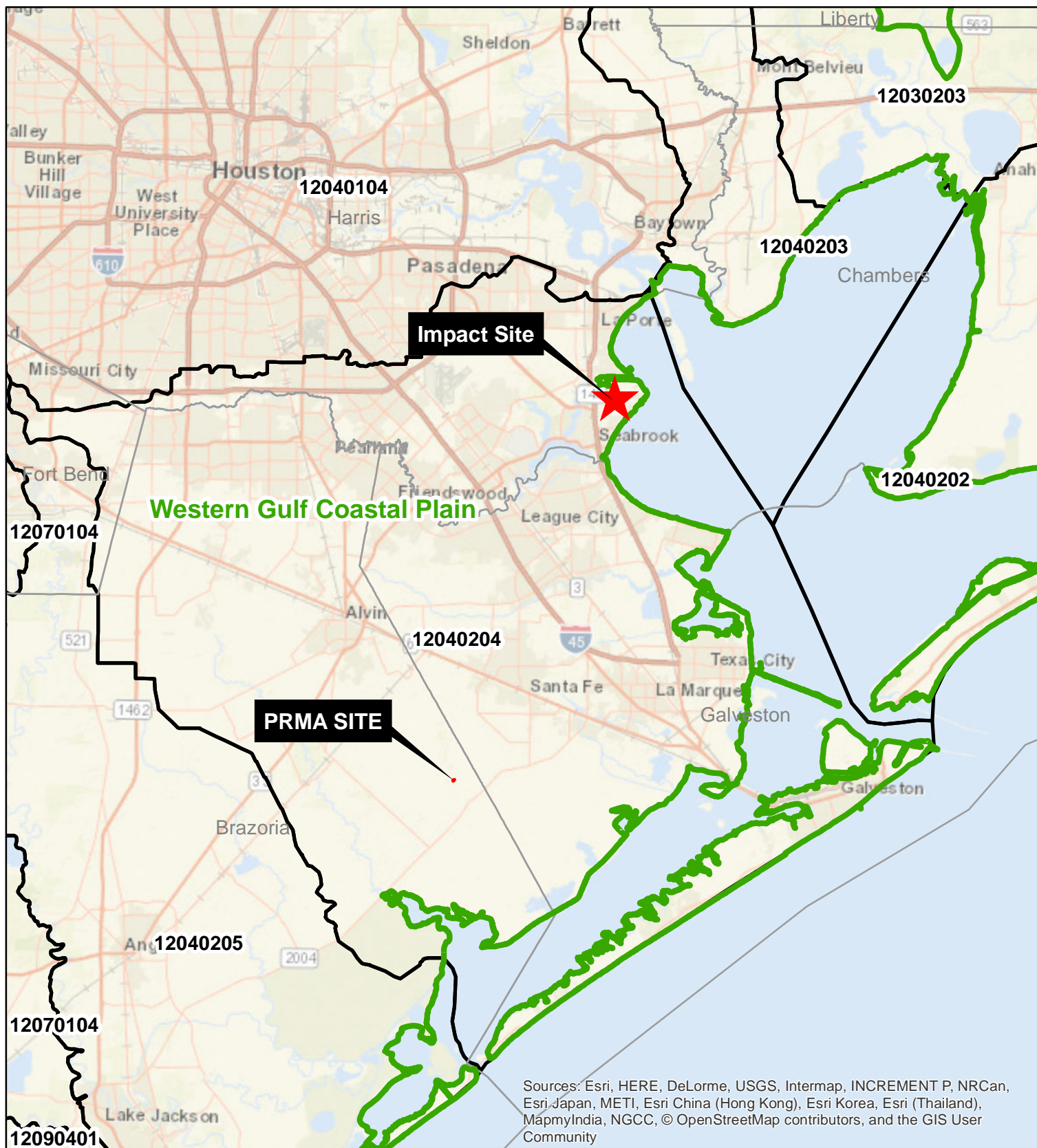
- Allen, J. A., B.D. Keeland, J. A. Stanturf, A. F. Clewell, and H. E. Kennedy, Jr. (2000) (revised 2004) *A Guide to Bottomland Hardwood Restoration*. USDA Forest Service General Technology Report SRS-40.
- DallaRosa, Jeff and Pulich, Dr. Warren (2005) *West Bay Conservation Initiative*. Presentation Presented to the Galveston Bay Estuary Program. Accessed February 13, 2019. Available URL: [http://www.tsswcb.texas.gov/files/docs/West\\_Bay2.pdf](http://www.tsswcb.texas.gov/files/docs/West_Bay2.pdf)
- Griffith, G., Bryce, S. Omernik, J., and A. Rogers (2007) *Ecoregions of Texas*. Project report to Texas Commission on Environmental Quality, prepared in part with funds from the U.S. Environmental Protection Agency. Accessed February 13, 2019. [ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf).
- Gulf Coast Bird Observatory (2016) *Land Protection*. Accessed February 13, 2019. Available URL: <http://www.gcbo.org/land-protection/>.
- Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner (2016) *The National Wetland Plant List: 2016 Update of Wetland Ratings*. Phytoneuron 2016-41: 1-42. Accessed February 13, 2019. Available URL: [http://wetland\\_plants.usace.army.mil/](http://wetland_plants.usace.army.mil/).
- Seaber, P.R, F.P. Kapinos, and G. L. Knapp (1987) *Hydrologic Unit Maps*. US Geological Survey. Water Supply Paper 2294.
- Natural Resources Conservation Service [NRCS] (2015) *Web Soil Survey, Version 2.2.6* [website]. U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey. Accessed February 13, 2019. Available URL <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
- United States Army Corps of Engineers [USACE] (1987) *Corps of Engineers Wetland Delineation Manual*. USACE Waterways Experiment Station Technical Report Y-87-1.
- United States Army Corps of Engineers [USACE] (2010) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*. United States Corps of Engineers Research and Development Center, Vicksburg, MS. ERDC/EL TR-10-20.
- U.S. Environmental Protection Agency [EPA] (2012) *Level IV Ecoregions of Texas*. U.S. EPA Office of Research and Development, National Health and Environmental Effects Research Laboratory. Accessed February 13, 2019. Available URL [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm).

## Attachment A. Figures

Figure 1. Vicinity, Watershed, and Ecoregion Map

Figure 2. Aerial Map with Floodplain and Soils

Figure 3. Mitigation Features Map



#### Legend

- Proposed PRMA (1.0 ac)
- EPA Level III Ecoregion
- 8-Digit HUC



**INEOS Styrolution America LLC**

#### VICINITY MAP

**Brazoria and Harris County, TX**

Created : TSC/ARCVIEW

Approved: CB

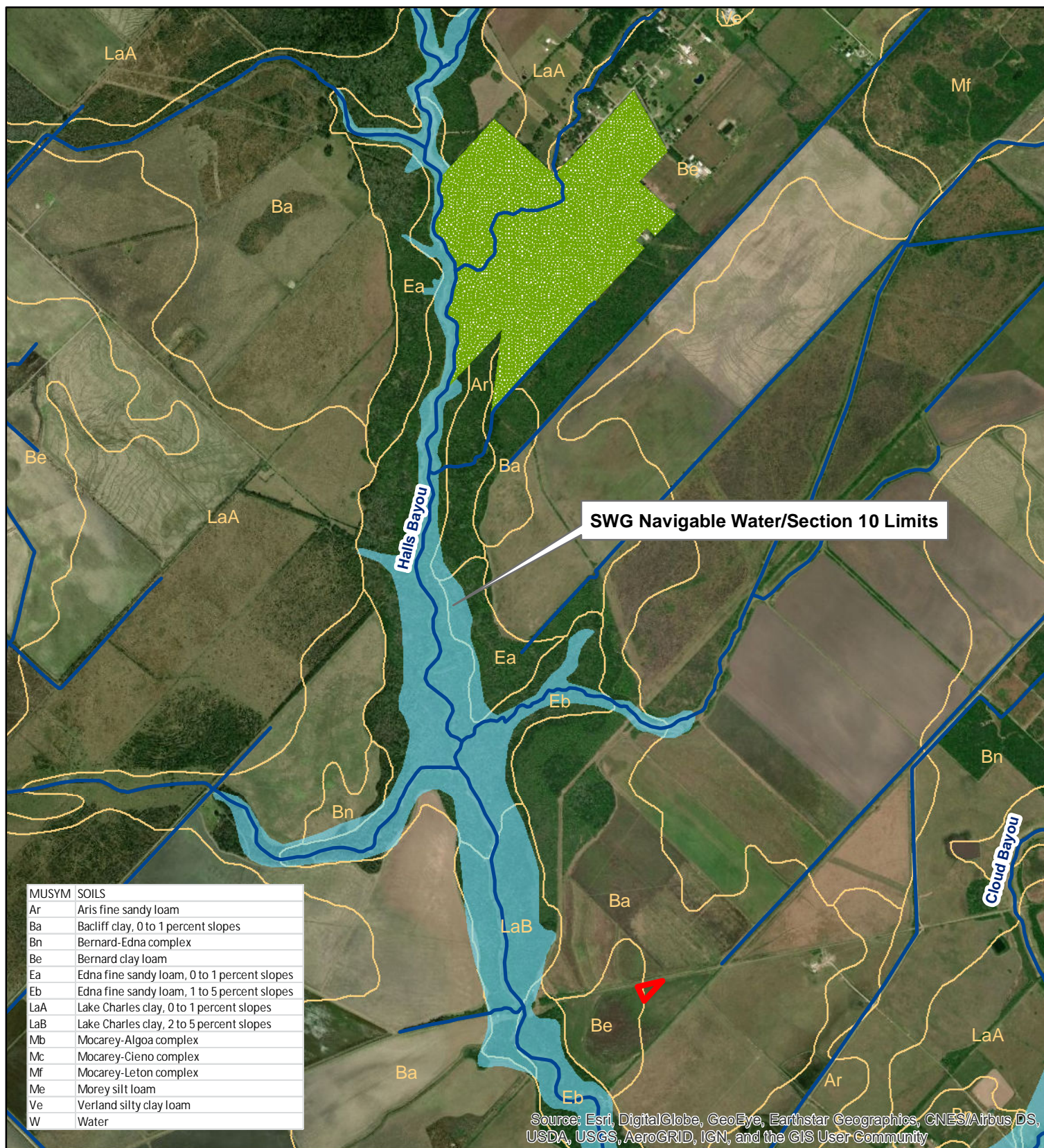
Date : 2/4/2019

Map No. : F1\_Vicinity.mxd



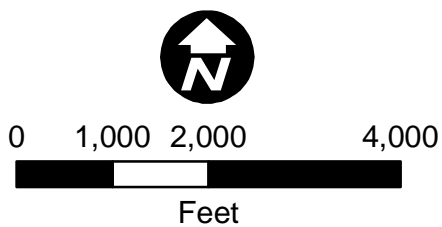
**FIGURE 1**





## Legend

- Proposed PRMA (1.0 ac)
- NHDFlowline
- USFWS San Bernard National Wildlife Refuge
- FEMA Flood Zone A
- SURRGO Soils



INEOS Styrolution America LLC

## FLOODPLAIN AND SOILS MAP

Brazoria County, TX

Created : TSC/ARCVIEW

Approved: CB

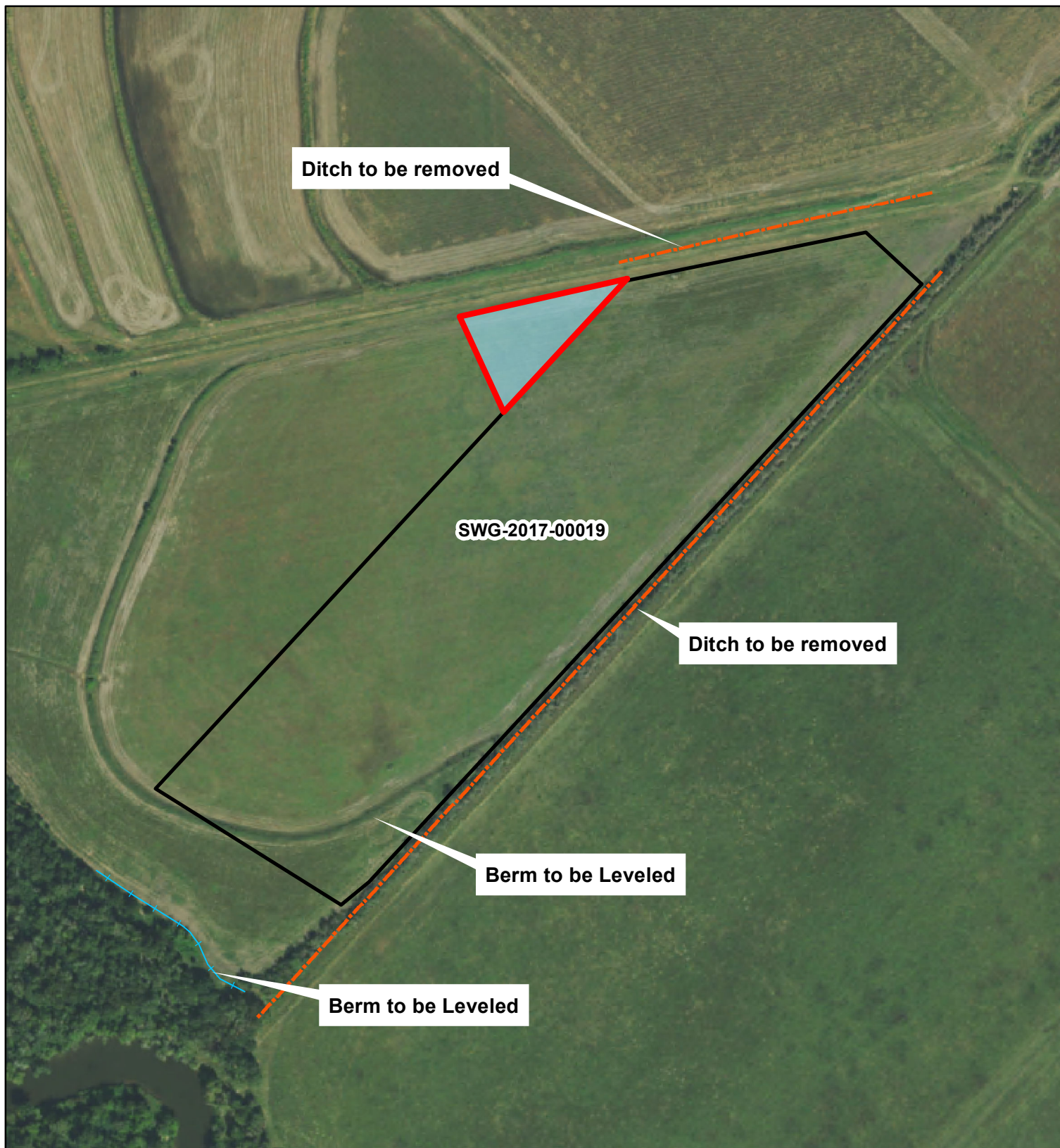
Date : 2/4/2019

Map No. : F2\_Connectivity.mxd



**FIGURE 2**





**Legend**

- Proposed PRMA (1.0 ac)
- PEM/PSS Rehabilitation
- (1.0 ac) Existing
- + SWG-2017-00019 Berm to be Levelled



0      150      300      600



Feet

**INEOS Styrolution America LLC**

**MITIGATION FEATURES**

**Brazoria County, TX**

Created : TSC/ARCVIEW

Approved: CB

Date : 2/4/2019

Map No. : F3\_Features.mxd



**FIGURE 3**

## Attachment B. Rehabilitation Riverine Herbaceous Shrub Hydrogeomorphic Interim Model Workbook

## Required Mitigation

**Table 1. PEM/PSS Wetland Impacts and Mitigation by Function, SWG-2018-00613.**

<b>Function</b>	<b>Impact Functional Capacity Unit (FCU)</b>	<b>Rehabilitated Functional Capacity Index (FCI) Lift</b>	<b>Calculated Mitigation Acres by Function</b>	<b>Watershed Multiplier</b>	<b>Total Mitigation Acres Required</b>	<b>Total Required Mitigation Acres</b>
<b>TSSW<sup>1</sup></b>	0.291	0.376	0.774	1.00	0.774	0.77
<b>MPAC<sup>2</sup></b>	0.267	0.500	0.533	1.00	0.533	
<b>RSEC<sup>3</sup></b>	0.225	0.303	0.743	1.00	0.743	

<sup>1</sup>TSSW (Temporary Storage and Detention of Storage Water [Physical])

<sup>2</sup>MPAC (Maintain Plant and Animal Communities [Biological])

<sup>3</sup>RSEC (Removal and Sequestration of Elements and Compounds [Chemical])

**Table 2. SWG-2018-00613 PRM Site Year 0  
Riverine Herbaceous-Shrub iHGM**

<b>WAA ID:SWG-2018-00613 PRM Impact Site</b>		
<b>Acreage</b>	<b>0.46</b>	
<b>Variable</b>	<b>Index Value</b>	
Vdur: Duration of flooding	0.50	
Vfreq: Frequency of flooding	0.50	
Vtopo: Topography	1.00	
Vwood: Woody vegetation	0.25	
Vmid: Midstory (Shrub/sapling/woody vines)	0.25	
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	0.637	
Biological FCI: Maintain Plant and Animal Community	0.583	
Chemical FCI: Removal & Sequestration of Elements & Compounds	0.493	
Physical FCU: Temporary Storage & Detention of Storage Water	0.291	
Biological FCU: Maintain Plant and Animal Community	0.267	
Chemical FCU: Removal & Sequestration of Elements & Compounds	0.225	

**Table 3. SWG-2018-00613 PRM Site Year 0  
Riverine Herbaceous-Shrub iHGM**

<b>WAA ID:SWG-2018-00613 PRM Site</b>		
<b>Acreage</b>	<b>1.00</b>	
<b>Variable</b>	<b>Index Value</b>	
Vdur: Duration of flooding	0.25	
Vfreq: Frequency of flooding	0.25	
Vtopo: Topography	0.40	
Vwood: Woody vegetation	0.25	
Vmid: Midstory (Shrub/sapling/woody vines)	0.25	
Vherb: Herbaceous layer	0.25	
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	0.285	
Biological FCI: Maintain Plant and Animal Community	0.333	
Chemical FCI: Removal & Sequestration of Elements & Compounds	0.303	
Physical FCU: Temporary Storage & Detention of Storage Water	0.285	
Biological FCU: Maintain Plant and Animal Community	0.333	
Chemical FCU: Removal & Sequestration of Elements & Compounds	0.303	

**Table 4. SWG-2018-00613 PRM Site Year 5  
Riverine Herbaceous-Shrub iHGM**

<b>WAA ID:SWG-2018-00613 PRM Site</b>		
<b>Acreage</b>	<b>1.00</b>	
<b>Variable</b>	<b>Index Value</b>	
Vdur: Duration of flooding	0.50	
Vfreq: Frequency of flooding	0.50	
Vtopo: Topography	1.00	
Vwood: Woody vegetation	0.50	
Vmid: Midstory (Shrub/sapling/woody vines)	0.50	
Vherb: Herbaceous layer	1.00	
Vconnect: Connectivity to other habitat types	1.00	
Vdetritus: Detritus	1.00	
Vredox: Redoximorphic process	0.10	
Vsorpt: Sorptive Soil Properties	1.00	

Physical FCI: Temporary Storage & Detention of Storage Water	0.661	
Biological FCI: Maintain Plant and Animal Community	0.833	
Chemical FCI: Removal & Sequestration of Elements & Compounds	0.607	
Physical FCU: Temporary Storage & Detention of Storage Water	0.661	
Biological FCU: Maintain Plant and Animal Community	0.833	
Chemical FCU: Removal & Sequestration of Elements & Compounds	0.607	

**FCI Lift Year 5 - Year 0**

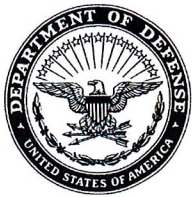
0.376

0.500

0.303

## Attachment C. Jurisdictional Determination and Wetland Delineation Data Sheets





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

March 1, 2018

Compliance Branch

SUBJECT: **SWG-2016-00700**; Delta Land Services, LLC., Approved Jurisdictional Determination, Proposed Halls Bayou Mitigation Bank on a 456.6-Acre Tract, Located Approximately 9,000 Feet Northwest of the FM 2004 and Halls Bayou Intersection, Brazoria County, Texas

Mr. Jace Jarreau  
Delta Land Services, LLC.  
1090 Cinclare Drive  
Port Allen, Louisiana 70767

Dear Mr. Jarreau:

This letter is in response to your August 1, 2016, request for an Approved Jurisdictional Determination and wetland delineation verification of waters of the United States on an approximate 456.6-acre site. The project site is a proposed mitigation bank located approximately 9,000 feet northwest of the FM 2004 and Halls Bayou intersection in Brazoria County, Texas (map enclosed).

Navigable waters are subject to Section 10 of the Rivers and Harbors Act of 1899 (Section 10). Section 10 requires Department of the Army (DA) authorization for any work and/or structures in/or affecting any navigable waters of the United States (which include all waters subject to the ebb and flow of the tide). Under Section 404 of the Clean Water Act (Section 404), a Department of the Army (DA) Permit is required prior to the discharge of any dredged and/or fill material into any waters of the United States (including adjacent wetlands). Wetlands with a surface hydrologic connection to a Traditional Navigable Waterway (TNW) are adjacent and are waters of the United States subject to Section 404.

Based on the review of the information provided, off-site data and information gathered during our March 22, 2017 site visit, we determined that the 456.6-acre project area contains approximately 75.56 acres of waters of the United States. Specifically, the project area contains 5.43 acres (5,774 linear feet) of Halls Bayou, 2.29 acres (1,905 linear feet) of an unnamed tributary to Halls Bayou, and 67.84 acres of wetlands adjacent to Halls Bayou. Halls Bayou is subject to the ebb and flow of the tide and is a traditional navigable water of the United States subject to Section 10 and Section 404. The acreage of navigable waters includes a drainage ditch located between WetMos18 and WetMos19 that extends the mean high water line of Halls Bayou approximately 650 feet. The unnamed tributary to Halls Bayou is a relatively permanent water and is a water of the United States subject to Section 404. The adjacent wetlands are

neighboring and, therefore, adjacent to Halls Bayou and are waters of the United States subject to Section 404. The 456.6-acre project area also contains approximately 264.3 acres of isolated wetlands that have no known nexus to interstate commerce and are not waters of the United States and are not subject to Section 404. Therefore, any work or structures in Halls Bayou or the discharge of fill material into the adjacent wetlands, the unnamed tributary to Halls Bayou and/or Halls Bayou requires a Department of the Army permit. The discharge of fill material into the isolated wetlands does not require a Department of the Army permit. The wetlands on site were identified using the Regional Supplement to the 1987 Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), which requires under normal circumstances, a predominance of hydrophytic vegetation, wetland soils, and sufficient hydrology at/or near the surface for adequate duration and frequency to support this aquatic ecosystem.

In addition, we have determined the delineation survey is a reasonable depiction of the approximate locations of the aquatic resources in the project area (see map enclosure). The listing of the features identified and their jurisdictional status is included in the second enclosure (see Final Resources Table enclosure). All features identified as waters of the United States within the project area will require a Department of the Army permit prior to any discharge of dredged or fill material into waters of the United States, including adjacent wetlands.

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

This letter contains an approved jurisdictional determination for your subject site, which is valid for 5 years from the date of this letter unless new information warrants a revision prior to the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination, you must submit a completed RFA form to the Southwestern Division Office at the following address:

Mr. Elliott Carman  
Regulatory Appeals Officer  
Southwestern Division, USACE, CESWD-PD-O  
1100 Commerce Street, Suite 831  
Dallas, Texas 75242-1317  
Telephone: 469-487-7061; FAX: 469-487-7199

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within **60 days** of the date of the NAP. It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter

If you have any questions concerning this jurisdictional determination, please reference file number **SWG-2016-00700** and contact Ms. Diana Stevens at the letterhead address or by telephone at 409-766-6380. To assist us in improving our service to you, please complete the survey found at [http://corpsmapu.usace.army.mil/cm\\_apex/f?p=136:4:0](http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0) and/or, if you would prefer a hard copy of the survey form, please let us know, and one will be mailed to you.

Sincerely,



John Davidson  
Team Lead, Compliance Branch

Enclosures

SWG-2016-00700 Delta, Halls Bayou Mitigation Bank AJD  
Final Resource Table

USACE Name	Consultant Initial ID	Latitude	Longitude	Cowardin	Area/Acres	Jurisdiction
WetMos18	Wet1_30%	29.30415866	-95.15291884	PFO	26.02x0.30= 7.80	TNW Adj Section 404
WetMos19	Wet2_30%	29.29915094	-95.15126173	PFO	16.98 x0.30=5.09	TNW Adj Section 404
WetMos20	Wet3_30%	29.30107500	-95.15180000	PFO	0.24 x0.30=0.07	TNW Adj Section 404
Wet16	JWet1	29.31415151	-95.14562128	PSS	13.91	TNW Adj Section 404
Wet17	JWet2	29.30778913	-95.15094521	PFO	38.59	TNW Adj Section 404
Wet14	JWet3	29.31255581	-95.14554726	PEM	0.02	TNW Adj Section 404
Wet15	JWet4	29.31265864	-95.14549424	PEM	0.02	TNW Adj Section 404
TNW1	OW1	29.30585500	-95.15432500	RUB	~5,774 LF/5.43ac	Section 10 Tidal Extent of Bayou
RPW2	OW2	29.31312800	-95.14506800	RUB	~1,905 LF/2.29ac	Section 404
Wet1	NJwet1	29.31125616	-95.14084463	PEM	~53.7	Isolated
Wet2	NJwet2	29.30965222	-95.14301770	PEM	~57.2	Isolated
Wet3	NJwet3	29.3061759	-95.14574091	PEM	~39.4	Isolated
Wet4	NJwet4	29.30491195	-95.14748759	PEM	~38.8	Isolated
Wet5	NJwet5	29.30266576	-95.14686831	PEM	~1.2	Isolated
Wet6	NJwet6	29.30294787	-95.14793642	PEM	~5.7	Isolated
Wet7	NJwet7	29.303388	-95.14921383	PEM	~10.3	Isolated
Wet8	NJwet8	29.30390352	-95.15019125	PEM	~7.2	Isolated
Wet9	NJwet9	29.30382452	-95.15075609	PEM	~4.7	Isolated
Wet10	NJwet10	29.30230536	-95.15113355	PEM	~3.3	Isolated
Wet11	NJwet11	29.30167100	-95.15182900	PEM	2.34	TNW Adj Section 404
Wet12	NJwet12	29.30054701	-95.14752723	PEM	~31.0	Isolated
Wet13	NJwet13	29.29945100	-95.15045300	PEM	~11.7	Isolated

Three JD forms completed with the following groupings:

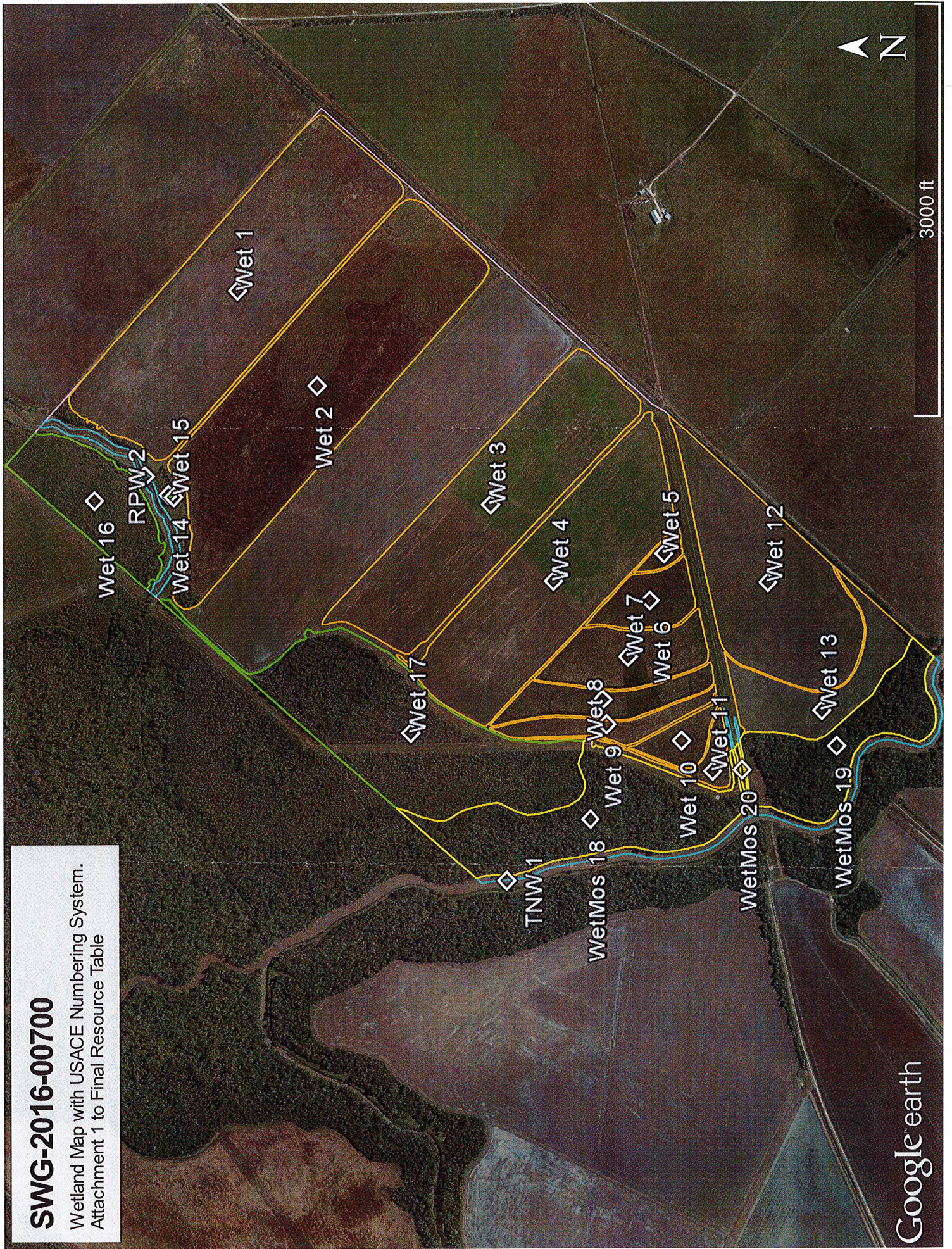
1. TNW1 (~ 5,774 LF, or 5.43 acres) and Adj Wets: WetMos18-20 & Wet 11 & 14-17 (67.84 acres).
2. RPW2 (~ 1,905 LF, or 2.29 acres)
3. Isolated Wetlands – Wet1-10, 12 & 13 total ~264.3 acres

The site contains a total of 75.56 acres of waters of the United States



# SWG-2016-00700

Wetland Map with USACE Numbering System.  
Attachment 1 to Final Resource Table





## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: <b>DELTA LAND SERVICES, LLC</b>	File Number: <b>SWG 2016-00700</b>	Date: <b>03/01/29/2018</b>
Attached is:		See Section below
<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
<input type="checkbox"/>	PERMIT DENIAL	C
<input checked="" type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION	D
<input type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx> or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

## SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

### POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Ms Diana Stevens  
Project Manager CESWG-RD-C  
U.S. Army Corps of Engineers  
P.O. Box 1229  
Galveston, Texas 77553-1229  
409-766-6380 FAX: 409-766-3931

If you only have questions regarding the appeal process you may also contact:

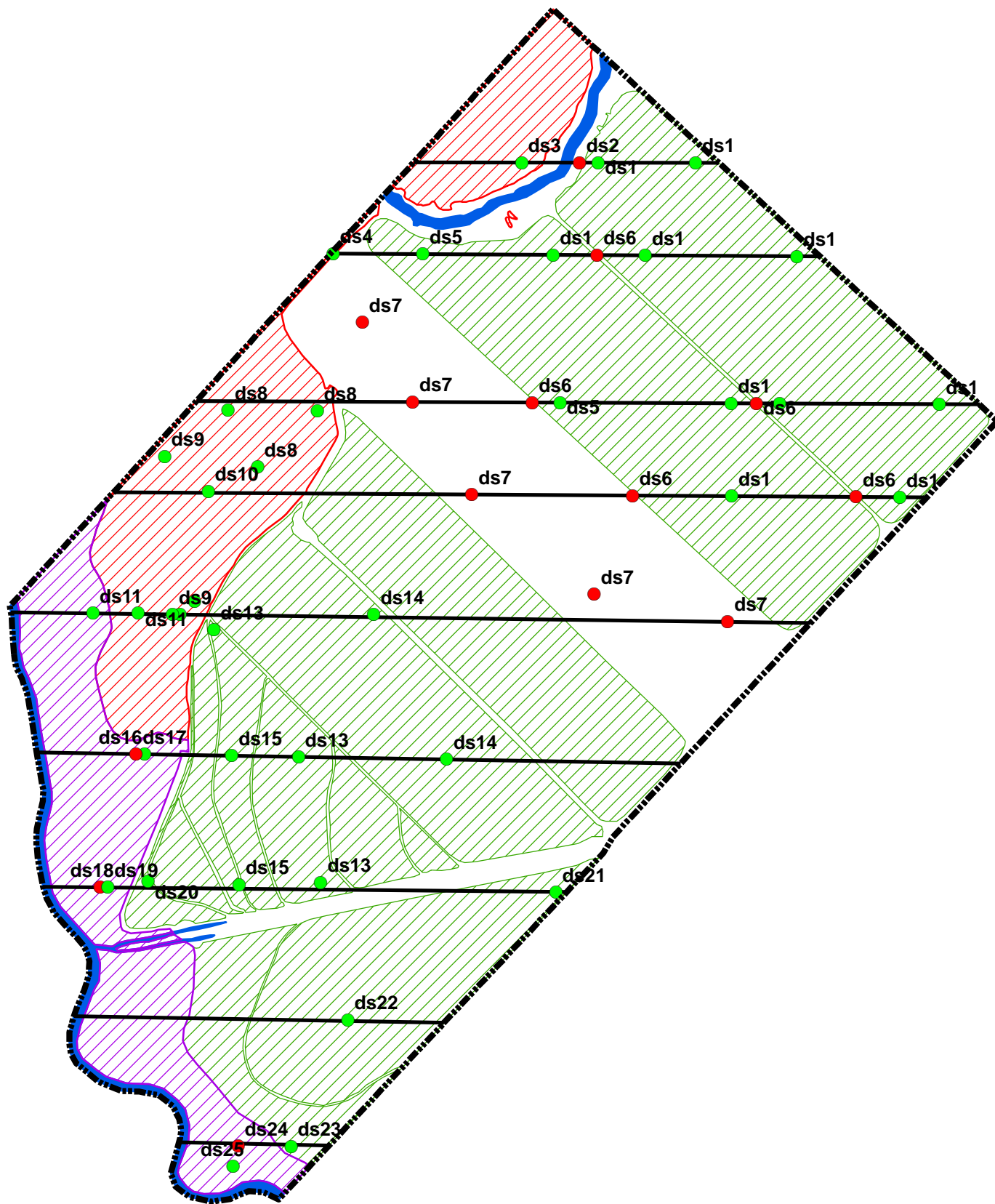
Mr. Elliott Carman  
Administrative Appeals Review Officer (CESWD-PD-O)  
U.S. Army Corps of Engineers  
1100 Commerce Street, Suite 831  
Dallas, Texas 75242-1317  
469-487-7061

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.









\_\_\_\_\_  
Signature of appellant or agent.

Date:

Telephone number:




#### Legend

-  Project Area (456.5 ac)
-  Non-Wetland Sample Point
-  Wetland Sample Point
-  Sample Location Transects
-  30% Mixed Jurisdictional Wetlands (43.2 ac.)
-  Jurisdictional Wetlands (52.5 ac.)
-  Jurisdictional Waters of the U.S. (7.7 ac.)
-  Non-Jurisdictional Wetlands (266.5 ac.)



0 400 800 1,600



Feet

Halls Bayou Wetland Delineation

#### WETLAND DELINEATION MAP

Brazoria County, TX

Created : TSC/ARCVIEW

Approved: CB

Date : 6/23/2016

Map No. : F7\_WLD.mxd



**FIGURE 7**



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Halls Bayou **City/County:** Brazoria **Sampling Date:** 05-Jul-16  
**Applicant/Owner:** Delta Land Services, LLC **State:** LA **Sampling Point:** 21  
**Investigator(s):** J. Jarreau, B. Delaney, C. Butler **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** MLRA 150A in LRR T **Lat.:** 29.302013 **Long.:** -95.144479 **Datum:** NAD83  
**Soil Map Unit Name:** Bernard Clay Loam **NWI classification:** N/A

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks: Ph. 041-047.	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  		
Remarks:		

**VEGETATION (Five/Four Strata) - Use scientific names of plants.**

Tree Stratum (Plot size: _____ )					Dominant Species?	Sampling Point: <u>21</u>
	Absolute % Cover	Rel.Strat. Cover	Indicator Status			
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
7. _____	0	<input type="checkbox"/> 0.0%				
8. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	= Total Cover			
Sapling or Sapling/Shrub Stratum (Plot size: _____ )						
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
7. _____	0	<input type="checkbox"/> 0.0%				
8. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	= Total Cover			
Shrub Stratum (Plot size: _____ )						
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	= Total Cover			
Herb Stratum (Plot size: _____ )						
1. <i>Eryngium hookeri</i>	60	<input checked="" type="checkbox"/> 63.8%	FACW			
2. <i>Lythrum alatum</i>	20	<input checked="" type="checkbox"/> 21.3%	OBL			
3. <i>Helianthus angustifolius</i>	10	<input type="checkbox"/> 10.6%	FACW			
4. <i>Iva annua</i>	3	<input type="checkbox"/> 3.2%	FAC			
5. <i>Verbena littoralis</i> var. <i>brevibracteata</i>	1	<input type="checkbox"/> 1.1%	UPL			
6. _____	0	<input type="checkbox"/> 0.0%				
7. _____	0	<input type="checkbox"/> 0.0%				
8. _____	0	<input type="checkbox"/> 0.0%				
9. _____	0	<input type="checkbox"/> 0.0%				
10. _____	0	<input type="checkbox"/> 0.0%				
11. _____	0	<input type="checkbox"/> 0.0%				
12. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>47</u>	20% of Total Cover: <u>18.8</u>	94	= Total Cover			
Woody Vine Stratum (Plot size: _____ )						
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	= Total Cover			

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>70</u>	x 2 = <u>140</u>
FAC species <u>3</u>	x 3 = <u>9</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>1</u>	x 5 = <u>5</u>
Column Total s: <u>94</u> (A)	<u>174</u> (B)
Prevalence Index = B/A = <u>1.851</u>	

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: 21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-3	10YR	4/2	95%	10YR	3/6	5%	M	Clay	
3-16	10YR	4/1	80%	7.5YR	4/6	15%	M	Clay	
				7.5YR	5/8	5%	PL	Clay	

<sup>1</sup> Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains    <sup>2</sup>Location: PL=Pore Lining. M=Matrix

## Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils<sup>3</sup>:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present?    Yes ☒    No ☐

Remarks:

**DP 21**



**General View**



**Soil Profile**

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Halls Bayou **City/County:** Brazoria **Sampling Date:** 05-Jul-16  
**Applicant/Owner:** Delta Land Services, LLC **State:** LA **Sampling Point:** 22  
**Investigator(s):** J. Jarreau, B. Delaney, C. Butler **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** MLRA 150A in LRR T **Lat.:** 29.299938 **Long.:** -95.148174 **Datum:** NAD83  
**Soil Map Unit Name:** Bernard Clay Loam **NWI classification:** N/A

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks: Ph. 129-133	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  		
Remarks:		

**VEGETATION (Five/Four Strata) - Use scientific names of plants.**

**Dominant Species?**

**Sampling Point: 22**

Tree Stratum	(Plot size: )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0    20% of Total Cover: 0		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0    20% of Total Cover: 0		0	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0    20% of Total Cover: 0		0	<b>= Total Cover</b>	
Herb Stratum	(Plot size: )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1. Symphyotrichum subulatum		80	<input checked="" type="checkbox"/> 95.2%	OBL
2. Eryngium hookeri		1	<input type="checkbox"/> 1.2%	FACW
3. Leptochloa digitata		1	<input type="checkbox"/> 1.2%	OBL
4. Cyperus esculentus		1	<input type="checkbox"/> 1.2%	FAC
5. Persicaria hydropiperoides		1	<input type="checkbox"/> 1.2%	OBL
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 42    20% of Total Cover: 16.8		84	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0    20% of Total Cover: 0		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 82 Multiply by: 1

OBL species 82 x 1 = 82

FACW species 1 x 2 = 2

FAC species 1 x 3 = 3

FACU species 0 x 4 = 0

UPL species 0 x 5 = 0

Column Total s: 84 (A) 87 (B)

Prevalence Index = B/A = 1.036

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: 22

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

<sup>1</sup>Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains    <sup>2</sup>Location: PL=Pore Lining. M=Matrix

---

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:



**DP 22**



**General View**



**Soil Profile**



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Halls Bayou City/County: Brazoria Sampling Date: 05-Jul-16  
 Applicant/Owner: Delta Land Services, LLC State: LA Sampling Point: 23  
 Investigator(s): J. Jarreau, B. Delaney, C. Butler Section, Township, Range: S T R  
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope: 1.0 % / 0.6 °  
 Subregion (LRR or MLRA): MLRA 150A in LRR T Lat.: 29.297934 Long.: -95.149154 Datum: NAD83  
 Soil Map Unit Name: Edna Fine Sandy Loam, 1-5% slope NWI classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Ph. 036-040.	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  		
Remarks:  		

**VEGETATION (Five/Four Strata) - Use scientific names of plants.**

Sampling Point: 23

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<i>Eryngium hookeri</i>	60	<input checked="" type="checkbox"/> 84.5%	FACW
2.	<i>Verbena litoralis</i> var. <i>brevibracteata</i>	5	<input type="checkbox"/> 7.0%	UPL
3.	<i>Iva annua</i>	5	<input type="checkbox"/> 7.0%	FAC
4.	<i>Paspalum urvillei</i>	1	<input type="checkbox"/> 1.4%	FAC
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>35.5</u> 20% of Total Cover: <u>14.2</u>		71	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<i>Campsis radicans</i>	5	<input checked="" type="checkbox"/> 100.0%	FAC
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>2.5</u> 20% of Total Cover: <u>1</u>		5	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0 Multiply by: 1

OBL species 0 x 1 = 0

FACW species 60 x 2 = 120

FAC species 11 x 3 = 33

FACU species 0 x 4 = 0

UPL species 5 x 5 = 25

Column Total s: 76 (A) 178 (B)

Prevalence Index = B/A = 2.342

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤ 3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type <sup>1</sup>		
0-4	10YR	4/1	95%	10YR	3/6	5%		Sandy Clay	
4-16	10YR	4/1	90%	10YR	3/6	10%		Clay	

<sup>1</sup> Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains <sup>2</sup>Location: PL=Pore Lining. M=Matrix

## Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils<sup>3</sup>:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

**DP 23**



**General View**



**Soil Profile**

## Attachment D. Construction, Establishment, and Long-term Finances



**Costs Analysis**  
**COE SWG-2018-00613**

Item	Units	Unit Values	Price Per Unit	Total Cost
Boundary Maintenance	Mile	0.0	\$ 150.00	\$ -
PEM/PSS Invasive Species Control	Acre	1.0	\$ 20.00	\$ 20.00
PEM/PSS Invasive Species Control Mobilization	Fixed	Fixed	Fixed	\$ 200.00
PEM/PSS Inspections (rate and per diem)	Day	1.0	\$ 200.00	\$ 200.00
Taxes on PEM/PSS Project Acreage	Acre	1.0	\$ 10.00	\$ 10.00
Herbaceous Planting Acreage	Acre	1.0	NA	NA
Herbaceous Planting Materials and Distribution	Seeds	10.0	\$ 50.00	\$ 500.00
Prescribed Fire (PEM/PSS)	Acre	1.0	\$ 50.00	\$ 50.00
Forest Planting Acreage	Acre	0.0	NA	NA
Site Prep per Acre (disking and ripping)	Acre	0.0	\$ 40.00	\$ -
Site Prep per Acres (herbicides)	Acre	0.0	\$ 40.00	\$ -
Seedling Planting Rate	Trees/Acre	436.0	NA	NA
Seedling Cost	Seedling	0.0	\$ 0.22	\$ -
Seedling Installation Rate	Seedling	0.0	\$ 0.17	\$ -
Seedling and Planting Cost	Seedling	0.0	\$ 0.39	\$ -
Hydrology Restoration (Earth Moving; blade/disk)	Cubic Yard	400	\$ 0.50	\$ 200.00
Site Prep and Pre-emergent Spray (PFO)	Acre	0.0	\$ 100.00	\$ -
Site Prep Herbaceous	Acre	1.0	\$ 150.00	\$ 150.00
Total Credit Acreage	Acre	20.2	NA	NA
Conservation Easement Acreage	Acre	20.2	NA	NA
PEM/PSS Mitigation Acres	Acre	1.0		

**PEM/PSS Construction Costs**  
**COE SWG-2018-00613**

**PEM/PSS Construction Costs**

Item	Units	Unit Values	Price Per Unit	Percent	Cost
Hydrology Restoration	Cubic Yards	400	\$ 0.50	3%	\$ 6.00
PEM/PSS Invasive Species Control	Herbicide	20.0	-	100%	\$ 20.00
PEM/PSS Invasive Species Mobilization	Application	200	-	3%	\$ 6.00
PEM/PSS Site Prep	Acres	1.0	150	100%	\$ 150.00
Planting Materials and Distribution	Seeds	10	50	100%	\$ 500.00
Prescribed Fire (PEM/PSS)	Acres	1.0	50	100%	\$ 50.00
<b>PEM/PSS Subtotal</b>					<b>\$ 732.00</b>
<b>PEM/PSS Construction Cost with 5% Contingency</b>					<b>\$ 768.60</b>
<b>Cost Per Credit Acre</b>					<b>\$ 1,147.16</b>

**Total PEM/PSS Construction                   \$    768.60**

**Total PEM/PSS Construction and  
Establishment                                   \$  2,146.70**

**PEM/PSS Establishment Costs for  
SWG-2018-00613 PRM  
Year 1 to 5**

Year	Event	Event Cost	Percent of Event Cost	Occurrences Per Year	Cost	Percent of Cost	Release Milestone
1	Monitoring/ Inspection <sup>1</sup>	\$ 200.00	100%	1	\$ 200.00		
1	PEM/PSS Seed Replanting	\$ 500.00	30%	1	\$ 150.00		
1	Invasive Species Mobilization/Control	\$ 26.00	100%	1	\$ 26.00		
1	Property Taxes	\$ 10.00	100%	1	\$ 10.00		<b>Initial Success</b>
<b>1</b>	<b>Subtotal</b>				<b>\$ 386.00</b>	<b>28.0%</b>	<b>\$386.00</b>
2	Monitoring/ Inspection	\$ 200.00	100%	1	\$ 200.00		
2	PEM/PSS Seed Replanting	\$ 500.00	10%	1	\$ 50.00		
2	Invasive Species Mobilization/Control	\$ 26.00	50%	1	\$ 13.00		
2	Preccribed Fire	\$ 40.00	100%	1	\$ 40.00		
2	Property Taxes	\$ 10.00	100%	1	\$ 10.00		
<b>2</b>	<b>Subtotal</b>				<b>\$ 313.00</b>	<b>22.7%</b>	
3	Monitoring/ Inspection	\$ 200.00	100%	1	\$ 200.00		
3	Invasive Species Mobilization/Control	\$ 26.00	20%	1	\$ 5.20		
3	Property Taxes	\$ 10.00	100%	1	\$ 10.00		<b>Interim Success</b>
<b>3</b>	<b>Subtotal</b>				<b>\$ 215.20</b>	<b>15.6%</b>	<b>\$528.20</b>
4	Monitoring/ Inspection	\$ 200.00	100%	1	\$ 200.00		
4	Invasive Species Mobilization/Control	\$ 26.00	10%	1	\$ 2.60		
4	Property Taxes	\$ 10.00	100%	1	\$ 10.00		
<b>4</b>	<b>Subtotal</b>				<b>\$ 212.60</b>	<b>15.4%</b>	
5	Monitoring/ Inspection	\$ 200.00	100%	1	\$ 200.00		
5	Invasive Species Mobilization/Control	\$ 26.00	5%	1	\$ 1.30		
5	Preccribed Fire	\$ 40.00	100%	1	\$ 40.00		
5	Property Taxes	\$ 10.00	100%	1	\$ 10.00		<b>Long-term Success</b>
<b>5</b>	<b>Subtotal</b>				<b>\$ 251.30</b>	<b>18.2%</b>	<b>\$463.90</b>
<b>Total Establishment Cost</b>					<b>\$ 1,378.10</b>	<b>100.00%</b>	
<b>Total PEM/PSS Construction and Establishment Cost</b>					<b>\$ 2,146.70</b>		



**Long-Term Annualized PEM/PSS Cost Summary**  
**SWG-2018-00613**

Item	Units	Unit Values	Price Per Unit	Unit Percent	Cost	Years	Annualized Cost
Taxes on Project Acreage	Acres	1.00	\$ 10.00	100.0%	\$ 10.00	1	\$ 10.00
Invasive Species Control	Acres	1.00	\$ 90.00	25.0%	\$ 22.50	1	\$ 22.50
Inspections (rate and per diem)	Day	1.00	\$ 200.00	100.0%	\$200.00	1	\$ 200.00

Average Annual Cost (Starting at Year 6)							\$ 232.50
Long-term Land Management and Maintenance Endowment (cap rate 3.5%)							\$ 6,642.86