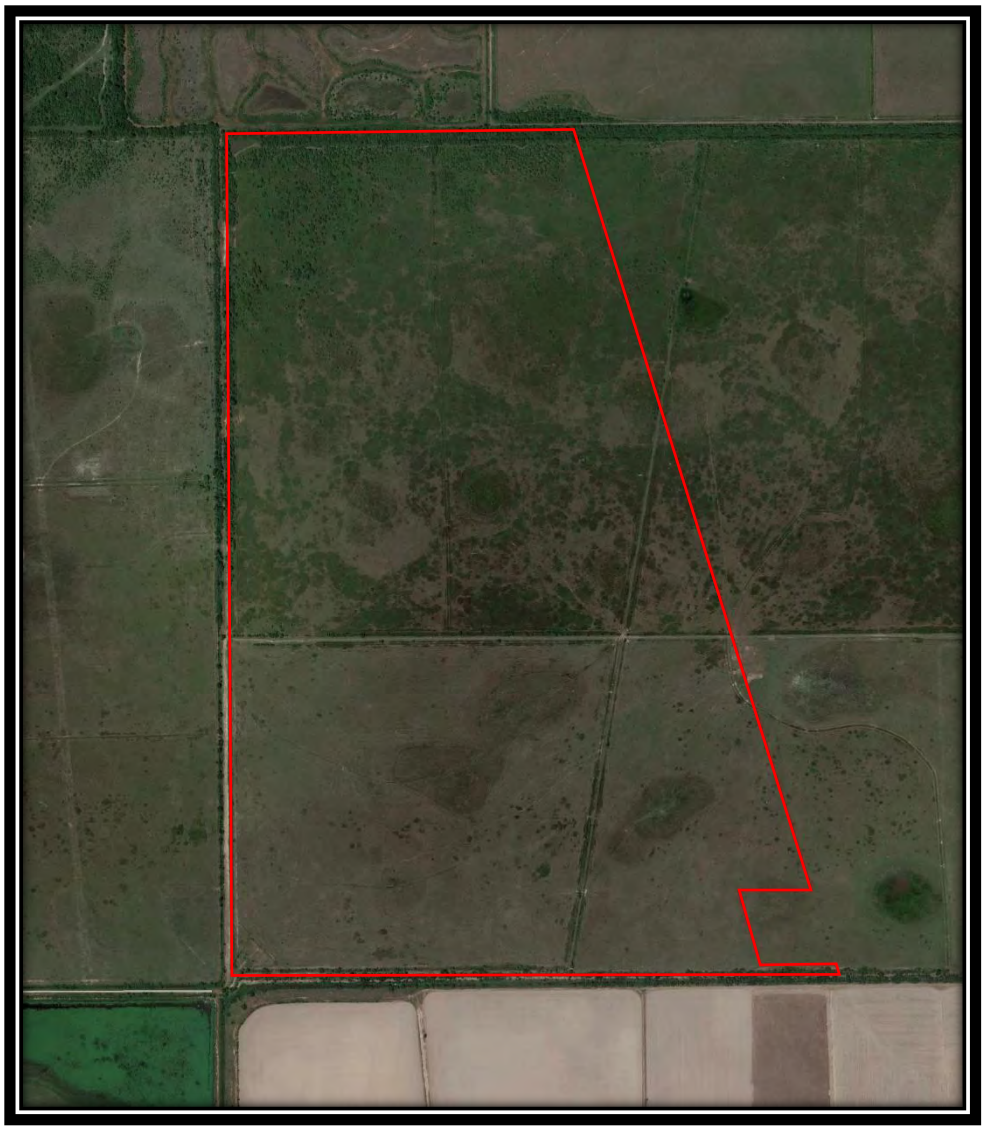
Draft Mitigation Plan for the
Katy Prairie Stream Mitigation Umbrella Bank
Hebert II Wetland Site

Waller County, Texas

OCTOBER 2016



Prepared by:

Prairie Wetland Ventures
1101 Haynes Street, Suite 211
Raleigh, NC 27604

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Table of Contents

LIST OF TABLES

All tables are located within the text of the report.

LIST OF FIGURES

All figures are located at the end of the report, Appendix A.

LIST OF APPENDICES

EXECUTIVE SUMMARY

This document outlines the proposed mitigation plan for the Hebert II Prairie Wetland Mitigation Bank Site (Site). Prairie Wetland Ventures (Sponsor) is proposing to develop the Site as an amendment to the existing Katy Prairie Stream Mitigation Umbrella Bank (KPSMUB), with the intention of offering wetland mitigation credits within the existing KPSMUB service area. The Site comprises approximately 364 acres of undeveloped, fallow agricultural land that is currently used as pastureland, and is planned to include approximately 219 acres of wetland restoration and enhancement, and 76 acres of restored upland buffers (Table 1; Photo 1).

Photo 1. The Hebert II Wetland Mitigation Bank Site offers a unique opportunity to restore rare prairie depressional wetland features across a large, contiguous site.

The Site lies in the center of the historic limits of the Katy Prairie and is approximately two miles south of the KPSMUB (Figure 1). More specifically, the Site is approximately 11 miles south of Waller, 7 miles north of Katy, and 2.3 miles west of the intersection of Katy-Hockley and Longenbaugh Roads, where it is situated along the eastern boundary of Waller County (Figure 2).

The Site is hydrologically located within the San Jacinto River Basin (6-digit Hydrologic Catalog Unit) [HUC] 120401) and lies along the border of two sub-basins: Spring (8-digit HUC 12040102) and Buffalo (8-digit HUC 12040104). On a smaller watershed basis, the Site exists within the following two watersheds: Mallard Lake-Cypress Creek (12-digit HUC 120401020103) and South Mayde Creek (12-digit HUC 120401040203). The hydrologic location of the Site is depicted in Figure 3.

The Sponsor proposes to restore and to enhance prairie depression wetlands (PDW) on the Site in a way that closely emulates the herbaceous wetlands endemic to the Katy Prairie. Upland areas between the PDWs will be restored to include areas of tallgrass prairie consisting primarily of herbaceous vegetation and prairie/pimple mounds, which were a common component of the Katy Prairie prior to European settlement (Wermund, 1994). The Site has been significantly altered over the last century from intensive agricultural practices, including rice production and cattle grazing. The Site's hydrology has been manipulated to control the movement and storage capacity of water. This has been accomplished through the use of land leveling, ditches, dikes,

and berms. The existing vegetation lacks the variety of species that once existed across the Katy Prairie, primarily because the hydrology that would have historically supported a vibrant prairie wetland system has been lost.

The mitigation plan for the Site includes 1) restoring native prairie depression wetlands, 2) enhancing existing depression wetlands, 3) restoring native prairie grassland buffers (uplands), 4) re-establishing native prairie species endemic to the Katy Prairie uplands and wetlands, and 5) establishment of a permanent preservation mechanism that will encompass all mitigation activities on the Site.

Table 1. Summary of Proposed Wetland Mitigation Plan.

Feature	Existing Area (acres)	Proposed Area (acres)
Wetlands		
Palustrine Emergent Wetland (PEM)	75.5	219.1
Palustrine Scrub-Shrub (PSS)	12.9	0.0
Canals and Ponds		
Ephemeral Canals	3.6	0.0
Perennial Manmade Pond	0.2	0.0
Uplands		
Herbaceous Upland Buffers	248.3	46.8
Uplands – Prairie Mounds	0.0	29.3
Other Areas		
Transition Zone (Mixture of Wetland/Upland Species)	0.0	47.7
Roads/Berms	23.6	21.2
TOTALS	**364.1**	**364.1**

Upon approval, the Hebert II Wetland Mitigation Bank will be the first wetland mitigation bank permitted under the 2008 Federal Mitigation Rule that is located in the Spring sub-basin AND in the Addicks/Barker overflow zone (i.e. the Buffalo sub-basin). These two sub-basins contribute the entirety of the hydrology moving through downtown Houston. The proper siting of ecologically appropriate mitigation projects, utilizing the watershed approach will contribute to the ongoing efforts in the region to stem flooding events that have resulted in the loss of life and hundreds of millions of dollars in damages.

1.0 INTRODUCTION

Prairie Wetland Ventures (PWV; Sponsor) is proposing to develop the Hebert II Prairie Wetland Mitigation Bank Site (Site) as an amendment to the existing Katy Prairie Stream Mitigation Umbrella Bank (KPSMUB; approved February 27, 2012, SWG-2009-00937), with the intention of offering wetland mitigation credits within the KPSMUB service areas. The Site lies in the center of the historic limits of the Katy Prairie and is approximately two miles south of the KPSMUB (Figure 1). More specifically, the Site is approximately 11 miles south of Waller, 7 miles north of Katy, and 2.3 miles west of the intersection of Katy-Hockley and Longenbaugh Roads, where it is situated along the eastern boundary of Waller County (Figure 2). The Site consists of undeveloped, fallow agricultural land that is currently used as cattle pasture. The Site comprises approximately 364 acres, which is expected to yield approximately 219 acres of wetland enhancement and restoration, 48 acres of transitional zones and 76 acres of upland buffers.

1.1 PROJECT GOALS AND OBJECTIVES

The primary goals of this project focus on re-establishing hydrologic function, improving water quality, and restoring prairie wetland and upland habitat, which will be accomplished by:

1. Removing nonpoint sources of pollutants associated with intensive agricultural practices by a) removing cattle from all areas of the Site, b) increasing the residence time and filtering of water on the Site, and c) promoting biological uptake of nutrients.
2. Restoration and enhancement of herbaceous and scrub-shrub vegetation by a) restoring site elevations and topography to mimic native prairie depression wetlands and b) re-establishing native vegetation endemic to the Katy Prairie wetlands;
3. Restoration of upland buffers by a) restoring site topography, b) recreating prairie mound formations (i.e. mima/pimple mounds), and c) re-establishing native vegetation endemic to Katy Prairie uplands;
4. Restoring hydrologic functions by a) restoring depressional topography of the Site, b) removing existing ditches and drainage features, and c) establishing connectivity between the restored and enhanced wetlands; and
5. Enhancing floodwater attenuation by a) increasing the Site's water storage capacity and b) establishing a network of native prairie depression wetlands.

These objectives will be achieved by:

- Restoring approximately 131 acres of native prairie depressional wetlands.
- Enhancing approximately 88 acres of existing wetlands.
- Restoring approximately 48 acres of transitional zones between wetlands and uplands.

- Restoring approximately 76 acres of native tall prairie grasslands, including prairie mounds.
- Establishing native prairie species endemic to the Katy Prairie uplands and wetlands.
- Protecting the Site in perpetuity with a conservation easement.

1.2 SPONSORSHIP OF THE PROPOSED BANK

Prairie Wetland Ventures (PWV; Sponsor) will serve as the project sponsor for the bank and is composed of two parties: the Katy Prairie Conservancy (KPC) and Restoration Systems (RS). Ownership of the Site will be controlled by KPC with easement rights being granted and held by the Texas Land Conservancy (TLC). Ecosystem Planning and Restoration (EPR) is assisting with the mitigation plan and will serve as the Owner's agent through the implementation of the Site design.

Owner/Sponsor	**Sponsor's Agent**
Prairie Wetland Ventures 1101 Haynes Street, Suite 211 Raleigh, NC 27604 Phone: (919) 755-9490 Fax: (919) 755-9492 Project Manager: Travis Hamrick Email: travis@restorationsystems.com	Ecosystem Planning and Restoration 17442 North Eldridge Parkway Tomball, TX 77377 Phone: (832) 399-3400 Fax: (919) 388-0789 Project Agent: Sonny Kaiser Email: skaiser@eprusa.net

1.3 TEAM EXPERIENCE

1.3.1 Restoration Systems

Restoration Systems (RS) has been a leader in the development of successful aquatic mitigation sites for more than 18 years. RS's qualifications are best illustrated by its track record in selecting high quality sites, and using highly skilled technical designers and experts for project implementation. RS has designed and implemented more than 50 wetland, stream and riparian buffer mitigation sites in Texas, Maryland, Tennessee, Louisiana, Virginia and North Carolina, representing more than 5,000 acres of wetlands and 50 miles of streams. Furthermore, RS provides financial surety for every project through every phase of work, and each site is inspected by staff at least quarterly in addition to requisite technical monitoring. A list of stream and wetland mitigation projects completed, or in advanced planning stages can be found in Appendix B.

1.3.2 Katy Prairie Conservancy

The Katy Prairie Conservancy (KPC) was founded in 1992 as a nonprofit, tax-exempt organization focused on preserving at least 50,000 contiguous acres on the prairie. KPC is making significant progress toward this goal, with over 20,000 acres now protected– 13,620 acres through direct ownership and the remaining acreage through conservation easements, purchased development rights, and public ownership.

The mission of KPC is to protect a sustainable portion of the Katy Prairie for the benefit of its wildlife and all Texans forever. KPC's long-term goals are to:

- protect at least 50,000 acres of the Katy Prairie;
- allow public access to KPC's preserves;
- enhance and improve habitat for upland- and wetland-related species;
- offer educational programs for school-aged and general public; and
- conduct and facilitate research to help accomplish KPC's mission.

1.3.3 Ecosystem Planning and Restoration

EPR was founded in the fall of 2012 to be a premier and specialized environmental services firm. In its first two years (2013 - 2014), EPR has experienced significant growth and expansion. EPR currently has 21 employees company-wide and has offices located in Houston, Texas, Columbia, Maryland and Raleigh, North Carolina. EPR's client base is diverse in both client sector and geography. EPR's clients include private companies, nonprofits, and federal and state governments. The locations of EPR's projects are equally diverse, and currently include Texas, North Carolina, West Virginia, Tennessee, Maryland, Alabama, Michigan, Wyoming, Alaska, Oklahoma, and Georgia.

2.0 SERVICE AREA & WATERSHED APPROACH

2.1 SERVICE AREA

The Sponsor is asking for designation of the Site as a unique, high-quality restoration area to provide compensatory wetland mitigation credits using the watershed approach. Such a designation would allow the Site to provide mitigation for permitted wetland impacts within a limited number of watersheds. The Site is located within the San Jacinto River Basin (6-digit HUC 120401) and lies along the border of two sub-basins: Spring (8-digit HUC 12040102) and Buffalo (8-digit HUC 12040104) (Figure 3).

The proposed primary and secondary service areas presented in this document are the same as those approved for use by Umbrella Banking instrument for the KPSMUB. The primary and

secondary service areas for the Site are shown in relation to their 8-digit HUCs and project boundary on Figure 4.

The **primary service area** includes the following sub-basins (8-digit HUCs):

- Spring (12040102)
- Buffalo (12040104)

The **secondary service area** includes the following sub-basins (8-digit HUC):

- West Fork San Jacinto (12040101)
- West Galveston Bay (12040202)
- Austin-Oyster (12040205)

The service areas would exclude all US Fish and Wildlife Service and Texas Parks and Wildlife Department properties, tidally influenced wetlands, and wetlands located on Texas barrier islands and peninsulas.

The Site will provide wetland mitigation within the primary service area at a 1:1 ratio. Mitigation provided in the secondary service area will be at a 1.5:1 ratio. The United States Army Corps of Engineers (USACE), after coordination with the Interagency Review Team (IRT), may allow the use of the bank credits outside both the primary and secondary service areas, when it is determined to be practicable and environmentally preferable. In such cases, the replacement ratios will be determined on a case-by-case basis during the review of the specific project for which the use of the Site is being considered.

2.2 WATERSHED APPROACH

The federal Compensatory Mitigation Rule, which came into effect in June of 2008, requires that all compensatory mitigation be planned using a "watershed approach." (33 CFR 332.3(c)). According to the Rule, the purpose of implementing a watershed approach is "to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites."

Using a watershed approach increases the likelihood that a compensatory mitigation bank will be prioritized and located where it will be most beneficial to the water resources in a given area, and best compensate for regional resources that are currently and historically degraded in the watershed.

Many federal, state and local government agencies and programs have taken on the task of developing watershed plans, basin wide studies, or similar documents.[1] The typical geographic

[1] *See* for example – Texas Soil & Water Conservation Board efforts at http://www.tsswcb.state.tx.us/wpp#handbook; North Carolina Division of Mitigation Services efforts at

planning unit for watershed analysis is the 8-digit HUC. Larger planning areas may be considered where several 8-digit HUC's converge into one resource, such as Lake Houston or Trinity/Galveston Bays, which will be discussed here, that are impacted by activities in multiple watersheds. The federal Rule directs mitigation providers to use a watershed plan as a basis for prioritizing the location of compensatory mitigation projects where such a plan has been completed.

Where a watershed plan does not exist, as is the case here, the Rule provides that the following should be considered regarding how a compensatory mitigation project will provide the desired aquatic resources functions over time:

- Sources of watershed impairment;
- Habitat requirements of important species;
- Current development trends;
- Habitat loss or conversion trends; and
- Requirements of other local and regional regulatory and non-regulatory programs.

We believe an analysis of these watershed characteristics reveals a clear need for prioritization of restoration-based wetland / prairie mitigation from the Site over mitigation from non-prairie mitigation projects in the two watersheds where the Site is located. First, we will characterize the primary service area 8-digit HUCs (Spring and Buffalo) and then we will address the secondary service areas (West Fork San Jacinto, West Galveston Bay, and Austin-Oyster).

2.3 PRIMARY SERVICE AREA

The primary service area (PSA) represents two of the four sub-basins that comprise the San Jacinto River Basin (HUC 120401)- the Spring (HUC 12040102) and Buffalo (HUC 12040104). The Site lies within the Western Gulf Coastal Plain (EPA Level III ecoregion) and the Northern Humid Gulf Coastal Prairies (EPA Level IV ecoregion) (Griffith et al., 2004).

Since the writing of the KPSUMB- Phase I watershed write-up, four segments of the SH 99 Grand Parkway, an approximate 185-mile circumferential outer loop, have been constructed and open to the public. This outer loop around Houston passes within six (6) miles to the east of the proposed Hebert II Site. The increased mobility provided by SH 99 will further support and allow access to remote areas and development, creating a need for mitigation and an imminent threat to the prairie wetland resources this Site is proposing to restore, enhance, and protect.

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http://deq.nc.gov/about/divisions/mitigation-services/dms-planning; and the U.S. EPA has a full web-based watershed planning program at http://iaspub.epa.gov/watershedplan/watershedPlanning.do?pageId=48&navId=35.

2.3.1 Spring (12040102)

The closest significant surface water to the Site is Cypress Creek, which lies approximately 0.3 miles (1,600 feet) north. The Cypress Creek watershed (HUC 1204010201) drains approximately 267 square miles along its path, with its western portion (Waller County) being primarily rural farmland and its eastern and central portions (Harris County) comprised mainly of highly developed, urbanized areas (Harris County Flood Control District, 2015). Due to the rapid increase in development and its outward expansion from Houston, Harris County has implemented almost $40 million in studies and projects to aid in flood control throughout the watershed over the last 20 years. Studies and projects in the watershed include the Cypress Creek Overflow Management Plan, Voluntary Home Buyouts, Cypress Park Basin Improvements, Cypress Creek Channel Restoration Project, and preparation of the HCFCD *Natural Stable Channel Design and Best Management Practices Guidance Manual for Corridor Channels* (anticipated release in late 2015).

Houston is one of the fastest growing regions in the US, and the 8-county region surrounding Houston is projected to grow by approximately 3.5 million people by 2040 (Houston-Galveston Area Council (HGAC)). Waller County, where the project Site is located, has experienced a 32 percent growth rate since 2000, a rate that is expected to accelerate in the years to come due to transportation improvement projects, such as the recently completed SH 99 Grand Parkway, the proposed US 290 improvements, and planned regional improvements to minor arterial roadways. Additionally, large residential, commercial, and industrial developments continue to expand, including Blackhorse, Fairfield Subdivision, the Bridgelands, Bluejack National Golf Course, growth in the cites of Magnolia, Tomball, and The Woodlands in the eastern portion of the watershed.

2.3.2 Buffalo (12040104)

Harris County makes up a majority of the Buffalo watershed and includes the Houston metro area. Harris County is the third most populous county in the nation with an estimated population of 4.5 million as of July 2015 (US Census). The Buffalo watershed mainly consists of urban development, major transportation corridors, residential and commercial development, as well as industrial development. The heart of the Buffalo watershed is the City of Houston and the immediate surrounding suburbs. The City of Houston is the largest city in Texas and consists of two major commercial airports, mass transit, the Houston Medical Center, and Downtown Metropolitan Houston.

Indirect and cumulative effects to water quality resulting from transportation projects, new residential subdivisions, and associated infrastructure are anticipated as growth continues in the City of Houston and surrounding areas. New roads and development will result in an increase in impervious cover and greater volumes of runoff during storm events. Inherently, this will result

in new municipal discharges from sewage treatment and storm water runoff from new off-system detention facilities.

The detention of water on the restored Hebert II Prairie Wetland Mitigation Site would have a clear and tangible benefit to filtration of surface water runoff, benefiting water quality and providing greater retention of storm water events. Additionally, the detention/retention of water on the prairie through the implementation of the Site has a clear and tangible benefit to the congressionally authorized USACE Addicks reservoir, a major water retention basin located in the Buffalo watershed.

In the post-World War II era, new industries began to form along Buffalo Bayou and the Houston Ship Channel and growth expanded to the southwest, west, and northwest to areas now considered downtown Houston. Since the 1960s, transportation planning has included circumferential roadways around the City of Houston including the Grand Parkway measuring over 185 miles in length. During this period, land ownership shifted from family farms to investors, rice prices decreased, and farmers turned to cattle production. The pre-settlement Katy Prairie is continuously under pressure from increased development and growth.

The continued growth of Galveston, Harris and Montgomery counties is anticipated to continue. This growth impacts the sub watersheds that make up the Buffalo watershed including White Oak Bayou, Buffalo Bayou, Cole Creek, Little White Oak Bayou, and many others in the City of Houston. The protection of the upper reaches of the Spring and Buffalo watersheds inherently benefits regional water quality, preserves a diminishing resource, and promotes natural filtration and water quality best management practices.

Photo 2. Area approximately 3 miles southeast of the Hebert II Site, showing the dramatic change in land use and loss of prairie depressional wetlands in the Katy Prairie region.

2.4 SECONDARY SERVICE AREA

The Secondary Service Area (SSA) is comprised on tree sub-basins- West Fork of San Jacinto (HUC 120401010), West Galveston Bay (HUC 12040104) and the Austin-Oyster (HUC 12040205). Credits can be sold in these sub-basins only if the sub-basin does not serve as a component for a competing banks PSA, available credits from an existing mitigation bank are not available and the IRT approves the transaction. Currently, there is one existing wetland mitigation bank (Spellbottom, SWG-2008-00887) and two proposed wetland mitigation banks (Gibbs Brothers, SWG-2015-00662, West Montgomery, SWG-2016-00616) located in the West Fork of San Jacinto sub-basin, no existing or proposed wetland mitigation banks in the West Galveston Bay sub-basin, and one existing (Lower Brazos, SWG-2008-00306) and one proposed (Columbia Bottomlands Conservation, SWG-2012-00798) wetland mitigation bank located within the Austin-Oyster sub-basin.

2.4.1 West Fork San Jacinto (12040101)

Just north of the Site's home watershed lies the West Fork of San Jacinto (WFSJ) sub-basin (HUC 12040101). Unlike the Spring or Buffalo sub-basins, a substantial amount of land within this watershed has been protected (Sam Houston National Forest), is undevelopable (Lake Conroe), and less of the sub-basin is expected to be developed over the life of the mitigation bank. Development pressure, while not absent, is simply not on the scale of the transformation we can expect on the periphery of west Houston.

The WFSJ can be considered two separate watersheds, above and below Lake Conroe. Neither area is suitable for compensatory mitigation at the Hebert II Site, when prioritized using the watershed approach. In the area above Lake Conroe, no large populations will be served with added wetland function as proposed at the Hebert II Site. Below Lake Conroe and the City of Conroe, and within the thin neck of the watershed as it approaches Lake Houston, populations are increasing, but at a lower rate than other portions of the service area.

From an ecological perspective, the WFSJ is dominated by a far more abundant and less critically threatened primary ecoregion: the South Central Coastal Plain ecoregion. This ecoregion is described by the EPA and locally as the "Piney Woods." The Piney Woods certainly face development pressure, but to date the WFSJ has fared substantially better ecologically than the prairies west of Houston in the Spring Creek sub-basin.

2.4.2 West Galveston Bay (12040204)

Just south of the Buffalo sub-basin lies the West Galveston Bay (WGB) sub-basin (HUC 12040104). A substantial amount of land within this watershed has been developed for residential, commercial, and transportation uses in northern Brazoria and western Galveston counties along the State Highway (SH) 288 and Interstate Highway 45 corridors and north of SH 6. Much of the land in southern Brazoria and Galveston Counties in the watershed are used for farming and ranching. This agricultural land is not protected and much of the sub-basin is expected to be developed over the life of the mitigation bank.

From an ecological perspective, the WGB is located in the Western Gulf Coastal Plain, the same ecoregion as the mitigation site. Although much of the native habitat has been lost to agriculture and urbanization, the region still provides important habitat for migratory birds and spawning areas for fish and shrimp (TPWD, 2016).

2.4.3 Austin-Oyster (12040205)

The Austin-Oyster (AO) sub-basin (HUC 12040205) lies to the south of the primary service areas and to the west of the WGB sub-basin. Most of this basin is currently in agricultural with the exception of the areas to the north around Sugarland and to the south around Lake Jackson and Freeport. Development in the northern part of the watershed near Sugarland is primarily residential. Development in the southern part of the watershed near Lake Jackson and Freeport is residential and industrial. SH 288 is a major artery connecting the watershed to the Houston-metro area. Distance to major population centers of Houston and Sugarland to the north and Lake Jackson to the south should limit residential development to much of the central portions of the watershed.

The AO is located in the Western Gulf Coastal Plain, the same ecoregion as the mitigation site and WGB. Much of the native habitat has been lost to agriculture and urbanization.

2.5 CONCLUSIONS

The strategic location of the Site provides a multitude of benefits for the fifth largest metropolitan area in the United States. The restoration of this resource will not only result in the protection of the immediate project footprint and the accompanying benefits that come with wetland restoration (re-establishing hydrologic function, improving water quality, flood attenuation, etc.), but will also create a financial mechanism that will provide for additional protection and restoration of the greater Katy Prairie environment.

The Site is in lockstep with the intent of the Federal Mitigation Rule by placing and planning a mitigation bank utilizing the watershed approach. It addresses the historic loss of the Katy Prairie grasslands by restoring and enhancing the wetlands and uplands. By generating income for KPC, additional lands can be protected and restored to increase the long-term value of the lands being conserved by KPC. This scenario has already play out with revenue generated from the sale of stream credits from Phase I of the KPSMUB.

In addition to the important role of wetlands related to surface and groundwater functions, wetlands provide secure habitat with an abundance of food and shelter for a variety of wildlife species, both terrestrial and aquatic. Wetlands associated with the Katy Prairie provide important habitat for waterfowl within the Texas Gulf Coast marshes and associated rice prairie lands, an area of international significance to migrating and wintering mid-continental waterfowl (Texas Mid-Coast Initiative Team, 1990).

In addition to the quality and location of the Site, the unavailability of appropriate mitigation projects within the Buffalo sub-basin and the greater level of protection and lower development pressure that exists within the WFSJ further make a case for focusing large scale environmental restoration projects in the Spring Creek sub-basin.

3.0 BASELINE CONDITIONS

3.1 PHYSIOGRAPHY AND LANDSCAPE POSITION

The Site is located within the Gulf Coastal Plain physiographic province of Texas, where it lies near the boundary of the Coastal Prairies and Interior Coastal Plains subprovinces (Bureau of Economic Geology, 1996). The physiography of the area consists of gentle slopes, low gradient rivers and streams, and typical elevations ranging from 0 to 300 feet above mean sea level (msl) (Griffith et al. 2007).

The Site is situated within a complex of conservation lands totaling more than 20,000 acres either managed or protected by KPC and located near the center of the historic limits of the Katy Prairie (Figure 1), a distinct tallgrass habitat that occurs at the intergrade of the Willis and Lissie geologic formations. The Site specifically occurs on the Lissie Formation, a geological formation composed of Pliocene aged material having a composition mainly of clays, silts and sands, along with minor fractions of gravel (Aronow, 2000). The typical thickness of the Lissie Formation is less than 100 feet and underlies the Katy Prairie. The Lissie formation formed from alluvial deposition from flows of perennial and intermittent streams and rivers, as well as laminar flows across uplands (Aronow, 2000). Over time, these depositional processes created nearly level landforms (i.e. prairies) marked by subtle micro-topographic features including low sloping stream terraces, prairie or "mima" mounds, and depressions or "prairie potholes" (Texas Coastal Wetlands, 2015). Prairie potholes associated with the Lissie formation are thought to be more than 100,000 years old (Texas Coastal Wetlands, 2015).

The Site elevations (excluding ditches) derived from topographic surveys range from 164 to 171 feet above mean sea level. The highest areas of the Site occur on its southeastern portion, with the Site gradually sloping toward to the north.

3.2 LAND USE

The Site lies near the center of the historic limits of the Katy Prairie (Figure 1). The Katy Prairie was historically part of the tallgrass prairie of the North American Great Plains and consisted of a mosaic of tall grasses and emergent wetland habitats and small, circular sandy mounds (called "mima," prairie, or pimple mounds), bisected with riparian corridors and dotted with tree islands (Smeins et al. 1992, Smeins, 1994). Prior to European settlement, the Katy Prairie encompassed more than 1,000 square miles of poorly drained, tallgrass prairie full of wetland depressions and was subject to periodic fires that restricted woody vegetation to just a few riparian zones (Wermund, 1994). However, the productive, arable soils of the region led farmers to convert extensive portions of the prairie to cropland, with the principal crops being rice, sorghum, cotton, and soybeans (Griffith et al., 2007). The Site and the surrounding area originally consisted of tallgrass and wet prairies, which were converted to agriculture uses such as rice production and pastureland (Newman, 2015).

Photo 3. The Hebert II Site has been extensively modified over time, including land leveling and the construction of berms, dikes, canals, and roads, like the one shown here. The result has been a significant decrease in historic wetland habitats.

Expansion of the Houston metropolitan area has further impinged on the Katy Prairie. As urbanization has increased throughout the ecoregion, installation of canals and stream channelization has altered the general hydrology of the region. In particular, several land developments have constructed storm retention facilities that consolidate surface waters, including prairie depressions, into fewer, deeper reservoirs. Today, most of the historic habitat of the Katy Prairie has been altered by agriculture and development. The Katy Prairie is part of the greater Gulf Coastal prairie system, of which approximately 15% remains, with only 1% left in its historic natural state (Arrajj, 2013).

A photographic log of the existing conditions at the Site, including vegetation, aquatic resources, and topography can be seen in Appendix C. These photographs were taken during the jurisdictional wetland determinations performed by SWCA Consultants in 2013.

The topography of the Site has been extensively modified over the years for rice production and pastureland (Photo 3). During rice cultivation, low dikes were constructed along topographic contours and some depressions were filled to provide more level field areas for rice production. Irrigation ditches were also dug across the Site to deliver irrigation water for field flooding. When the Site was converted to pasture production, the Site was leveled again and the low dikes were graded out to promote pasture production and grazing land. The ditches that were once used primarily for irrigation now help drain the Site, and additional small ditches have been excavated to drain some of the remaining depressions on the Site.

3.3 VEGETATION

Initial site investigations performed by SWCA Consultants in 2013 revealed four distinct vegetative communities: herbaceous upland, scrub-shrub upland, palustrine scrub-shrub (PSS) wetland, and palustrine emergent (PEM) wetland. Additional investigations have been conducted by EPR since the fall of 2014 and continue to the present day. Vegetative information presented in this section is a compilation of these investigations.

Photo 4. Chinese tallow has become established in localized areas of the Site, and will be eradicated as part of the proposed mitigation plan.

Uplands

Existing upland vegetation on the Site is characterized by species including bermudagrass (*Cynodon dactylon*), bahiagrass (*Paspalum notatum*), narrowleaf marshelder (*Iva angustifolia*), deep-rooted sedge (*Cyperus entrerianus*),

sneezeweed (*Helenium amarum*), butterfly gaura (*Gaura lindheimeri*), wing-angle loosestrife (*Lythrum alatum*), annual marsh elder (*Iva annua*), Canadian goldenrod (*Solidago canadensis*), smut grass (*Sporobolus indicus*) and southern dewberry (*Rubus trivialis*) in herbaceous communities. Scrub-shrub uplands are similar in composition but include Chinese tallow (*Triadica sebifera*) and green hawthorn (*Crataegus viridis*) as dominant shrub stratum species (Photo 4).

Wetlands

As would be expected in wet prairies, PEM wetlands within the property are dominated by swamp smartweed (*Persicaria hydropiperoides*), torpedo grass (*Panicum repens*), green flat sedge (*Cyperus virens*), sand spike-rush (*Eleocharis montevidensis*), pull-and-be-damned (*Paspalum denticulatum*), annual marsh elder, Vasey's grass (*Paspalum urvillei*), deep-rooted sedge, and gaping grass (*Steinchisma hians*). The herbaceous stratum of PSS wetlands within the property includes deep-rooted sedge, pull-and-be-damned, swamp smartweed, and soft rush (*Juncus effusus)* with a shrub canopy including Chinese tallow and green hawthorn.

Non-Native Invasive Species

In general, the non-native invasive species occur in localized areas and are scattered across the Site. The primary non-native invasive species are Chinese tallow and deep-rooted sedge with bahiagrass, bermudagrass, and Vasey grass comprising a smaller component. Chinese tallow is found infrequently along ditches and fencerows or in small clusters within the PSS wetlands (northern end of Site). Deep-rooted sedge is a component of both wetland and upland communities, but does not form dense monocultures, and therefore could be successfully controlled through active invasive species control and subsequent competition from native wetland species. All non-native invasive species within the Site will be actively managed using methods outlined by the Texas Invasive Plant and Pest Council (TIPPC) (TIPPC, 2016).

3.4 SOILS

Soils typical of prairies within the Western Gulf Coastal Plains consist of a mixture of fine textured clay, clay loam, and sandy clay loam with a thickness of less than 100 feet (Griffith et al. 2007). Two NRCS soil map units occur on the Site, and include Aris fine sandy loam and Katy fine sandy loam (Figure 5). The Aris fine sandy loam is mapped over approximately 60% of the Site, with the Katy fine sandy loam mapped over the remaining portion. Descriptions of the NRCS soil map units at the Site are provided in Table 2.

Soil investigations were conducted across the Site to characterize the soils and to determine the depth to the restrictive clay layer (aquitard). The aquitard layer was found to be present across the entire Site and appears to significantly limit the downward infiltration of groundwater through the layer. Depths to the aquitard ranged from approximately 1.3 to 2.7 feet (below natural ground), with an average depth across the Site of 1.9 feet. This impermeable clay layer

greatly reduces the loss of water from the Site by infiltration and deep percolation, and, in the absence of surface drainage features, would have historically supported a broad depressional wetland system on the Site.

Table 2. NRCS Soils Mapped Within the Site.

Soil Map Unit	Map Symbol	Drainage Class	Permeability	Runoff	Water Table Depth (ft)	Taxonomic Class	Hydric
Aris fine sandy loam, 0-1% slopes	ArA	Somewhat Poorly	Very slow	Slow	0.5 – 2.0 (perched)	Fine, mixed, thermic Typic Glossaqualfs	Yes
Katy fine sandy loam, 0-1% slopes	KaA	Somewhat Poorly	Very slow	Very slow	surface – 2.5 (perched)	Fine-loamy, siliceous, thermic Aquic Paleudalfs	No

Source: Austin and Waller County Soil Survey (NRCS)

3.5 HYDROLOGY

The Site hydrology is primarily influenced by rainfall; however, periodic flooding from Cypress Creek and its tributaries results in intermittent periods of prolonged saturation, particularly on the northern end of the Site, further contributing to site hydrology and conditions that would be favorable to the maintenance of wetland hydrology. KPC owns the adjacent property to the north of the Site along Cypress Creek, and has previously constructed wetland restoration projects on this adjoining land.

Average annual precipitation was determined using the Houston-Barker weather station (TX0520), which is located approximately 10 miles southeast of the Site. The average annual precipitation ranges from 39.87 to 52.51 inches (70% chance), with an average of 46.96 inches. Average annual precipitation generally peaks between the months of May and September for this weather station.

The majority of the Site is located in the Federal Emergency Management Agency (FEMA) 100-year floodplain of Cypress Creek (Figure 6). This floodplain connects to the upper 100-year floodplains of Bear and South Mayde creeks, forming the Addicks/Barker overflow zone, a critical floodwater attenuation zone servicing the Buffalo-San Jacinto watershed.

The Site has been hydrologically manipulated in the past by the excavation of ditches, presumably to facilitate the movement of water for agricultural purposes. Agricultural ditches bound the northwest corner of the property and bisect the eastern portion of the Site. These ditches facilitate collection and diversion of water during heavy precipitation events, but may retain

water for prolonged periods following rainfall events. These ditch features are visible on the 2015 aerial photography (Figure 7).

Historical aerial photography illustrates the significant changes that have occurred at the Site over the past 80 years (Figures 7, 7A - 7E). The presence of field terracing in the 1940 aerial photograph (Figure 7D), indicates that the property was in rice production during that period. It appears that rice production lasted up to the turn of the 21st century, when the property was transitioned back to pastureland. In addition to ditches, the Site topography has been manipulated and graded to fill some of the depressions that were historically present on the Site. For the remaining depressions that are still evident, small shallow ditches have been excavated to allow these depressions to drain during wet periods, greatly limiting the present extent of wetlands on the Site. The current drainage infrastructure appears to significantly reduce the amount of surface water that is held on the property, thereby limiting the possible area of wetlands the property can support (Photo 5). Therefore, it appears that this altered hydrological regime is the primary factor currently limiting the presence of wetlands within the property.

Photo 5. The hydrology of the Site has been severely impacted by past land leveling, and the construction of canals and roads across portions of the Site.

To better understand the water table across the Site, shallow water wells were installed in April 2015 to document existing hydrologic conditions. These wells will be used to document water table levels and fluctuations during the growing season, to aid in the development of final design plans. In general, the period since the shallow water wells were installed has been extremely wet. Most recently, historic rainfall totals were recorded in the Upper Cypress Creek watershed during April 17-18, 2016. Rainfall totals near the Site ranged from 15 to 23 inches for the two-day period (Lindner, 2016). These rainfall totals represent almost 50% of the average annual precipitation for the area, which is approximately 47 inches per year for the Houston-Barker weather station (TX0520). The growing season is approximately 302 days for Waller County, generally occurring between February 9th and December 9th, according to the Austin and Waller County Soil Survey (USDA, 1984). Location and data for each well can be found in (Appendix D).

3.6 JURISDICTIONAL WATERS

A wetland delineation was conducted by SWCA Consultants in 2013 to determine the amount, classification, and functional value of the streams and wetlands within the Site. Following a field review of the mapped resources, the USACE requested that EPR reevaluate the delineated resources. An updated delineation package was prepared per USACE field comments and submitted to the USACE in early August 2015 for review and approval. An approved jurisdictional determination letter (File No. SWG 2009-00937) was received from the USACE on March 29, 2016 for the Site. All information related to the existing jurisdictional resources can be found in Appendix E.

3.6.1 Wetlands

The Site currently includes thirteen PEM wetlands (75.2 acres) and two PSS wetlands (12.9 acres), totaling 88.1 acres of existing wetlands (Figure 8). The PEM wetlands are found across the Site in the bottoms of topographic depressions that have poor drainage. The PSS wetlands are situated at the northern end of the Site, and are also located within poorly drained topographic depressions and along the northern dike that runs near the property line. Existing vegetation and soils associated with these jurisdictional wetlands are described in Sections 3.3 - 3.4 and Appendix E.

3.6.2 Ephemeral Canals and Perennial Pond

Ten man-made water features exist on the Site, including nine ephemeral canals/ditches and one perennial pond, which sum to approximately 3.8 acres. Many of the canals appear to have been constructed for irrigation prior to 1940, from reviews of historic aerial photography (Figures 7D and 7E). Table 3 lists the aquatic resources identified on the Site.

Table 3. Existing Aquatic Resources on the Site (unverified as of February 2016).

Waterbody Type	Length Within the Site Boundary (feet)	Area Within the Site Boundary (acres)
Palustrine Emergent Wetland (PEM)	-----	75.5
Palustrine Scrub-shrub Wetland (PSS)	-----	12.9
Perennial Manmade Pond	-----	0.2
Ephemeral Canal	2,099	3.6
TOTALS	**2,099**	**92.2**

3.7 RARE AND PROTECTED SPECIES

Some populations of fauna and flora have been in, or are in, the process of decline due to impacts of their environments by human activities. Federal law (under the provisions of the Endangered

Species Act of 1973, as amended) requires that any action likely to adversely affect a species classified as federally protected, be subject to review by the United States Fish and Wildlife Service (USFWS). Other species may receive additional protection under separate State laws.

3.7.1 State and Federally Protected Species

The analysis of potential effects to threatened and endangered species under the Endangered Species Act (ESA) is a continuous process. Due to the Site's location along the border of Harris and Waller counties, state and federally protected species in both counties were reviewed. Both the USFWS and the Texas Parks and Wildlife Department (TPWD) maintain species lists for Harris and Waller counties. As of September 20, 2016, the USFWS and TPWD online lists of federally protected species for these two counties included 12 Endangered, 3 Threatened, and 2 Candidate species, 5 delisted species, and 4 species under review (TPWD, 2016; USFWS, 2016a, 2016b). Sixty-four (64) federal and state listed species for Harris and Waller counties are summarized in Appendix F.

Additionally, element occurrence data requested from the Texas Natural Diversity Database (TXNDD) was received on February 9, 2015 (TXNDD, 2015). The two closest federally threatened or endangered species (TES) were the Texas prairie dawn (*Hymenoxys texana*) [Endangered], which has been identified approximately 3.9-miles northeast of the Site, and the Houston toad (*Anaxyrus houstonensis*) [Endangered], which has been identified approximately 14.8 miles southwest of the Site. While no records are available which confirm the presence of federally listed or rare species within the Site, surveys for individuals (where practicable) and suitable habitat were conducted for the species discussed below.

The Attwater's prairie-chicken (*Tympanuchus cupido attwateri*), a federal and state-listed endangered species, is included within the TPWD Annotated County List for Waller County. Attwater's prairie-chickens live on coastal prairie grasslands with tall grasses, such as little bluestem, indiangrass, and switchgrass. The birds like a variety of tall and short grasses in their habitat. They gather to choose a mate in an area of bare ground or short grass where the males can be easily seen by the females. Hens build their nest in tall grass and usually lay 12 eggs during nesting season. The eggs hatch in April or May. Small green leaves, seeds, and insects form the diet of the Attwater's prairie-chicken. Attwater's prairie-chickens live about 2 to 3 years in the wild. Based on a review of NDD files and field investigations, no preferred habitat for the Attwater's prairie-chicken occurs within the Site.

The Texas prairie dawn, a federal and state listed endangered plant, is an annual sunflower (*Asteraceae*) that ranges in height from 1.5 to 7 inches. The bracts conceal the minute ray flowers; the yellow disk flowers are 0.1 to 0.2 inches long. Texas Prairie Dawn habitat consists of small, sparsely vegetated areas of fine-sandy saline soil. These sparsely vegetated areas commonly occur on the lower sloping portion of prairie (mima) mounds or on the level to slightly concave

area around the mound's base. Prairie remnants are often characterized by this unusual microrelief topography (Smeins, 1994). The Texas prairie dawn blooms and fruits from mid-March to mid-April and senescence is usually complete by May (Poole and Riskind, 1987). Field surveys for Texas prairie dawn were conducted in March, April, and May of 2015 by qualified biologists. No Texas prairie dawn or suitable habitat was observed during the field investigations.

The Houston toad is a Pleistocene relic species confined to deep sandy soils of east central Texas. Preferred habitat includes sandy soil with overstory vegetation. Breeding occurs in late winter or early spring after significant rain events, typically within ephemeral wetlands or fishless ponds. The largest known population occurs near the Lost Pines area in Bastrop County. No Houston toads or their habitat were identified during field investigations. Additionally, the project site does not contain deep sandy soils to which Houston toads are adapted. The nearest known viable population is 30 miles west, in Cat Spring.

The Southern crawfish frog (*Lithobates areolatus areolatus*) is a moderately large Ranid with a generally disjunct distribution through the southern and central U.S. Habitat for southern crawfish frogs across their range includes bottomland forests, wooded valleys, prairies, and pine forests. A key component to southern crawfish frog habitat is the presence of at least one species of primary burrowing crayfish, whose abandoned burrows the crawfish frog uses for refuge. In southeast Texas, southern crawfish frogs have been found recently in sandy remnant prairie, cattle pastures, and fallow rice fields. Breeding habitat includes man-made and natural ponds within those habitats. Southern crawfish frogs persist in disturbed areas where their breeding pond has remained primarily intact. Habitat is present for southern crawfish frogs within the subject property and calling males were located near Hebert Road northwest of the subject property in March 2015. Because wetland areas within the subject property will remain intact and measures will be taken to enhance their functionality, the proposed project is not anticipated to adversely impact southern crawfish frogs.

The black rail (*Laterallus jamacicensis*) is a bird of salt, brackish, and freshwater marshes. Other habitats favored by black rails include pond edges, wet meadows, and grassy swamps. Potential habitat for the black rail exists on the subject property, primarily in wetland areas. Similar to the black rail, the wood stork (*Mycteria americana*) [State Threatened] is a bird of prairie ponds and grassy wetlands, with potential habitat on the subject property. Because wetland areas within the subject property will remain intact and measures will be taken to enhance their functionality, the proposed project is not anticipated to adversely impact black rails or wood storks.

The subject property contains potential habitat for the Plains spotted skunk (*Spilogale putoria interrupta*). Preferred habitat for this species includes open fields, tallgrass prairies, and brushy areas. Additionally, Plains spotted skunks are known to utilize croplands, fence rows, and farm

yards. Because of their adaptability, and because the subject property will remain intact, adverse impacts are not anticipated to the Plains spotted skunk.

Potential habitat for the smooth green snake (*Liochlorophis vernalis*) may be present on the Site, but defined habitat for the snake has not been established for the remnant Texas population. No records exist for the Site or the Katy Prairie area. Additionally, nearby sites have been recently surveyed by qualified biologists specifically for smooth green snakes with no snake sightings.

Potential habitat for Indianola beakrush (*Rhynchospora indianolensis*) may be present on the subject property. The preferred habitat for this species includes wet portions of coastal prairies, marshes, and disturbed sites such as cattle pastures, roadside ditches, and borrow ponds (NatureServe, 2016; TPWD, 2016). However, during field investigations over the last two years, no sightings of the species have been documented.

The only other species listed by the USFWS is the bald eagle (*Haliaeetus leucocephalus*), which as of August 9, 2007 is no longer a federally threatened species. The bald eagle is still afforded special protection under the Bald and Golden Eagle Protection Act (USFWS, 2007). The bald eagle is now a migrant and winter resident throughout Texas (Texas Ornithological Society, 1995). It is generally found in coastal areas and around large bodies of water, such as reservoirs, lakes, and rivers. Nesting in Texas is largely restricted to the eastern one-third of the state and to the coastal prairies region. The bald eagle prefers habitat in deciduous forests with large hardwoods or pine trees for roosting and nesting. In Texas, wintering and migrating bald eagles frequently stop-over along water body shores and large rivers, which provide the eagle with the bulk of its dietary requirements (Campbell, 1995). During field investigations, no evidence of nesting has been identified and no bald eagles have been observed. This species has been seen in the area but nesting is not likely to occur within the project area due to the absence of suitable foraging and nesting habitat.

The goals of the proposed mitigation project are to restore and enhance the historic habitat of the Katy Prairie wetlands, which will provide an overall benefit to threatened and endangered species native to prairie habitats.

3.8 CULTURAL RESOURCES

The Sponsor is not aware of any historical or cultural resources present on the Site that might qualify for protection. Through discussions with the landowners, preliminary on-site investigations, and review of digital data sources, no historic or cultural resources have been identified on the Site or adjacent areas; however, no formal surveys have been performed to date.

The Sponsor sent a letter to the Texas Historic Commission (THC) on February 11, 2015, requesting a review of potential cultural resources near the Site. A letter dated March 12, 2015 was received from THC, stating that "No Historic Properties" and "No Significant Sites" will be affected and the project may proceed (Appendix E).

3.9 WATER RIGHTS

Wetland components of the Site will be fed hydrologically by rainfall, periodic overbank flooding from Cypress Creek, and periodic discharge during rainfall events from a field border canal at the southwestern corner of the Site. With the primary source of hydrology being precipitation, the issue of water rights does not impact the potential for the ecological success of the Site.

3.10 MINERAL RIGHTS

Mineral resources, including oil and gas, may exist under the land compromising the Site. Other parties may own subsurface rights to these mineral resources, in whole or in part. Recognizing that landowners in the State of Texas cannot control a mineral owner's access to those resources, the Sponsor shall take all reasonable steps to develop a Mineral Surface Management Plan (MSMP) with the mineral owner(s) prior to the initiation of any mineral exploration or extraction activities. The MSMP shall include a listing of all surface and subsurface ownership, a description of the anticipated impacts of the exploration and extraction activities on the local aquatic ecosystem functions and values, and a set of guidelines or best management practices that would minimize the adverse impact of those activities on the local aquatic ecosystem. The Sponsor shall, whenever practicable, work with the subsurface mineral owner(s) to develop leases, easements, or other suitable surface use agreements that are consistent with the MSMP.

The exploration for, and production and transportation of, subsurface mineral resources beneath the Site is acceptable provided that use of an adjacent non-wetland location is unfeasible and the resulting ground disturbing activities and surface alterations are minimized to the maximum extent practical; activities are conducted in a manner that minimizes adverse environmental impacts; impacted areas are restored to pre-existing conditions as soon as practicable; reasonable and appropriate compensatory mitigation is achieved, and the entity conducting these activities complies with all applicable regulatory requirements, including those under Section 404 of the Clean Water Act. The number of available credits associated with the Site will be reduced by the number of functional impact units of areas adversely impacted by the activities. If sufficient credits are not available, the USACE may require other appropriate compensatory mitigation.

4.0 RESTORATION PLAN

The primary goals of this mitigation plan include 1) re-establishing wetland hydrology across a significant portion of the Site, and 2) restoring native wetland and upland vegetation and prairie habitat.

Primary activities include 1) re-establish and enhance wetland hydrology, 2) upland buffer restoration, 3) establish native vegetation; and 4) permanently protect the Site through a conservation easement. These activities will:

- Restore approximately 131 acres of native prairie depressional wetlands.
- Enhance approximately 88 acres of existing wetlands.
- Restore approximately 48 acres of transitional zones between wetlands and uplands.
- Restore approximately 76 acres of native tall prairie grasslands, including prairie mounds.
- Establish native prairie species endemic to the Katy Prairie uplands and wetlands.
- Protect the Site in perpetuity with a conservation easement.

4.1 PRAIRIE WETLAND RESTORATION APPROACH

The proposed restoration approach for returning Prairie Depressional Wetlands (PDWs) to the Site (the Approach) seeks to more closely mimic the natural geomorphology of the wetlands endemic to the Katy Prairie and portions of the Gulf Coastal Plain. The Approach incorporates a series of shallow excavations that were likely present prior to agricultural land manipulation to restore prairie pothole configurations. These excavated areas are designed to distribute overland flows across the Site to maximize water retention from surface water and precipitation. This is done by orienting depressions in a way that facilitates not only retention, but the distribution of overflows to adjacent depressions through topographic low points between adjacent depressions. This design approach provides connectivity between the depressions and ultimately a significant nexus with tributaries to Cypress Creek.

The general design concept for the Approach is based on the following observations and documents:

- Lessons learned from the restoration of the Indian Grass Demonstration Site, performed by the Katy Prairie Conservancy in 2014, and located approximately 4 miles northwest of the Site. The restoration of the Indian Grass Demonstration Site used a very similar restoration approach as described in this section for the Hebert II Site.

- Documentation of historic Texas Coastal PDW depths, spatial layout, and micro-topography during the Sheldon Lake State Park Coastal Prairie Wetland Restoration Project (Texas Parks and Wildlife Department, Texas AgriLife Extension Service – Sea

Grant Program, the Texas Soil and Water Conservation Board, and several volunteer groups), which involved re-excavation of wetlands previously filled for agricultural use.

- Field observations made by local researchers on the hydrologic connectivity of Texas Coastal PDWs (Wilcox et al. 2011, Jacob and Lopez 2005, Sipocz 2005).

- Historic aerial photograph research regarding Katy Prairie PDW size, shape, and distribution, developed through the review of historic aerial photography.

Under existing conditions, there are 75.5 acres of PEM wetlands and 12.9 acres of PSS wetlands that have been delineated on the Site. As part of the proposed mitigation plan, the existing PEM wetlands will be enhanced to provide a more natural wetland hydroperiod and appropriate native vegetation species (see Section 4.6). Existing PSS wetlands will be converted to PEM wetlands by restoring a more natural hydroperiod, removing any invasive species that are currently present, and replanting emergent herbaceous vegetation that is appropriate for the target prairie depressional wetland habitats.

Photo 6. The restoration approach for the Hebert II Wetland Mitigation Bank Site is similar to the approaches used by KPC on the Indian Grass Demonstration Site, approximately 4 miles away. In October 2014, members of the IRT visited the Indian Grass Demonstration Site to view the progress of the site and discuss use of the PDW approach for the proposed Hebert II Site.

4.2 UPLANDS

Currently, there are no large-scale prairie depressional wetland mitigation areas within the Katy Prairie that have incorporated appreciable amounts of upland buffer into their overall design. Nearby restoration efforts at the Indian Grass Demonstration Site located on KPC property have employed a similar approach on a smaller scale, and for demonstration purposes rather than mitigation purposes.

To emulate the tall grasslands of the Katy Prairie, upland restoration activities are planned for approximately 76 acres of the Site. By restoring upland areas and vegetation communities

adjacent to restored wetland areas, the overall ecological diversity and complexity of the restored Site will more closely match those of natural prairie wetland sites.

Prairie mounds will be restored as topographic high spots that are approximately 1.0 – 1.5 feet higher in elevation than the surrounding ground surface, and approximately 10 to 33 feet in diameter. Prairie mounds were once common in the Gulf Coast of Texas but many have been lost due to development and intense agricultural practices. These prairie mound characteristics were adapted from Robinson (2012), Carty et al. (1988) and Collins (1975) and further refined to match the Site conditions through discussions with local KPC personnel. The addition of prairie mounds will provide a more holistic approach to the overall design and create a more diversified habitat for both flora and fauna within the Site. The proposed prairie mound restoration may also provide future habitat for the federally endangered Texas prairie dawn, the rare Houston daisy (*Rayjacksonia aurea*), and two state species of concern, the Threeflower broomweed (*Thurovia triflora*) and Texas meadow-rue (*Thalictrum texanum*). These species naturally occur in the region and are associated with these mound formations.

The proposed prairie mound restoration techniques will attempt to mimic the topographic characteristics of natural prairie mounds; however, natural mounds require thousands of years to form. Therefore, it is impossible to replicate the soil texture, structure, and chemical characteristics of natural mounds. The prairie mound technique will be evaluated during the monitoring period to assess the establishment of vegetation communities and species diversity, providing valuable information and insight for future restoration projects.

4.3 HYDROLOGY

The hydrology of the Site has been manipulated in the past to collect and to divert water off of the Site, promoting conditions conducive to agricultural purposes. In order to re-establish the hydrology on the Site, the following techniques will be used:

1) The existing ditches, canals, and other drainage features will be filled to reduce the loss of water from the Site by surface flow;

2) Depressions will be graded to hold varying depths of water to increase the overall storage capacity of the Site;

3) Tillage practices will incorporate microtopography within each restored and enhanced wetland area, further maximizing water retention;

4) Depressions will be oriented in such a way that when full, surface water will flow into the adjacent depressions (down slope), thereby increasing water retention and providing connectivity between the depressions;

5) Surface flow will be allowed to enter the Site at the southwest corner (higher elevation) by installing an impervious dike in the adjacent canal and constructing a swale that will route flows during storm events into the southwest corner of the Site;

6) A water control structure (flashboard riser) will be installed at the Site outlet (north central berm) that will set the ponding level at the outlet end of the Site. As water leaves the Site, it will flow into an existing network of canals, ultimately draining into Cypress Creek.

The techniques described above will greatly increase the storage capacity for surface waters and precipitation on the Site and decrease drainage losses from the Site, thereby promoting wetland hydrology in the targeted restoration areas. In a preliminary hydrologic analysis of the Site, performed by Forbes Consultancy and attached as Appendix G, indicated that the Site will support over 200 acres of wetlands if the techniques described above are implemented.

To further assess the hydrology of the Site, groundwater monitoring wells were installed during April 2015 to document existing water table conditions across the Site. Collected data will be used to calibrate more detailed hydrologic modeling efforts that will be performed during the final design stages to determine final design grades, storage capacity, and outlet elevations.

4.4 SITE GRADING

The restored PDWs will generally be very shallow with varying bottom depths and microtopography to provide habitat diversity and additional water storage. The majority of the wetlands will be approximately 6-inches deep with deeper pools varying from 6- to 12-inches deep and the deepest pool depths ranging from 12- to 24-inches. These depths and variations are consistent with those constructed during the Sheldon Lake State Park Coastal Prairie Wetland Restoration Project (Texas Coastal Watershed Program, 2012). The deepest pools in each wetland will be excavated to a depth of 6- to 12-inches above the underlying confining clay layer (aquitard), which was located and mapped via a series of shallow soil borings across the Site (previously described in Section 3.1). Care will be taken during construction to ensure that the aquitard layer is not disturbed.

The process of restoring and enhancing the wetlands at the Site will involve large scale grading. During the construction process, surface soil horizons will be separated from subsurface soil horizons during grading, stockpiled separately, and then redistributed across the Site to achieve final design grades and mimic in-situ soil conditions. This step will be critical for plant establishment, growth and survivability.

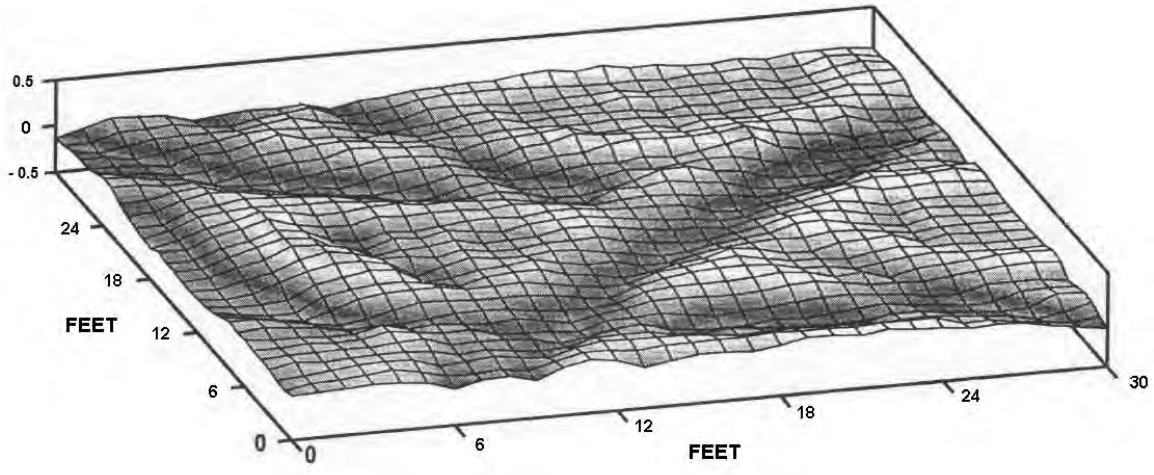
Subsurface soil horizons excavated during grading will be placed in upland areas of the Site in accordance with the grading plans. Drainage features such as ditches and ephemeral canals will be filled to retain more surface water onsite, and other areas will be built up through the placement of excavated spoil. Within the upland areas, prairie mounds will be created to a height

of approximately 12- to 18-inches high with diameters ranging from 10- to 33-feet wide, as specified in the design plan sheets (Appendix H).

4.5 RESTORATION OF SOIL MICROTOPOGRAPHY

The final topography of the restored site will be patterned after natural sites and will include the restoration of minor depressions and topographic irregularities (microtopography) that promote diversity of hydrologic conditions and habitats common to natural wetland areas. The incorporation of microtopography promotes greater surface ponding and infiltration, decreased drainage capacity, and results in higher water table conditions across the restoration site. Microtopography contributes to the properties of wetland soils and to the diversity and patterns of plant communities (Lutz, 1940; Stephens, 1956; Bratton, 1976; Ehrnfeld, 1995). The combination of microtopography and complex inundation patterns ultimately promotes diverse plant communities (Forbes et al., 2009). Microtopography provides differing levels of moisture and nutrient availability across a site, which affects germination, growth, and ultimately the survivability of the plants (McKinney, 1997).

Once wetland areas have been established to design grades, microtopography will be established using tillage equipment that will leave a furrow approximately six to twelve feet wide and approximately 6 – 10 inches deep. The equipment will be worked in irregular patterns to create a random pattern of interconnected and isolated furrows and ridges, as shown below.



Typical pattern of microtopography restored by using tillage equipment.

4.6 VEGETATIVE PLANTING

Variations in vegetative planting will occur based on topography, expected soil wetness, and depth of standing water. Vegetative species composition will mimic reference prairie data, onsite

observations, and KPC and Texas Watershed Program staff recommendations. All plant or seed sources will be derived from local sources, specifically adapted to Katy Prairie's climate and disease stressors. Local suppliers will be utilized to ensure the quality and provenance of the seeds and plants to be established at the Site. Since PDWs can be inundated and then dry up during the driest portion of the growing season, plant selection will consider this hydrologic criterion. Four planting zones and their associated species are listed in Table 4 below, and shown graphically in Figure 9. Final seeding mixes and specific densities will be determined based on availability at the time of planting, but will include no less than 6 species from each of the zone lists provided, and no single species will comprise more than 30% of the overall planting mixture.

Species will be established through seeding or planting of plugs and containerized plants, as specified in the design plan sheets (Appendix H).

After vegetation has been established within the planting zones in winter or early spring, an initial evaluation will be performed during early summer to verify planting methods were successful and to determine initial species composition and density. Supplemental planting and additional modifications (adaptive management) will be implemented, if necessary, to reach target densities and coverage.

Table 4. Vegetative Plantings by Zone

Zone 1 – Prairie Depressional Wetlands (Deeper Water)	
Scientific Name	**Common Name**
Echinodorus cordifolius	Creeping burhead
Nymphaea odorata	American white water-lily
Peltandra virginica	Arrow arum
Pontedaria cordata	Pickerel weed
Sagittaria graminea	Grass-leaf arrowhead
Sagittaria longiloba	Long-barb arrowhead
Sagittaria platyphylla	Delta duck potato
Utricularia radiata	Little floating bladderwort
Zone 2 – Prairie Depressional Wetlands	
Scientific Name	**Common Name**
Andropogon glomeratus	Bushy bluestem
Carex hyalinolepsis	Thin-scaled sedge
Carex joorii	Cypress swamp sedge
Crinum americanum	Crinum
Cyperus articulatus	Jointed flat sedge
Cyperus virens	Green flatsedge
Eleocharis montana	Mountain spike-rush
Eleocharis montevidensis	Sand spike-rush
Eleocharis quandrangulata	Squarestem spike-rush
Hymenocallis liriosme	Spring spiderlily
Iris virginica	Southern Blue Flag
Juncus effusus	Soft-stem rush
Juncus validus	Round-head rush
Juncus repens	Lesser creeping rush
Leersia hexandra	Clubhead cutgrass
Panicum hemitomon	Maidencane
Persicaria hydropiperoides	Swamp smartweed
Rhynchospora colorata	Narrow-leaf whitetop
Rhynchospora corniculata	Short-bristle horned beak sedge
Xyris iridifolia	Yellow-eyed grass
Zone 3 – Transition Zones	
Scientific Name	**Common Name**
Wetland Plants	
Andropogon glomeratus	Bushy bluestem
Cyperus virens	Green flatsedge
Eleocharis montevidensis	Sand spike-rush
Iris virginica	Southern Blue Flag
Juncus effusus	Soft-stem rush
Juncus nodatus	Stout rush

Zone 3 – Transition Zones (continued)	
Scientific Name	**Common Name**
Rhynchospora colorata	Narrow-leaf whitetop
Rhynchospora indianalensis	Indianola beak sedge
Upland Plants	
Andropogon gerardii	Big Bluestem “Earl”
Bouteloua curtipendula	Sideoats Grama, “El Reno”
Leptochloa dubia	Green Sprangletop, “Van Horn”
Panicum virgatum	Switchgrass, “Blackwell”
Schizachyrium scoparium	Little Bluestem, “Cimarron”
Schizachyrium scoparium	Little Bluestem, “Native Prairie Collection”
Setaria vulpiseta	Plains Bristlegrass, “VNS”
Sorghastrum nutans	Indiangrass, “Cheyenne”
Zone 4 – Tallgrass Prairie and Prairie Mounds (Uplands)	
Scientific Name	**Common Name**
Agalinis heterophyla	Prairie agalinis
Coreopsis tinctoria	Plains coreopsis
Sporobolus cryptandrus	Sand dropseed
Dracopis amplexicaulis	Clasping coneflower
Schizachyrium scoparium	Little Bluestem (Colorado County)
UHCC Prairie Harvest	Gayfeather-Rattlesnake Master
Eragrostis trichodes	Sand Lovegrass
Rudbeckia hirta	Black-eyed susan
Helianthus angustifolius	Swamp sunflower
Bouteloua gracilis	Blue grama
Galliarda pulchella	Indan Blanket
Monarda citriodora	Lemon Mint
Ratibida columnifera	Red Mexican Hat
Helianthus maximiliani	Maximilian Sunflower
Ratibida columnifera	Yellow Prairie Coneflower
Tridens flavus	Purpletop
Desmanthus illinoensis	Illinois Bundleflower
Coreopsis basalis	Golden Wave
Muhlenbergia capillaris	Gulf Coast Muhly
Elymus canadensis	Praire Wildrye
Elymus virginicus	Virginia wildrye
Andropogon virginicus	Broomsedge Bluestem
Aristida purpurea	Purple Three-Awn
Salvia coccinea	Scarlet Sage
Dalea candida	White Prairie Clover
Oenethera speciosa	Pink Evening Primrose
Dalea purpurea	Purple Prairie Clover

Zone 4 – Tallgrass Prairie and Prairie Mounds (Uplands) - continued	
Scientific Name	**Common Name**
Coreopsis lanceolata	Lanceleaf Coreopsis
Cassia fasciculata	Partridge Pea
Aristada longiseta	Red Three-Awn
Engelmannia pinnatifida	Cutleaf Daisy
Lupinis texensis	Texas Bluebonnet
Callirhoe leiocarpa	Annual Winecup
Erichloa sericea	Texas Cupgrass
Centaurea americana	American Basketflower
Lindheimera texana	Texas Yellow Star
Delphinium virescens	Prairie Larkspur
Hebertia lahue	Prairie Nymph
Polytaenia nuttallii	Prairie Parsley

4.7 NON-NATIVE INVASIVE SPECIES

Currently, deep rooted sedge and Chinese tallow are the primary non-native invasive species found within the Site, with a small component of bahiagrass, bermudagrass, and Vasey grass. During grading and prior to establishing Site vegetation, all non-native invasive species listed by TIPPC will be considered undesirable species and subject to removal per their guidelines (TIPPC, 2016).

4.8 LIVESTOCK EXCLUSION

Livestock grazing will be excluded from the property unless the Sponsor receives IRT approval for the use of livestock to suppress invasive flora species and promote native flora species. A detailed cattle management plan will be provided to the IRT for review once construction has been completed.

4.9 IMPLEMENTATION TIMELINE

This project will conform to Federal regulations (33 CFR 332.8[m]) which state that implementation of an approved mitigation plan shall be "no later than the first full growing season after the date of the first credit transaction." A six-month construction time frame would be expected with planting occurring during the appropriate season following the completion of earthwork.

4.10 PROPOSED WETLAND MITIGATION CREDITS

Based on the restoration design proposed, 88.4 acres of emergent wetlands will be enhanced, and 130.7 acres of emergent wetlands will be restored as part of the proposed project. As a

result, the project is expected to generate approximately 159.9 TSSW (Temporary Storage of Water) Functional Credit Units (FCU's), 100.3 MPAC (Maintain Plant & Animal Community) FCU's, and 175.5 RSEC (Removal & Sequestration of Elements) FCU's using the interim hydro-geomorphological model (iHGM) for riverine herbaceous/shrub (RHS) wetlands (Table 5).

Table 5. Proposed Site Mitigation Amounts.

Proposed Wetland Type	Restored (ac)	Created (ac)	Enhanced (ac)	Protected (ac)
Emergent Wetland	130.7	0.0	88.4	0.0
Impoundment	0.0	0.0	0.0	0.0
Totals:	130.7	0.0	88.4	0.0

Functional Credit Units	TSSW	MPAC	RSEC
Total Wetland FCUs Predicted	159.87	100.26	175.49

The iHGM RHS model was used during site assessments to quantify the functional capacity of the Site in its existing condition. The model was then run for the post-restoration condition, modifying the parameters of the model to represent conditions after the mitigation plan described in this document has been implemented. iHGM RHS spreadsheets that document the existing condition and post-restoration HGM scores are provided in Appendix I.

iHGM RHS is the only model approved for use by the USACE-Galveston District for impacts and mitigation associated with herbaceous and scrub/shrub wetlands. It is ideally suited for assessing wetland impacts and mitigation for wetlands that are associated with riverine environments. However, the iHGM RHS is not optimized for wetlands dominated only by herbaceous vegetation and fails to provide an appropriate score for emergent wetlands lacking woody and mid-story species because they are naturally dominated by herbaceous vegetation. Federal regulations and guidelines promote the use of in-kind restoration and replacement of lost aquatic functions. Therefore, the proposed restoration approaches for the Site are appropriate when seeking to replicate historic wetland functions and ecological communities, and should not be penalized for this approach.

NOTE: Our understanding is that the USACE-Galveston District is currently evaluating a new or revised iHGM model for emergent herbaceous wetlands, such as prairie depressional wetland systems, that would more appropriately weigh the iHGM sub-index scores to appropriately score herbaceous environments when the target vegetative cover is dominated by emergent herbaceous species. The Sponsor requests the right to re-evaluate the functional lift of the proposed mitigation Site and recalculate mitigation credits provided this revised iHGM method is approved prior to the pre-closeout phase of the Site.

4.11 PROPOSED CREDIT RELEASE SCHEDULE

Credit releases for the Site will be dictated by the completion of appropriate project milestones and achieved performance standards. The proposed credit release schedule for the Site is provided in Table 6.

Table 6. Proposed Credit Release Schedule.

Task/Milestone	Justification/Criteria	Credit Release
Task 1: Pre-Construction	Execution of MBI, recording the conservation easement, and establishing financial assurances.	25%
Task 2: Construction Completion	Completion of all earthwork activities and hydrologic modifications.	15%
Task 3: Planting Completion	Completion of planting for the entire site.	10%
Task 4: Monitoring Report (Year 1)	Approved Monitoring Report with Site on trajectory for success.	15%
Task 5: Monitoring Report (Year 3)	Approved Monitoring Report with Site on trajectory for success.	15%
Task 6: Monitoring Report (Year 5)	Approved Monitoring Report with Site on trajectory for success.	15%
Task 7: Final Release (Year 7)	Approved Monitoring Report with Site on trajectory for success, and approved long-term endowment.	5 %

5.0 MONITORING PLAN AND SUCCESS CRITERIA

Monitoring of the Site's wetland mitigation efforts will be performed for seven years, or until agreed upon success criteria are fulfilled and approved by the IRT. Monitoring is proposed to identify trends in hydrology, vegetation, and wetland function, and will be conducted in the late summer/early fall of each monitoring year, near the end of the growing season. Monitoring reports will be submitted annually to the USACE during December of each monitoring year.

The jurisdictional verification received from the USACE prior to restoration activities will serve as the baseline for the type and quantity of the existing wetlands at the Site. Upon completion of the final year of monitoring (Year 7), a new wetland delineation will be conducted and verified by the USACE to determine type and quantity of wetlands present (post monitoring). The difference between the two jurisdictional verifications will determine the type and quantity of wetlands restored and enhanced at the Site.

5.1 VEGETATION MONITORING

5.1.1 Vegetation Success Criteria

A primary goal of the project is to establish a diverse assemblage of native emergent vegetation across the Site. Therefore, vegetation success criteria for the Site will include three components: percent coverage, species diversity, and percentage of undesirable species, which are described below:

1. Percent Coverage – Percent areal coverage of emergent vegetation will be measured and estimated from aerial photographs taken during monitoring. The emergent vegetated coverage should be a minimum of 25% and 50% at the end of Years 1 and 5, respectively. At the end of monitoring Year 7, the areal coverage of emergent vegetation should be at least 70% across the entire Site.

   Remedial actions will be implemented, if necessary, to ensure the Site meets the minimum coverage criteria of 70% at the end of Year 7. All proposed remedial actions must be approved by the IRT prior to implementation.

2. Species Diversity – Diversity will be assessed by using the data collected during transect sampling of the Site. Transect sampling data should demonstrate that at least six (6) native herbaceous species are present within each of the designated planting zones (i.e. deeper wetland pools, depressional wetlands, transition areas, and uplands) on the Site, and that no individual species accounts for more than 50% of a planting zone.

3. Undesirable Species – Aerial photographs, transect sampling, and field observations will be used to document the presence and extent of invasive and woody species (trees, shrubs, etc.), both of which are detrimental to the establishment of native emergent prairie vegetation and considered undesirable. All noxious species listed by TIPPC will be considered an undesirable species and removed per their guidelines (TIPPC, 2016). Annual reviews and appropriate remedial actions will be taken, so that no more than 5% of the Site includes undesirable species at the end of the monitoring period.

5.1.2 Vegetation Monitoring Methodology

Quantitative vegetation monitoring will be conducted in late summer/early fall of each monitoring year. Vegetation monitoring will consist of three components:

1. Aerial Photography – Aerial photographs will be taken during each monitoring event to facilitate the documentation of the percent cover of emergent vegetation on the Site. Aerial photographs will be used to document areas of limited vegetative cover that may require supplemental planting to reach target densities. Aerial photographs will be used to help identify areas of possible undesirable species. These locations will

be verified through field observations to document the presence and extent of undesirable species that may require remedial action during the monitoring period.

2. Ground Photography – Photographs will be taken from ground level each year to document the development of vegetation communities across the Site. Permanent photo points will be established to ensure the same location and photo view are used each year. Up to 30 photo points will be established across the Site to document the different types of vegetative communities (wetlands and uplands) that develop.
3. Diversity Transects – Eight (8) permanent transects that cross the Site will be established during the first year of monitoring. Four (4) transects will run west to east, and four (4) transects will run north to south. Transects will be spaced evenly across the Site to provide representative coverage. Transects will cross the various vegetation zones (wetlands to uplands) that will be restored on the Site. Species present will be identified and categorized by their planted vegetation zones (i.e. deeper wetland pools, depressional wetlands, transition areas, and uplands). Photographs will be taken from each end of the transects every year for a total of 16 photographs. During monitoring activities, any invasive species or woody species observed will be identified on a map with its name and extent. This information will be included in the annual monitoring report.

5.2 WETLAND HYDROLOGY

5.2.1 Hydrologic Success Criteria

To meet the hydrologic success criteria for the Site, the monitoring data must show that for each normal year within the monitoring period, the Site has been inundated or saturated within 12 inches of the soil surface for a minimum of 5% of the growing season, or 16 consecutive days during the period from February 9 through December 9. This targeted hydroperiod represents the lower limit of jurisdictional wetland hydrology per USACE guidelines, and is appropriate for the Site since the hydrology of prairie depressional wetlands is seasonal and restoration includes extensive areas of transitional wetland fringe.

5.2.2 Hydrologic Monitoring Methodology

Automated groundwater-monitoring stations will be installed across the project area to document hydrologic conditions of the restored site. Twelve (12) groundwater monitoring stations will be installed, and each station will include an automated water level recorder and a well for manual measurements. The locations of the monitoring stations will be selected to represent the range of expected wetland hydrology on the Site, from deeper wetland pools to

transitional wetland fringes. Ground water monitoring stations will follow the USACE standard methods found in Wetlands Regulatory Assistance Program (WRAP) Technical Note ERDC TN-WRAP-06-02 (2006), regarding installation of well monitoring stations.

To determine if rainfall is normal for a given year, rainfall amounts will be tallied using data obtained from the nearby Houston Barker automated weather station (TX0520), located approximately 10 miles southeast of the project site and compared to the long-term average.

5.3 WETLAND FUNCTIONAL ASSESSMENTS

Wetland functional assessments using the USACE-Galveston District iHGM RHS model, or approved alternative, will be performed in monitoring years 1, 3, 5, and 7 to document any changes in predicted functional uplift. Model spreadsheets, like those provided in Appendix I used to document the existing site conditions, will be reassessed to evaluate the functional uplift provided by the mitigation site. Any modifications to the predicted mitigation credits developed from the Site, both positive and negative, will be reflected in the credit release for that monitoring year, and in the credit ledger for the Site.

NOTE: Our understanding is that the USACE-Galveston District is currently evaluating a new or revised iHGM model for emergent herbaceous wetlands, such as prairie depressional wetland systems, that would more appropriately weigh the iHGM sub-index scores to appropriately score herbaceous environments when the target vegetative cover is dominated by emergent herbaceous species. The Sponsor requests the right to re-evaluate the functional lift of the proposed mitigation Site and recalculate mitigation credits provided this revised iHGM method is approved prior to the pre-closeout phase of the Site.

6.0 MAINTENANCE, MANAGEMENT AND PROTECTION

6.1 MAINTENANCE PLAN

The maintenance plan consists of two phases: pre-closeout and post-closeout. In the pre-closeout phase or project implementation/monitoring phase, the use of date collected through annual monitoring efforts will be used to identify problem areas that may require remedial actions. In addition, quarterly site visits will be part of an ongoing effort to ensure that the project is performing as planned. Through these combined efforts, strategies will be developed with IRT coordination to address concerns as they arise.

Some potential problems that may arise and would require maintenance are the substantial loss of seeded/planted vegetation, soil erosion, siltation, and/or the presence of invasive or noxious species. If such problems occur within the monitoring period, the Sponsor will develop a proposal for remedial action that will be submitted to the IRT for comment and approval. Minor issues will

be addressed as they arise without IRT coordination but will be noted within the annual monitoring reports.

The issues of trespass and the related impacts that often result (damaged vegetation, vandalism, etc.) will be minimized through active management and long-term stewardship. Once the IRT has determined that the Sites performance standards have been met, the Site will enter the post-closeout phase and become the responsibility of KPC (Section 6.3).

6.2 ADAPTIVE MANAGEMENT PLAN

The Sponsor views the concept of adaptive management as those activities not normally performed during on-going maintenance. As the project matures, the Sponsor will do what is required (identified in previous section) to ensure the project is trending in a direction of equilibrium. However, as the base of knowledge regarding ecological restoration continues to grow, new methods may be incorporated to improve the overall quality of the project.

One such strategy that may be incorporated is the use of prescribed fire within the Site. Prescribed fire is used to improve habitat and to mimic natural processes that once occurred on the Katy Prairie. Prior to pre-colonial settlement, fire was a common part of the prairie ecosystem and has been essentially eliminated, along with much of the prairie ecosystem. If prescribed fire is to be utilized, it would only occur after consultation with and approval by the IRT. The hope is that this project will serve as a "living classroom" to further the knowledge of prairie wetland restoration. Other adaptive management strategies (See Livestock Exclusion Section 4.8) may be implemented with IRT approval.

6.3 LONG TERM MANAGEMENT PLAN

KPC will be the organization responsible for the long-term management and maintenance for the Site. The draft Management and Funding Agreement and associated draft Long-Term Management Plan (LTMP) are included in Appendix J. This plan utilizes the USACE approved LTMP for Phase I of the Bank as it's template.

6.4 SITE PROTECTION

The Site shall be protected in perpetuity by a conservation easement to be held by the Texas Land Conservancy (TLC). A draft Conservation Easement (CE) is included in Appendix K. The CE and endowment funding shall be in place prior to the first credit release. A letter from the TLC indicating its willingness to be the Conservation Easement holder is also included in Appendix K.

6.5 FINANCIAL ASSURANCES

Prior to the commencement of construction, the Sponsor shall provide financial assurances in the form of either an annually renewable contract performance bond or casualty insurance policy

to protect the Bank in the event of non-compliance. The total anticipated cost for project implementation (construction through Year 7 monitoring), including a 10% contingency is $814,000.00. This amount includes construction ($360,000.00), planting ($100,000.00), and seven years of monitoring at $40,000.00 per year ($280,000.00). It should be noted that Restoration Systems has implemented over 55 compensatory mitigation projects throughout the United States since its establishment in 1998. Each of these projects, including four stream mitigation projects in the Galveston USACE District, have been covered by various financial assurance mechanisms and none have been called, or any penal amount forfeited.

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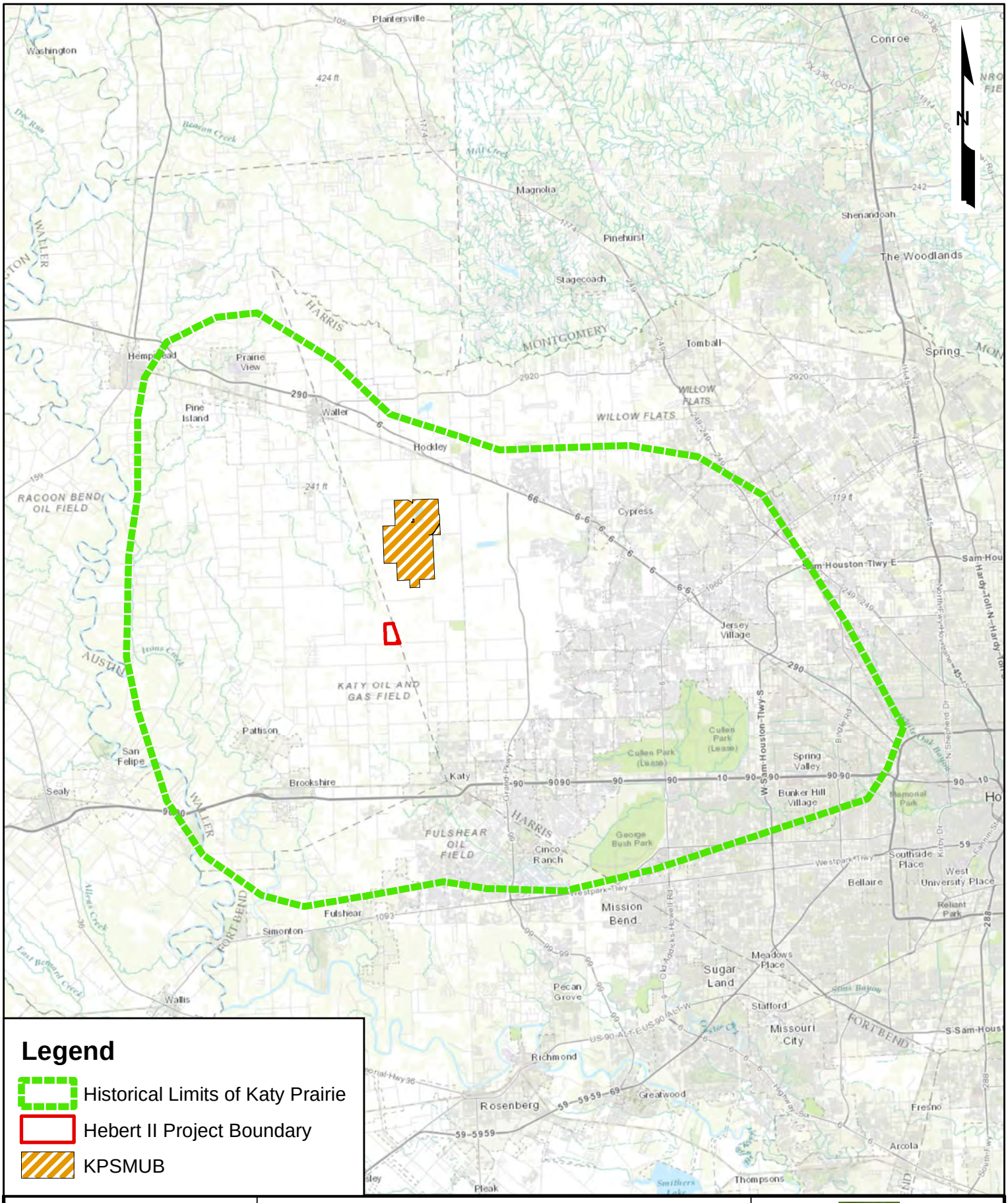
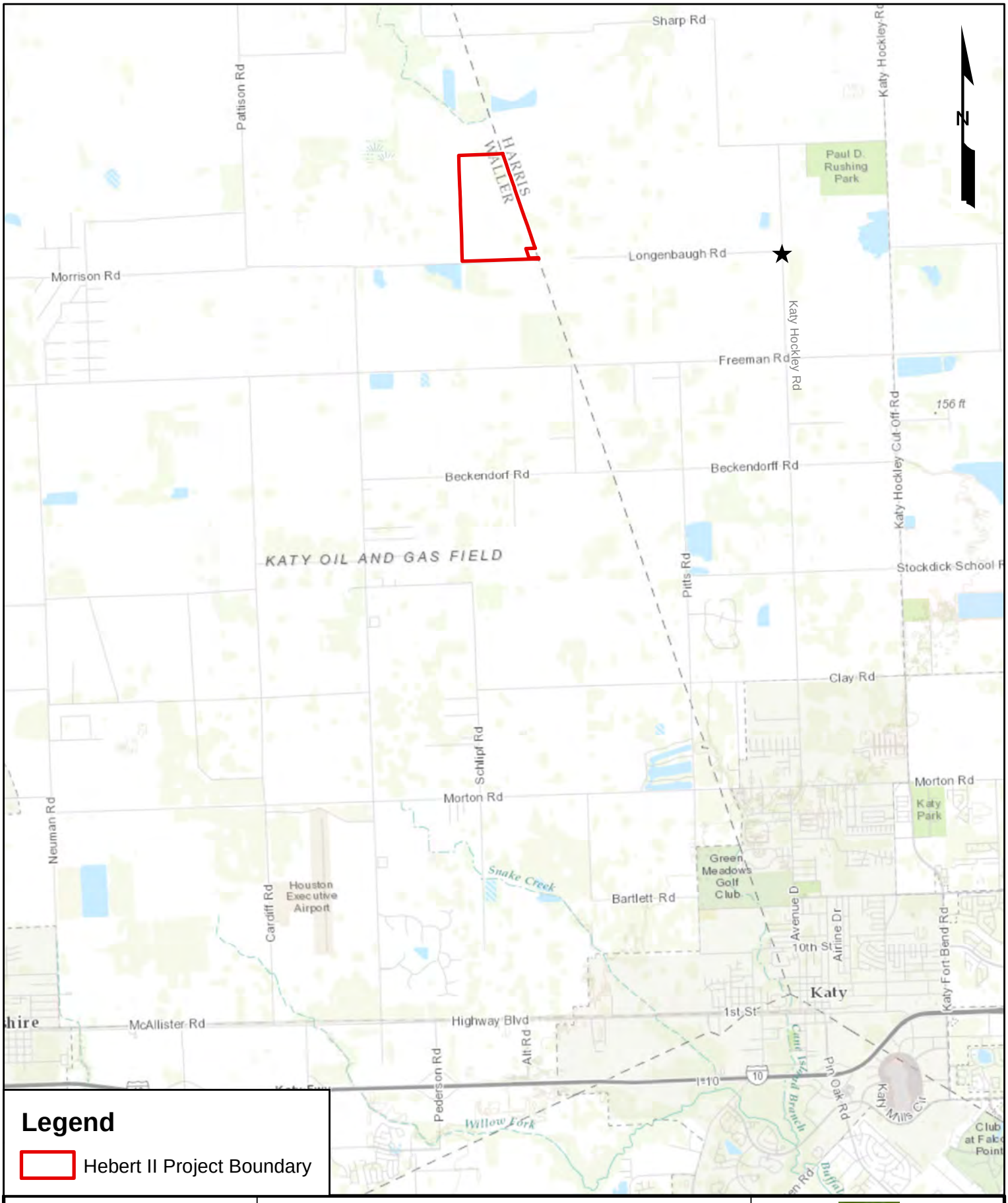
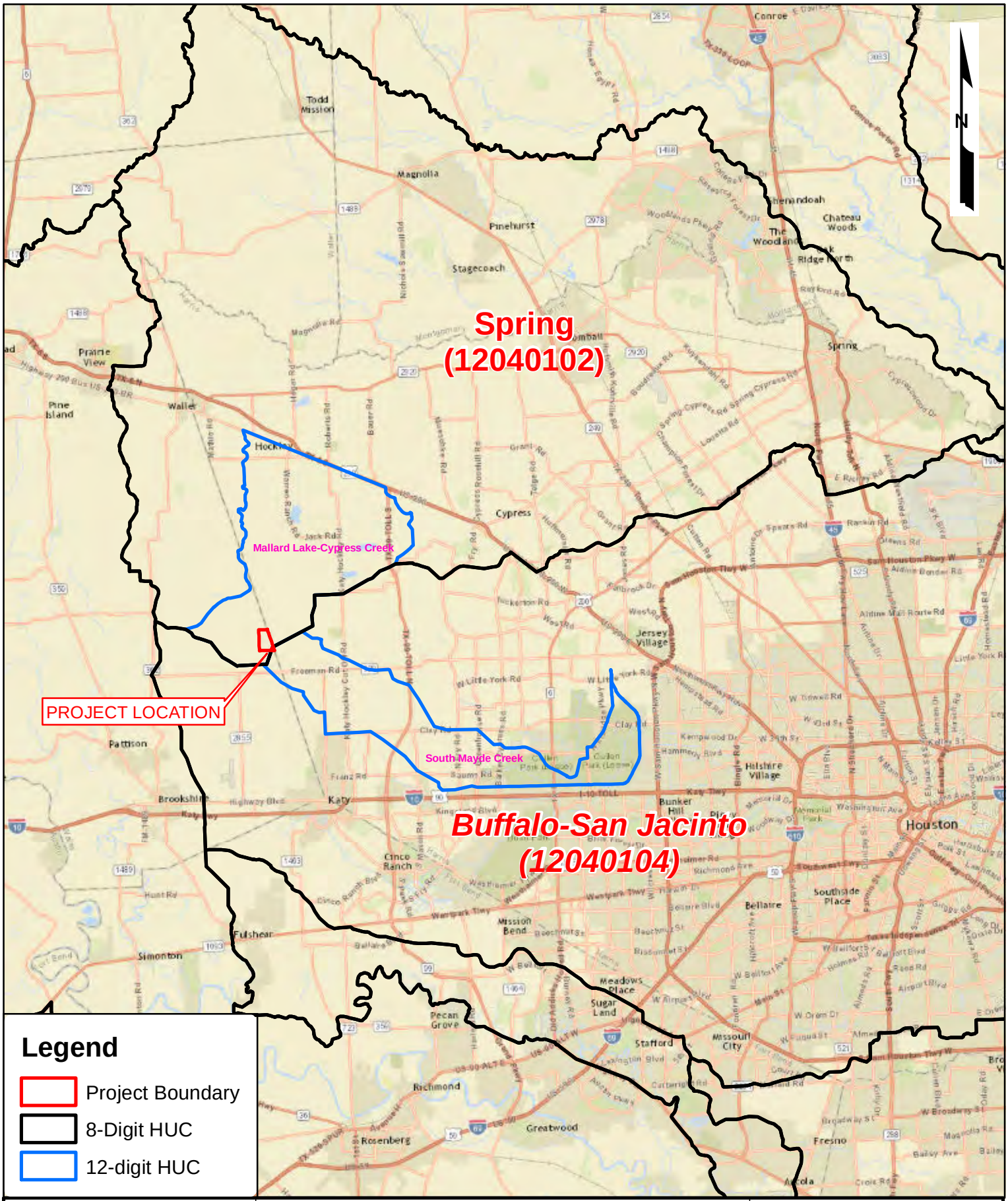
Appendix A

Figures


Legend
Historical Limits of Katy Prairie
Hebert II Project Boundary
KPSMUB
N
0 3 6
Miles
Washington
Plantersville
Conroe
Magnolia
Pinehurst
Shenandoah
The Woodlands
Stagecoach
Tomball
Spring
Hempstead
Prairie View
Pine Island
Waller
Hockley
Cypress
Jersey Village
Sam Houston Tlwy E
W Sam Houston Tlwy S
Bunker Hill Village
Spring Valley
Cullen Park (Lease)
George Bush Park
Cinco Ranch
Katy
Brookshire
Sealy
San Felipe
Pattison
Fulshear
Simonton
Wallis
Mission Bend
Sugar Land
Meadows Place
Stafford
Missouri City
Pecan Grove
Richmond
Rosenberg
Greatwood
Fresno
Arcola
Thompsons
Pleak
Bellaire
Southside Place
West University Place
Reliant Park
Memorial Park
RACOON BEND OIL FIELD
KATY OIL AND GAS FIELD
FULSHEAR OIL FIELD
WILLOW FLATS
HARRIS
MONTGOMERY
WALLER
FORT BEND
HEBERT II WETLAND MITIGATION SITE
OVERVIEW MAP
FIGURE 1
WALLER COUNTY, TEXAS
PREPARED BY:
RESTORATION SYSTEMS LLC
ECOSYSTEM PLANNING & RESTORATION
DATE:
SEPT. 2016



0 0.5 1 Miles	HEBERT II WETLAND MITIGATION SITE VICINITY MAP		
FIGURE 2	WALLER COUNTY, TEXAS	PREPARED BY: Ecosystem Planning & Restoration	DATE: SEPT. 2016



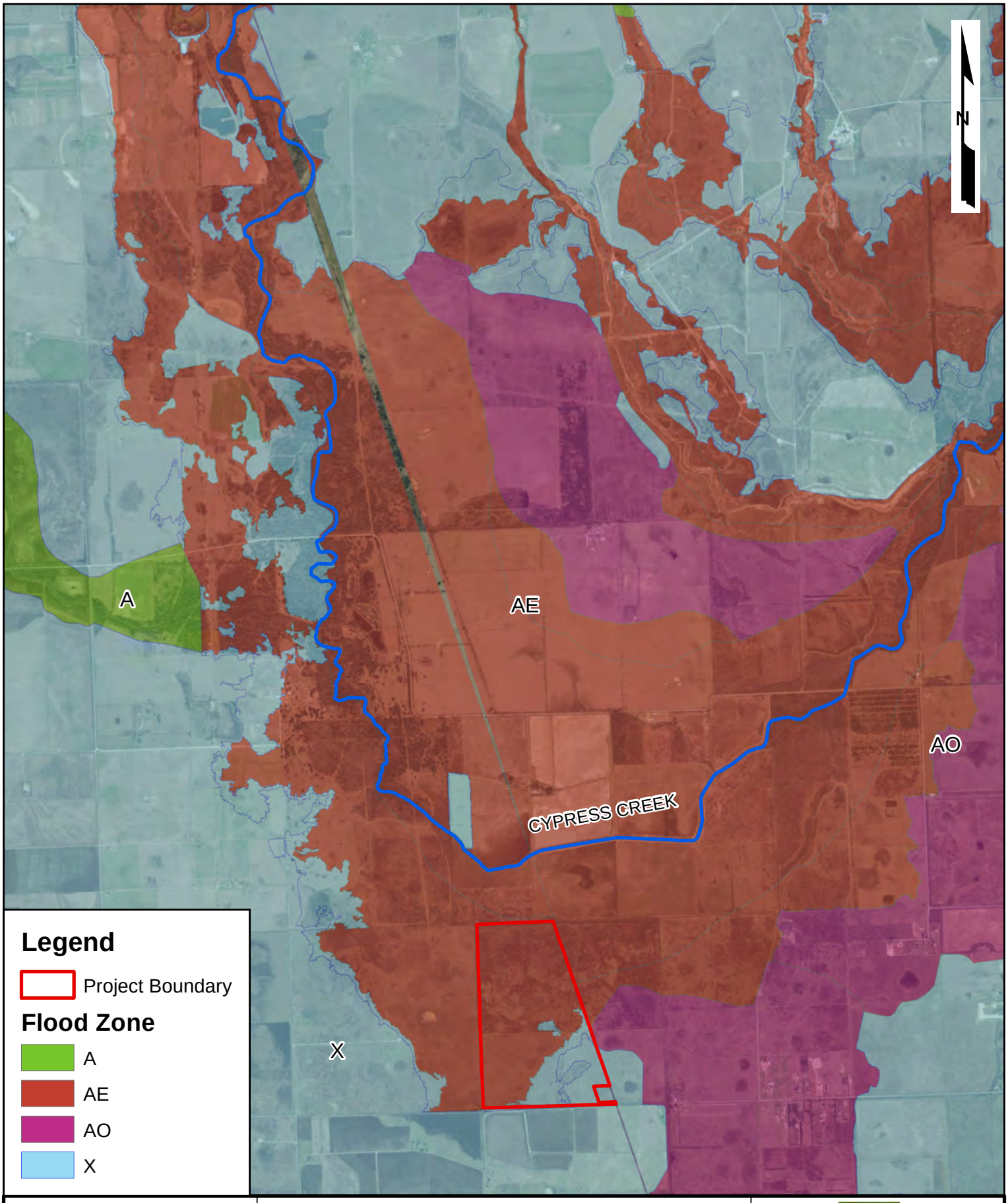
HEBERT II WETLAND MITIGATION SITE
WATERSHED MAP

FIGURE 3

WALLER COUNTY, TX

PREPARED BY: Ecosystem Planning & Restoration

DATE: SEPT. 2016



HEBERT II WETLAND MITIGATION SITE

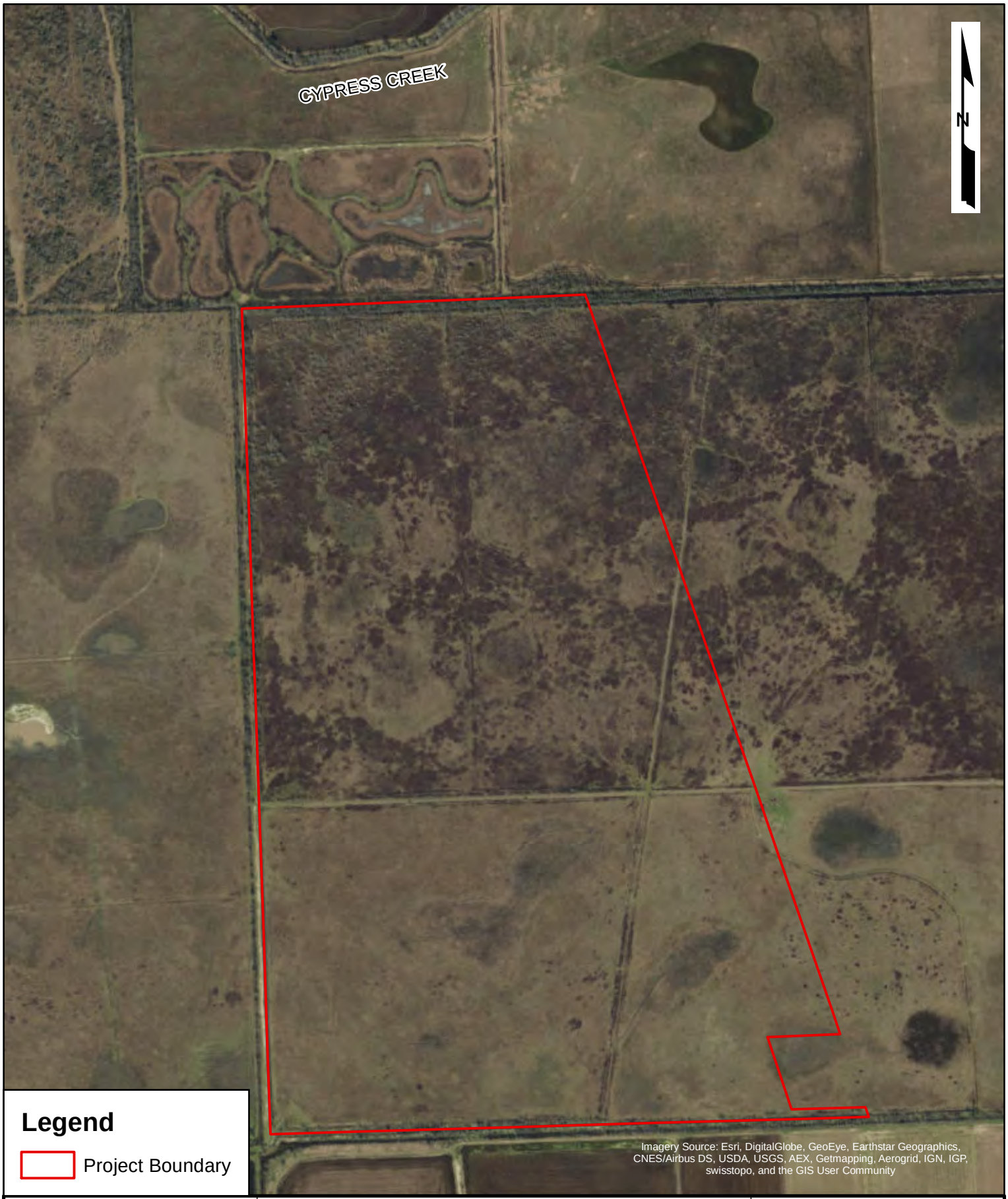
FEMA 100 YR. FLOODPLAIN MAP

FIGURE 6

WALLER COUNTY, TEXAS

PREPARED BY: Ecosystem Planning & Restoration

DATE: SEPT. 2016



0 400 800 Feet

HEBERT II WETLAND MITIGATION SITE

EXISTING CONDITIONS MAP (JANUARY 2015)

FIGURE 7

WALLER COUNTY, TEXAS

PREPARED BY: Ecosystem Planning & Restoration

DATE: SEPT. 2016

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

March 29, 2016

Compliance Branch

SUBJECT: **SWG-2009-00937**; Restoration Systems, LLC, Approved Jurisdictional Determination, Proposed Phase 2, Katy Prairie Stream Mitigation Bank, Approximate 355-Acre Tract, Waller County, Texas

Mr. Clarence H. (Sonny) Kaiser III
Ecosystem Planning & Restoration
17442 North Eldridge Parkway
Tomball, Texas 77377

Dear Mr. Kaiser:

This letter is in response to a request from the USACE Galveston District Policy Analysis Branch, dated March 7, 2015, for verification of a jurisdictional delineation on an approximate 355-acre tract for the proposed Phase 2 of the Katy Prairie Stream Mitigation Bank. Restoration Systems, LLC applied for a permit to expand the mitigation bank to include wetlands. The project site is located approximately 2 miles northeast of the Freeman Road (FM 529) and FM 2855 intersection, in Waller County, Texas.

Based on our July 2, 2015 site visit, subsequent desk review, and coordination with the EPA, we determined that the approximate 355-acre tract contains 88.06 acres of waters of the United States, specifically, fifteen adjacent wetlands that do not abut a relatively permanent water (see enclosed map). Cypress Creek, a perennial relatively permanent water and the closest water of the United States, is located approximately 1,550 feet north of the tract. The fifteen adjacent wetlands are neighboring Cypress Creek and have more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of the downstream traditional navigable water, Cypress Creek approximately 30 river miles downstream of the tract. Therefore, the fifteen adjacent wetlands are waters of the United States. The waters of the United States are subject to Section 404 of the Clean Water Act and the discharge of fill material into the adjacent wetlands requires a Department of the Army permit. The wetlands were identified using the Atlantic and Gulf Coastal Plain Region Supplement of the 1987 Corps of Engineers Wetland Delineation Manual and under normal circumstances exhibit wetland hydrology, a dominance of hydrophytic vegetation, and hydric soils.

This determination has been conducted to identify the limits of the United States Army Corps of Engineers (USACE) CWA jurisdiction for the site identified in this request. However, 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. If you wish to appeal the approved jurisdictional determination, please see the enclosed sheets regarding the administrative appeal process for jurisdictional determinations: Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you object to this determination, you may request an administrative appeal under USACE regulations at 33 CFR Part 331. 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
Administrative Appeal Review Officer, CESWD-PD-O
U.S. Army Corps of Engineer Division, Southwestern
1100 Commerce Street, Room 831
Dallas, Texas 75242-1731
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.

This approved jurisdictional determination is valid for 5 years from the date of this letter unless new information warrants a revision prior to the expiration date. If you have any questions concerning this jurisdictional determination please reference file number **SWG-2009-00937** and contact me at the letterhead address or by telephone at 409-766-3933 or by email at john.davidson@usace.army.mil. 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 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

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant:	File Number:	Date:
RESTORATION SYSTEMS, LLC	**SWG 2009-00937**	**03/29/2016**

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	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/inet/functions/cw/cecwo/reg/ 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 jurisdictional determination (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.)

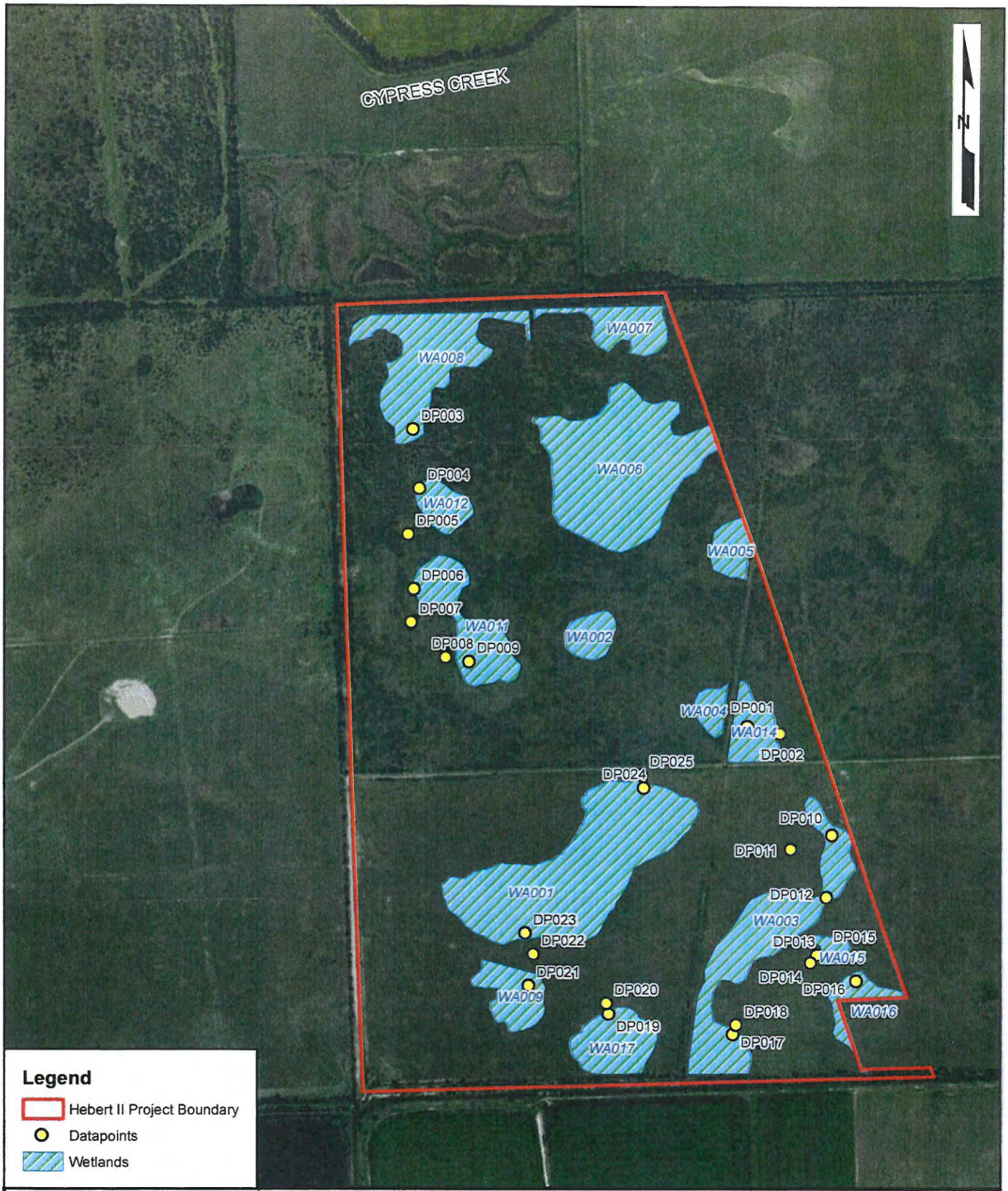
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant 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: John Davidson Compliance Section Team Lead CESWG-RD-C P.O. Box 1229 Galveston, Texas 77553-1229 Telephone: 409-766-3933 FAX: 409-766-6301	If you only have questions regarding the appeal process you may also contact: Elliott Carman Administrative Appeals Review Officer USACE (CESWD-PD-O) U.S. Army Corps of Engineers 1100 Commerce Street, Suite 831 Dallas, Texas 75242 Phone: 469-487-7061 FAX: 469-487-7199

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 authorized agent.	Date:	Telephone number:



HEBERT II WETLAND MITIGATION SITE
WETLAND DELINEATION MAP

FIGURE 2

WALLER COUNTY, TEXAS

PREPARED BY: Ecosystem Planning & Restoration

DATE: JULY 2015

Hebert II Wetlands

WET ID	Type	Acres	CLASS OF AQUATIC RESOURSE
WA001	PEM	20.40783	CWA SEC 404
WA002	PEM	1.84454	CWA SEC 404
WA003	PEM	11.35787	CWA SEC 404
WA004	PEM	1.20161	CWA SEC 404
WA005	PEM	1.82705	CWA SEC 404
WA006	PEM	17.92466	CWA SEC 404
WA007	PSS	3.40045	CWA SEC 404
WA008	PSS	9.47359	CWA SEC 404
WA009	PEM	3.29634	CWA SEC 404
WA011	PEM	5.622239	CWA SEC 404
WA012	PEM	2.080511	CWA SEC 404
WA014	PEM	2.753819	CWA SEC 404
WA015	PEM	0.817153	CWA SEC 404
WA016	PEM	1.735032	CWA SEC 404
WA017	PEM	4.332494	CWA SEC 404
	Total Wetlands	88.075180	

PEM = Palustrine Emergent Wetland

PSS = Palustrine Scrub/Shrub Wetland

PFO = Palustrine Forested Wetland

TNW = Traditionally Navigable Water

RPW = Relatively Permanent Water

Non-RPW = Non-Relatively Permanent Water

EPR
ECOSYSTEM PLANNING & RESTORATION

Ecosystem Planning and Restoration, LLC
104 Fountain Brook Circle, Suite A
Cary, NC 27511

Phone: (919) 388-0787
www.eprusa.net

NO HISTORIC PROPERTIES AFFECTED
PROJECT MAY PROCEED
for Mark Wolfe
State Historic Preservation Officer
Date 3/12/15
Track#

RECEIVED
FEB 18 2015
Texas Historical Commission

February 11, 2015

Pat Mercado-Allinger
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Subject: Hebert 2 wetland mitigation site in Waller County, Texas

Dear Ms. Mercado-Allinger,

Ecosystem Planning and Restoration requests review and comments on any possible issues that might emerge with respect to archaeological or cultural resources associated with potential wetland mitigation occurring on the Herbert II Wetland Mitigation Site (Site). To assist in the review, a vicinity map, topographic map, and soils map, along with a photo log have been included as attachments.

The Hebert 2 mitigation site consists of approximately 370 acres in eastern Waller County, TX. The Site is predicted to include approximately 186 acres of restored wetlands and 23 acres of enhanced existing wetlands. Approximately 151 acres of property will be preserved for upland buffer around the wetland components. No architectural structures or archeological artifacts have been observed or noted during preliminary surveys of the site for mitigation purposes.

We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions you may have concerning the degree of site disturbance associated with this project.

Sincerely,

Erin M Bennett

Erin Bennett, EI

Water Resources Specialist – Ecosystem Planning and Restoration, LLC

Email: ebennett@eprusa.net

...S CODE OF TEXAS REVIEW
...IGNIFICANT SITES
...OJECT MAY PROCEED
...Wolfe
...ive Director, THC
3/12/15

AGREEMENT TO ESTABLISH THE KATY PRAIRIE STREAM MITIGATION UMBRELLA BANK IN HARRIS COUNTY, TEXAS
Revised 23NOV2015
Revised 21OCT2016

PART I: BANK INFORMATION

1. CONTACT INFORMATION

Sponsor & Owner: Prairie Creek Ventures
c/o George Howard
1101 Haynes Street, Suite 211
Raleigh, NC 27604
george@restorationsystems.com

2. SERVICE AREA

The Katy Prairie Stream Mitigation Umbrella Bank (Bank) is located in the San Jacinto River Basin, specifically hydrologic unit (HU) 12040102, which is the Spring Creek watershed. The bank will provide compensatory mitigation for permitted impacts to streams and wetlands within the Service Area as defined below.

Primary Service Area – The Primary Service Area (PSA) for the Bank is its resident 8-digit HU, which is 12040102 (Spring), as well as the adjacent 8-digit HU- 12040104 (Buffalo).

Secondary Service Area – The Secondary Service Area for the Bank is comprised of both Cataloging Units within the San Jacinto-Brazos Basin (West Galveston Bay- 12040204 and Austin Oyster- 12040205) as well as the West Fork (12040101) of the San Jacinto Basin.

Credits shall be debited at a 1:1 ratio for impacts within the Primary Service Area, or on a 1.5:1 ratio for impacts within the Secondary Service Area. USACE, after coordination with the IRT, may allow use of the bank outside both the primary and secondary service areas, when it is determined to be practicable and environmentally preferable. In such cases, the replacement ratios will be determined on a case-by-case basis during review of the specific project for which the use of the Bank is being considered.

These Service Areas and the Watershed Approach applied are fully discussed within the site specific Mitigation Plan incorporated herein as Exhibit A.

PART II: AUTHORITIES

1. PURPOSE

The purpose of this MBI is to establish guidelines and responsibilities for the establishment, use, operation, and maintenance of the Bank. The Bank will be used with the intent to sell credits commercially for compensatory mitigation for unavoidable impacts to waters of the United States, including streams, which result from activities authorized under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899, provided such use has met all applicable requirements and is authorized by the USACE.

2. REGULATORY AUTHORITIES

The establishment, use, and operation of the Bank is carried out in accordance with the following authorities:

- Clean Water Act (33 USC 1251 et. seq.)
- Rivers and Harbors Act (33 USC 403)
- Fish and Wildlife Coordination Act (16 USC 661 et. seq.)
- Regulatory Programs of the U.S. Army Corps of Engineers, Final Rule (33 CFR 320-332)
- Guidelines for Specification of Disposal Sites for Dredged and Fill Material (40 CFR 230)
- Memorandum of Agreement between the Environmental Protection Agency and the
- Department of the Army concerning Determination of Mitigation Under the Clean Water Act, Section 404(b)1 Guidelines (February 6, 1990)
- Final Rule for the Compensatory Mitigation for Losses of Aquatic Resources issued by the U.S. Army Corps of Engineers and the Environmental Protection Agency (April 10, 2008)
- Section 7 and Section 9 of the Endangered Species Act
- Section 106 of the National Historic Preservation Act
- Texas State Water Quality Certification [30 Tex. Admin. Code §279.12 (2001)]
- Texas State Water Quality Standards [30 Tex. Admin. Code § 301 (2000)]
- Texas Parks and Wildlife Code Chapter 14 Powers and Duties Concerning Wetlands

3. INTERAGENCY REVIEW TEAM (IRT)

The IRT is composed of the individuals representing the agencies listed below and is chaired by the United States Army Corps of Engineers (USACE):

Agency	Representative	Address
US Army Corps of Engineers-Galveston District	Mr. Sam Watson	2000 Fort Point Rd. Galveston, TX 77553
US Environmental Protection Agency	Mr. Jim Herrington	TAMU AG Extension 720 East Blackland Road Temple, Texas 76502
U.S. Fish & Wildlife Service	Mr. Jeff Hill	17629 El Camino Real Suite 211 Houston, TX 77058
National Marine Fisheries Service	Mr. Rusty Swafford	4700 Avenue U Galveston, TX 77550
Natural Resources Conservation Service	Mr. Dan Keesee	USDA-NRCS Texas 101 South Main St. Temple, TX 76501
Texas Commission on Environmental Quality-Water Quality Division	Mr. Robert Hansen	Mail Code 150 P.O. Box 13087 Austin, TX 78711-3087
Texas General Land Office-Coastal Coordination Council	Mr. Tony Williams	1700 North Congress Ave. Austin, TX 78701-1495
Texas Parks and Wildlife Department	Mr. Mike Morgan	TPWD-Dickinson Marine Lab 1502 East FM517 Dickinson, Texas 77539

4. FORCE MAJURE

A. The Sponsor shall be responsible to maintain the bank property and perform remedial action as described herein except for damage or noncompliance caused by catastrophic events, events of force majeure or unlawful acts. In order for such exception to apply, the Sponsor shall reasonably demonstrate all of the following:

1. That the damage or non-compliance was caused by circumstances beyond the control of the Bank Sponsor;
2. That the Bank Sponsor could not have reasonably foreseen and prevented such damage or noncompliance; and
3. The period of damage or non-compliance was a direct result of such circumstances.

B. The Sponsor shall notify the USACE and IRT within 24 hours of occurrence of a catastrophic event, event of force majeure, or unlawful act, and as promptly as reasonably possible thereafter. The Bank Sponsor, USACE and the IRT shall meet to discuss the best course of action in response to such occurrence. In the

meantime, Sponsor shall continue to manage and maintain the bank property to the full extent practicable.

5. DISPUTE RESOLUTION

Should a dispute arise between the Sponsor and the USACE/IRT as to the application of this MBI, then the following Dispute Resolution protocol shall be applied:

(1) Any person or entity having an objection or matter to dispute pertaining to the interpretation or application of this MBI shall send notice of the same directly to the district engineer with a copy to the Sponsor and all IRT members. This notification must include an explanation of the basis for the dispute and offer recommendations for resolving the dispute.

(2) The district engineer must respond to such notification of dispute within 30 days of receipt. Such response must be provided to the Sponsor and all IRT members. The district engineer may either dismiss the objection or provide a resolution to the dispute.

(3) If the party raising the dispute is not satisfied with the decision of the district engineer, that party has 15 days from receipt of the district engineer's decision to appeal the decision to the Assistant Secretary of the Army for Civil Works through the Director of Civil Works.

(4) The dispute may be terminated by the objecting party upon 30 days notice to the district engineer, Sponsor and all IRT members.

Nothing in the forgoing shall preclude the Sponsor from seeking any legal remedies available for breach of this agreement by any party.

6. VALIDITY, MODIFICATION and TERMINATION OF THE MITIGATION BANK

This MBI will become valid upon signature by the USACE and bank sponsor. The initial credit release shall be authorized following the filing of the conservation easement, execution of the financial assurances requirements, and any other requirements specified in the MBI. This MBI may be amended, altered, released, or revoked only by written agreement among the parties hereto or their heirs, assigns or successors-in-interest, the amendment must follow the appropriate procedures listed in 33 CFR 332.8 (d), unless the district engineer determines that the streamlined review process described in 33 CFR 332.8 (g) (2) is warranted. Any of the IRT members may terminate their participation upon written notification to all signatory parties. Participation of IRT members will terminate 30 days after written notification.

7. CONTROLLING LANGUAGE

The language of this MBI and site specific mitigation plans shall control the operation and implementation of the Bank. Where contradictions may arise between supporting documentation or other such nonbinding documentation, such contradiction shall be resolved by the language contained herein.

PART III. MITIGATION PLAN

The Bank is developed with an umbrella component; meaning, overtime multiple sites will be incorporated into the Bank. As new sites are proposed for inclusion within the Bank, a complete mitigation plan will be developed for each individual site that is consistent with 33 CFR 332.4 and attached hereto as Exhibit A

PART IV. BANK OPERATIONS

1. ACCOUNTING PROCEDURES

The Sponsor will coordinate with permitees for stream and/or wetland impacts to provide information on the availability of credits. The Sponsor will provide the permittee with a Statement of Credit Availability for submission with permitee's application to the USACE.

Credits will be made available from the bank in accordance with the Credit Release Schedule set forth in item 3 below. The Sponsor has developed accounting procedures, including the ledger and a Transfer of Credit Certificate, through which accurate records of debits made from the Bank will be maintained. This ledger will be used to a report by the Sponsor showing credits used at the time they are debited from the Bank, which the Sponsor shall provide along with the executed Transfer of Credit Certificate within 15 days of the debit to each member of the IRT and to the USACE. In addition, the Sponsor shall prepare an annual report, on each anniversary of the date of execution of this agreement, showing all credits used, and the balance of credits remaining, to each member of the IRT and the USACE, until such time as all of the credits have been utilized, or this agreement is otherwise terminated. All reports shall identify credits debited and remaining by type of credit and shall include for each reported debit the Corps Permit number for the permit for which the credits were utilized.

2. REPORTING PROTOCOLS

The Sponsor will provide a financial assurance statement to USACE by (January 15) of each monitoring year. In the financial assurance statement the Sponsor shall discuss the status of the financial assurance, assess the adequacy of the financial assurance to reasonably ensure the perpetual operation of the bank in compliance with the requirements of the MBI, and propose any reduction or increase to the financial assurance that the Sponsor deems appropriate in light of the requirements of the MBI. USACE will consider a proposal to reduce the financial assurance and, after coordination with the IRT, provide the Sponsor a decision on the proposal.

3. CREDIT RELEASE SCHEDULE

The credit release schedule is the time table for authorizing credits to be sold upon satisfactory completion of project milestones. Project milestones and percent of credit released are shown in the table below for stream and wetland projects.

Stream Mitigation Projects		
Milestone	**Verification**	**Percent of Credit Release**
Mitigation Banking Instrument Approval & Property Protection	1. Execution of MBI by the Sponsor, USACE, and other agencies eligible for membership in the Interagency Review Team who choose to execute the agreement 2. Approval of the final mitigation plan 3. Delivery of financial assurances 4. Recordation of the conservation easement, as well as the title opinion covering the property that is acceptable to the USACE	20
Construction	Completion of all initial physical and biological improvements made pursuant to the mitigation plan	20
1st Bank Full Event*	Criteria Met	
	Channel Morphology Criteria Met	7
	Water Quality Success Criteria Met	7
	Vegetation Success Criteria Met	6
2nd Bank Full Event*	Criteria Met	
	Channel Morphology Criteria Met	10
	Water Quality Success Criteria Met	10
	Vegetation Success Criteria Met	10
Year 5 Monitoring Report	Year 5 Monitoring Report Approved	5
Final Monitoring Report (Year 7)	Year 7 Monitoring Report and IRT Close-Out (all requirements met)	5
	Total	100

***NOTE: No more than one bankfull event will be recognized per year**

Wetland Mitigation Projects		
Milestone	**Verification**	**Percent of Credit Release**
Mitigation Banking Instrument Approval & Property Protection	1. Execution of MBI by the Sponsor, USACE, and other agencies eligible for membership in the Interagency Review Team who choose to execute the agreement 2. Approval of the final mitigation plan 3. Delivery of financial assurances 4. Recordation of the conservation easement, as well as the title opinion covering the property that is acceptable to the USACE	20
Construction Completion	Completion of all earthwork activities and hydrologic modifications.	15%
Planting Completion	Completion of planting for the entire site.	10%
Monitoring Report (Year 1)	Approved Monitoring Report with Site on trajectory for success.	15%
Monitoring Report (Year 3)	Approved Monitoring Report with Site on trajectory for success.	15%
Monitoring Report (Year 5)	Approved Monitoring Report with Site on trajectory for success.	15%
Final Release (Year 7)	Approved Monitoring Report with Site on trajectory for success, and approved long-term endowment.	5 %

4. CONTINGENCY PLANS/REMEDIAL ACTION

The Sponsor will perform data collection throughout the life cycle of the mitigation bank and it is expected that this data will identify problem areas that may require remedial actions. In addition to the data that is proposed for collection (baseline and monitoring), monthly site visits will be a part of an ongoing effort to ensure that the project is performing as planned. Based on what is observed during monthly visits and through data collection, strategies will be developed and implemented to address concerns as they arise.

If such problems are to occur within the monitoring period, the Sponsor will perform remedial actions such as structure replacement, re-grading of banks, additional plantings and the removal of invasive vegetation and nuisance species. The issue of trespass and the impacts that often result (loss of vegetation, water diversion) will not occur on site as a result of having an invested landowner in the project on site.

Except in the case of an emergency, where immediate action is necessary to protect the life of either livestock or human or other immediate danger to the project area or adjacent land, any and all necessary remedial actions shall be taken in coordination with the USACE and IRT members.

If the authorizing agencies determine that the bank is operating at a deficit, debiting by the sponsor of deposited credits shall immediately cease, and the USACE, in consultation with the IRT and the sponsor, will determine what remedial actions are necessary to correct the situation.

5. PROVISIONS COVERING THE USE OF THE LAND

The bank area shall be protected in perpetuity by a Conservation Easement substantially in the same form as the template included within the Mitigation Plan (Exhibit A). A detailed description of the current and projected land use of the bank area and surrounding land also included within the Mitigation Plan.

6. APPROVED CREDIT QUANTITIES

Upon signature of the document, the USACE, in consultation with the IRT, shall grant sponsor the proposed quantity of mitigation credits. The release of these credits shall follow the schedule described in Part IV(3). In accordance with the Final Rule for the Compensatory Mitigation for Losses of Aquatic Resources issued by the USACE and the EPA, dated April 10, 2008, these quantities can be adjusted downward if performance standards are not met or adjusted upward if the performance standards are significantly exceeded.

7. LEGAL RESPONSIBILITY STATEMENT

Sponsor assumes all legal responsibility for satisfying the mitigation requirements of any and all Corps Permits for which fees have been accepted (i.e., the implementation, performance, and long-term management of the compensatory mitigation project approved under this agreement). The transfer of liability is established by: 1) the approval of this instrument; 2) receipt by the district engineer of a credit sale that is signed by Sponsor and the permittee and dated and 3) the transfer of fees from the permittee to Sponsor.

It is understood and agreed to by Sponsor that the responsibility for financial success and risk to the investment initiated by the Bank Sponsor rests solely with the Bank Sponsor. The regulatory agencies that are parties to this agreement administer their regulatory programs to best protect and serve the public's interest, and not to guarantee the financial success of banks, specific individuals, or entities. Accordingly, there is no guarantee of profitability for any individual mitigation bank. Sponsor does not construe the agreement as a guarantee in any way that the agencies will ensure sale of credits or that the agencies will forgo other mitigation options that may also serve the public interest.

8. DEFAULT and CLOSURE PROVISION

If the USACE in coordination with the IRT determines that Sponsor has failed to meet the required compensatory mitigation performance standards, submit monitoring reports in a timely manner, establish and maintain ledgers and report in accordance with the provisions in Section IV (1), Accounting Procedures, and/or otherwise comply with the terms of the MBI, the USACE must take appropriate action to achieve compliance with the terms of the MBI. Such actions may include suspending credit sales, decreasing available credits, requiring adaptive management measures, utilizing financial assurances or contingency funds, terminating the MBI, or referring the non-compliance with the terms of the instrument to the Department of Justice.

Any delay or failure of Sponsor to comply with the terms of this MBI shall not constitute a default if and to the extent that such delay or failure is primarily caused by any force majeure or other conditions beyond Sponsor's reasonable control and significantly adversely affects its ability to perform its obligations hereunder, such as flood, drought, lightning, earthquake, fire, landslide, condemnation or other taking by any governmental body. Sponsor shall give written notice to USACE and IRT if affected by any such event as soon as is reasonably practicable in order to restore compliance. Either signatory may terminate the MBI within 60 days of written notification to the other party. In the event that the (bank) operated by Sponsor is terminated, Sponsor is responsible for fulfilling any remaining mitigation obligations including relevant maintenance, monitoring, reporting, and long-term management requirements. Sponsor shall remain responsible for fulfilling these obligations until such time as the long-term financing obligations have been met and the long-term ownership of all mitigation lands has been transferred to the party responsible for ownership and all long-term management

This MBI will become valid upon signature by Sponsor and the USACE. This MBI may be amended, altered, released or revoked only by written agreement among the parties hereto or their heirs, assigns or successors-in-interest.

The terms and conditions of the MBI remain throughout the operational life of the Bank. As taken from the Federal Compensatory Mitigation Rule, with the exception of arrangements for long-term management and protection in perpetuity of the aquatic and riparian resources, this period terminates at the point when the following occur:

- Compensatory mitigation credits have been exhausted or banking activity is voluntarily terminated with written notice by the bank sponsor provided to the BI signatories; and
- It has been determined that the debited bank is functionally mature and/or self-sustaining to the degree specified in the banking instrument.

PART V: ADDITIONAL INFORMATION

The following Exhibit is hereby incorporated into and made part of this Agreement:

Exhibit A: Mitigation Plan

Sponsor must obtain all appropriate permits or other authorizations needed to construct and maintain the bank. The MBI does not fulfill or substitute for such authorization.

SPONSOR: PRAIRIE CREEK VENTURES

George Howard Date

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT

Lars N. Zetterstrom Date
Colonel, District Commander

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 6

William K. Honker, P.E. Date
Director, Water Quality Protection Division

U.S. FISH AND WILDLIFE SERVICE

Karen Cathey Date
Acting Field Supervisor, Texas Coastal Ecological Services Field Office- Houston

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Salvador Salinas Date
State Conservationist

TEXAS PARKS AND WILDLIFE DEPARTMENT

Carter Smith
Executive Director

Date

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

David Galindo Date
Director, Water Quality Division

TEXAS GENERAL LAND OFFICE

George P. Bush
Land Commissioner

Date