DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS LA 70118-3651

February 5, 2024

Regulatory Division
Special Projects and Policy Team

Project Manager:
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Application #: MVN-2022-1283-AL

PUBLIC NOTICE

Interested parties are hereby notified that a permit application has been received by the New Orleans District of the U.S. Army Corps of Engineers pursuant to: [X] Section 10 of the Rivers and Harbors Act of March 3, 1899 (30 Stat. 1151; 33 USC 403); and/or [X] Section 404 of the Clean Water Act (86 Stat. 816; 33 USC 1344).
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Terrebonne Basin Umbrella Mitigation Bank in Lafourche Parish

NAME OF APPLICANT:
Terrebone Basin Conservation, LLC, attn: Mr. Greg Fell, 7330 Highland Road, Suite B-1, Baton Rouge, LA 70808

LOCATION OF WORK: The 4,262.6-acre site is located in Sections 42,43,70,71, and 78-80, Township 16 South and Ranges 17 and 18 East. The proposed bank is located approximately 11 miles southeast of the city of Thibodaux, in Lafourche Parish Louisiana, (lat. 29.700257, long. -90.667504), as shown within the attached drawings. (Hydrologic Unit Code 08090302, West Central Louisiana Coastal watershed).]

CHARACTER OF WORK: The proposed project is to restore, enhance, and preserve approximately 332 acres of bottomland hardwoods, 285.5 acres of cypress swamp, and 3404.4 acres of coastal tidal freshwater marsh. The purpose of the project is to establish a phased umbrella mitigation bank to provide compensatory mitigation for authorized impacts within jurisdictional areas per 33 CFR 332.3(1)(a-b) and LAC 43:724. The project as proposed would restore or improve hydraulic connectivity through the removal of culverts, degradation of interior berms, plugging of artificial swales, and installation of culverts in targeted locations. Planting of appropriate vegetative species for the 3 targeted wetland types will be planted during the non-growing season (December 15-March 15) after targeted site prep activities which may include chemical and/or mechanical techniques have concluded.

The comment period on the requested Department of the Army Permit will close **30 days** from the date of this public notice. Written comments, including suggestions for modifications or objections to the proposed work, stating reasons thereof, are being solicited from anyone having interest in this permit request, and must be submitted so as to be received before or by the last day of the comment period. Letters and/or comments concerning the subject permit application must reference the Applicant's Name and the Permit Application Number and can be preferably emailed to the Corps of Engineer's project manager listed above or forwarded to the Corps of Engineers at the address above, **ATTENTION: REGULATORY DIVISION, RG, Anthony R Lobred**. Individuals or parties may also request an extension of time in which to comment on the proposed work by mail or preferably by emailing the specified project manager listed above. Any request for an extension of time to comment must be specific and substantively supportive of the requested extension and received by this office prior to the end of the initial comment period. The Division Chief will review the request and the requester will be promptly notified of the decision to grant or deny the request. If granted, the time extension will be continuous and inclusive of the initial comment period. This public notice is also available for review online at https://go.usa.gov/xennJ

Corps of Engineers Permit Criteria

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The U.S. Army Corps of Engineers is soliciting comments from the public, federal, state, and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the U.S. Army Corps of Engineers to determine whether to make, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Further, all factors that may be

relevant to the proposal will be considered, including the potential cumulative effects associated with the proposed project.

The New Orleans District is presently unaware of properties listed on the National Register of Historic Places at or near the proposed work but is pending further review in accordance with the National Historic Preservation Act. The possibility exists that the proposed work may damage or destroy presently unknown archeological, scientific, prehistorical, historical sites, or data. As deemed necessary, copies of this public notice will be sent to the State Archeologist, State Historic Preservation Officer, and federally listed tribes regarding potential impacts to cultural resources.

Based on the Information Planning and Consultation (IPaC) tool for Endangered Species in Louisiana, as signed on January 27, 2020, between the U.S. Army Corps of Engineers, New Orleans and the U.S. Fish and Wildlife Service, it has been determined that the project would have no effect to any species listed as endangered by the U.S. Fish and Wildlife Service, nor affect any habitat designated as critical to the survival and recovery of any such species.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The applicant's proposal may result in the destruction, alteration, and/or disturbance of 0.0 acres of EFH utilized by various life stages of red drum and penaeid shrimp. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

If the proposed work involves deposits of dredged or fill material into navigable waters, the evaluation of the probable impacts will include the application of guidelines established by the Administrator of the Environmental Protection Agency. Also, a certification that the proposed activity will not violate applicable water quality standards will be required from the LA Department of Environmental Quality before a Department of the Army permit is issued.

Any person may request, (preferably by email to the project manager, or in writing), within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

The applicant has certified that the proposed activity described in the application complies with and will be conducted in a manner that is consistent with the Louisiana Coastal Resources Program. The Department of the Army permit will not be issued unless the applicant received approval or a waiver of the Coastal Use Permit by the Department of Natural Resources.

You are invited to communicate the information contained in this notice to any other parties whom you deem likely to have interest in the matter.

Brad A. Guarisco
Deputy Chief, Regulatory Division

Enclosures

Terrebonne Basin Umbrella Mitigation Bank
Final Prospectus

December 5, 2023

Sponsor:
Terrebonne Basin Conservation, LLC
7330 Highland Road, Suite B-1
Baton Rouge, Louisiana 70808

Table of Contents

List of Figures

List of Appendices

1.0 Introduction

Terrebonne Basin Conservation, LLC (Sponsor), submits this Final Prospectus to the US Army Corps of Engineers, New Orleans District (CEMVN), Louisiana Department of Natural Resources (LDNR), and the Interagency Review Team (IRT), to initiate evaluation of the proposed Terrebonne Basin Umbrella Mitigation Bank (Bank, TBUMB), in accordance with 33 CFR §332.8 (d)(2) and LAC 43:724. The 4,262.6-acre Bank will provide compensatory mitigation for unavoidable, permitted impacts to "Waters of the United States" and coastal wetlands if deemed appropriate per 33 CFR §332.3(1) (a) and 33 CFR §332.3 (1) (b) and LAC 43:724. The details pertaining to the use of this site as a mitigation bank will be specified in the subsequent Mitigation Banking Instrument (MBI).

The 4,262.6-acre Bank is located near Bayou Folse and Lake Fields in the Louisiana Coastal Zone and Louisiana Coastal Wetland Conservation Plan Area. It is located downstream of Thibodaux between the natural levees of Bayou Lafourche and Bayou Blue. It is within the Louisiana Department of Environmental Quality (DEQ) Terrebonne River Basin and the United States Geological Survey (USGS) Hydrologic Unit Code #08090302.

The Sponsor intends to restore, enhance, and preserve 322.0 acres of Bottomland Hardwoods (BLH), 285.5 acres of Cypress Swamp (SW), and 3404.4 acres of coastal Fresh Marsh-Tidal (FM). The Sponsor intends to establish an Umbrella Mitigation Bank, which will consist of six individual "Tracts," where mitigation work plan activities may be implemented in phases to facilitate more effective construction, establishment, monitoring, and management. Additional tracts in the Terrebonne River Basin may also be added to the Umbrella Bank where appropriate.

As described in this Final Prospectus, the Sponsor proposes to execute a perpetual conservation servitude, conduct wetland restoration and enhancement activities, facilitate the establishment of a self-sustaining wetland ecosystem, and provide long-term management/maintenance activities. This will allow for improved wetland functions and values for the watershed that will be realized by the public for the long-term.

1.1 Bank Location

The 4,262.6-acre Bank is located in Sections 42-43, 70-71, 78-80, Township T16 South, Ranges R17 East-R18 East within Lafourche Parish, LA (Figure 1). The approximate centroid (decimal degrees) of the Bank is 29.700257, -90.667504. The Bank is located approximately 11 miles southeast of Thibodaux and approximately 4 miles west of Raceland (Figure 2). The Bank consists of maintained cattle pasture, forested and herbaceous wetlands with varying degrees of habitat quality, natural channels and ponds, and artificial drainage channels. Topographically, the Bank contains portions of two natural ridges formed by abandoned Mississippi River distributaries, low-lying interdistributary basins, and artificial spoilbanks.

The Bank is described as six distinct tracts (Figure 3). The contiguous 4,139.2-acre area north of US-90 consists of Tracts A-E. Within this parcel, Tracts A and B contain the remnant Bayou Folse ridge, Tract E contains a portion of the Bayou Grand Coteau ridge, and Tracts C and D contains the

remaining area, which is primarily marsh habitat. Tract F is a 123.4-acre triangular parcel bordered by LA-182 which also contains a portion of the Bayou Grand Coteau ridge.

Table 1 below shows the acreages of each parcel.

Table 1: Terrebonne Basin Umbrella Mitigation Bank Tracts	
Tract	***Acreage***
A	465.6
B	723.2
C	1377.0
D	1403.5
E	169.9
F	123.4

2.0 Project Goals and Objectives

The goal of the project is to re-establish, rehabilitate, enhance, and preserve bottomland hardwood forest (BLH), cypress swamp (SWP), and tidal freshwater marsh (FM) for the purposes of providing compensatory mitigation for unavoidable and authorized impacts to wetlands authorized by Section 404 and/or Coastal-Use Permitting.

Table 2 below shows the proposed mitigation features of the Bank, which are illustrated in Figure 4.

Table 2: Proposed Mitigation Features							
	Tract A	Tract B	Tract C	Tract D	Tract E	Tract F	**Total**
BLH Preservation	41.4	0	0	3.3	8.1	2.3	**55.1**
BLH Enhancement	0	0	0	0	0	0.1	**0.1**
BLH Rehabilitation	59.8	122.2	0	0	0	82.5	**264.5**
BLH Re-Establishment	1.2	1.1	0	0	0	0	**2.3**
SWP Enhancement	15.7	0.2	0	0	26.8	4.0	**46.7**
SWP Rehabilitation	33.2	181.5	0	0	0	23.7	**238.4**
SWP Re-Establishment	0.2	0.2	0	0	0	0	**0.4**
FM Preservation	0	21.7	33.3	0	0	10.8	**65.8**
FM Enhancement	272.3	357.3	1206.5	1376.6	110.7	0	**3323.4**
FM Re-Establishment	3.4	0.8	7.9	3.1	0	0	**15.2**
Total Mitigation	**427.2**	**685.0**	**1247.7**	**1383.0**	**145.6**	**123.4**	**4011.9**

Additional non-mitigation features include 39.8 acres of upland buffer/inclusion (restored and preserved), 151.4 acres of other waters, 9.2 acres of Pipeline Rights of Way (ROW), and 50.3 acres of Non-Mitigation Features, which includes access areas and North Lafourche Levee District (NLLD) drainage easements along the banklines of the Bayou Folse and Bayou Cutoff Canals.

2.1 Aquatic Resource Functions and Values

As defined by The Natural Communities of Louisiana published in 2009 by the Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Natural Heritage program (LNHP), BLH forests are forested, alluvial wetlands occupying broad floodplain areas that flank large river systems. BLH forests may be called fluctuating water level ecosystems characterized and maintained by a natural hydrologic regime of alternating wet and dry periods. These forests support distinct assemblages of plants and animals associated with particular landforms, soils, and hydrologic regimes. They are important natural communities for maintenance of water quality, providing a very productive habitat for a variety of fish and wildlife, and are important in regulation of flooding and stream recharge.

As defined by The Natural Communities of Louisiana, bald cypress (*Taxodium distichum*) swamps are forested, alluvial swamps growing on intermittently exposed soils. The soils are inundated or saturated by surface water or groundwater on a nearly permanent basis throughout the growing season except during periods of extreme drought. Bayous commonly intersect these wetlands. There is a low floristic diversity. Taxodium distichum (bald cypress) is the dominant overstory species. Many aquatic food webs depend on the input of allochthonous material in the form of leaf litter or other organic debris that the wetland forest provides. Net primary productivity of swamp forests seems to be increased by periodic flooding or increased water flow and decreased by slow water movement or stagnation.

As defined by The Natural Communities of Louisiana published in 2009 by the Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Natural Heritage program (LNHP), FM is a palustrine system with emergent vegetation. The frequency and duration of flooding in these areas are determined by their microtopography, which together are the primary factors governing species distributions. These areas have the greatest plant diversity and highest soil organic matter content of any marsh. The species composition of these areas varies from site to site but is often dominated by *Panicum hemitomon* (maidencane).

This project will provide improved wetland functions and values following the proposed mitigation activities. The restored and enhanced BLH, SWP, and FM will regulate the movement of water within the watershed as well as in the global water cycle (Richardson 1994; Mitsch and Gosselink 1993). Wetlands store precipitation and surface water and then slowly release the water into associated surface water resources, groundwater, and the atmosphere (Taylor et al 1990). Following the proposed surface hydrology improvements and the removal/modification of artificial impediments (levees/channels) in certain areas, sheet flow and stormwater retention associated with rainfall events will be improved, along with improved interaction with Lake Fields. Improved and maintained hydrology will allow chemical functions such as organic compound breakdown, decomposition, nutrient assimilation, oxidation/reduction potential, and denitrification to be more representative of natural BLH, SWP, and FM habitats.

The planting of BLH, SWP, and FM species within the Bank will provide improved habitat, structure, and nesting/breeding grounds for a variety of wildlife species. Planting SWP species will also provide a seed source that will aid in natural regeneration during low water growing seasons. Following the implementation of the vegetation work plan, these habitats, along with existing BLH and FM habitat will be protected under a perpetual conservation servitude. Furthermore, the

Bank will be adjacent to the existing Upper Bayou Folse and Bayou Grand Coteau Mitigation Banks, resulting in a large expanse of preserved and protected wetland habitat.

The wetland values that will be provided will occur at the following three levels (Mitsch and Gosselink, 2000):

- Population – Animals harvested for pelts and/or food; wildlife observation/recreation; endangered/threatened species habitat
- Ecosystem – Flood mitigation; storm abatement; aquifer recharge, water quality improvement; aesthetics
- Biosphere – Nitrogen cycle; sulfur cycle; carbon cycle; phosphorus cycle

To meet these goals and improve the aquatic resource area, functions, and values of this BLH ecosystem, the Sponsor will meet the following objectives:

- Restore and improve historic/natural surface hydrology and increase wetland areas through removing/cutting artificial spoil banks/levees, removing/replacing culverts, and filling/plugging artificial hydrology features,
- Conduct vegetative plantings of BLH, SWP, and FM species,
- Ensure initial, interim and long-term success through the implementation of a monitoring, management and maintenance program,
- Establish appropriate financial mechanisms to ensure the successful completion of the proposed construction, establishment and long-term management activities, and
- Ensure long-term protection through the execution of a perpetual conservation servitude in accordance with 33 CFR §332.7.

3.0 Ecological Suitability of the Bank/Baseline Conditions

3.1 Land Use

3.1.1 Historical Land Use

Louisiana

Native Americans probably first inhabited portions of Louisiana 10,000-12,000 years ago (Kniffen et al. 1987) with the original inhabitants of Lafourche Parish being members of the Chitmach, Washa, and Chawash Native American Tribes (Soil Survey of Lafourche Parish 1984). The natural levee ridges offered the highest and best-drained ground for building homes and fields (McKenzie et al. 1995), and with the abundance of food found along the natural levees and back swamps, populations were strongly concentrated along these waterways (Kniffen and Hilliard 1988).

Europeans came to live in Louisiana in approximately 1700. They used the same Native American water highways and trails along levee ridges, and their towns grew on the sites of or near Native American villages located on the natural levees (McKenzie et al. 1995) such as the Bayou Folse and Bayou Grand Coteau Ridges, which traverse the Bank.

Lafourche Parish

Created in 1807, Lafourche Parish is one of the original Parishes of Louisiana (Thibodaux Chamber of Commerce 2023). The soils of Lafourche Parish have always been used for farming even during Native American habitation. Trappers and traders likely came to the region first, but farmers soon followed. Cotton, corn, and sweet potatoes were grown on the natural levees even before 1700 with indigo also being an important crop for a short time. Cotton was the main crop for many years; however, sugarcane increased significantly in 1794 after sugar granulation procedures were successfully developed. By 1861, sugarcane became the principal crop in Lafourche Parish (Soil Survey of Lafourche Parish 1984).

Bank

The 1940 aerial photograph (Figure 5) shows that the Bank had already been largely cleared of trees along the remnant Bayou Folse ridge at this time. The remainder of Tracts A-E is primarily marsh habitat. In Tract F, approximately 13 acres in the northeastern corner had been cleared with an access road constructed. The remainder of Tract F was forest and marsh habitat. The artificial Bayou Folse Canal, as well as a north-south drainage channel within the Bank, were also present. Agricultural land use is visible along Bayou Lafourche.

The 1953 aerial photograph (Figure 6) shows that the remainder of Tract F had been cleared, except for approximately 10 acres near the center. The 1980 aerial photograph (Figure 7) shows that additional trees had been cleared from the remnant Bayou Folse ridge in Tracts A and B. An access road was constructed connecting LA-182 to the ridge. New internal drainage channels and spoilbanks were constructed within Tracts C and D, and the roadbed of US-90 had been constructed along the southern boundary of the Bank. An interchange between US-90 and LA-182 was constructed within 0.25 miles from the Bank. Surrounding the Bank, additional forested habitat was converted to agriculture and low-intensity development between 1953 and 1980. The 2007 aerial photograph (Figure 8) shows increased tree cover relative to 1980 throughout the Bank. However, progressively fewer live trees and more open water are visible in the 2010 and 2015 aerials (Figures 9-10).

3.1.2 Existing/Current Land Use

The current conditions of the Bank are shown in Figure 11 (2021 aerial photograph). The remnant Bayou Folse ridge in Tracts A and B, as well as Tract F, are currently utilized as pasture for cattle farming. The low-lying areas in Tracts C and D consist of undeveloped herbaceous marsh habitat interspersed with open water and sparse woody vegetation. Of the adjacent land within a one-mile radius of the Bank, 15,846 acres (67.4%) are undeveloped, 4,786 acres (20.4%) have residential land use, and 2,865 acres (12.2%) have agricultural land use. Land use adjacent to the Bank is mapped in Figure 12.

3.1.3 Bank Elevations

The 1-meter USGS LIDAR map is shown in Figure 13. The mean elevation within the Bank is 1.2 ft NAVD88, and 99.7% of the Bank is below 5 ft NAVD88. A comprehensive elevation survey of ground elevations, channel cross sections, and culvert invert elevations was conducted by Charles McDonald Land Surveyor Inc in March 2023. The survey results will be used in conjunction with

the USGS LIDAR to determine planting zones, develop a hydrodynamic modeling terrain map, calculate earthwork volumes, and to ultimately develop detailed mitigation work plans.

3.2 Soils

Spatial and tabular soils data were downloaded from the USDA Web Soil Survey for Lafourche Parish, LA, Version 14 published in 2019. Mapped soils within the Bank boundary are shown in Figure 14. In total, the soils underlying the Bank consist of Allemands-Larose association (AN, 2732.9 acres), Barbary muck-frequently flooded (BB, 793.3 acres), Fausse-Schriever association (FA, 367.6 acres), Rita muck (Ra, 112.7 ac), Schriever silty clay loam (Sh, 12.5 acres), Schriever clay (Sk, 9.8 acres), Schriever clay-occasionally flooded (Sr, 36.7 acres), Gramercy silty clay-frequently flooded (Tn, 182.3 acres), and 86.9 acres of open water (W).

Table 3 below shows the underlying soil acreages within each tract:

Table 3: Soil Acreages by Tract

Soil	Tract A	Tract B	Tract C	Tract D	Tract E	Tract F	Total
AN	76.1	231.1	1352.3	987.4	67.2	0	**2714.1**
BB	241.1	66.5	0	383.2	96.6	0	**787.4**
FA	106.8	229.0	4.5	27.5	0	0	**367.8**
Ra	0	0	0.1	0	0	105.5	**105.6**
Sh	0	0	0	0	0	10.7	**10.7**
Sk	0	0	0	0	6.1	3.0	**9.1**
Sr	39.1	0	0	0	0	0	**39.1**
Tn	0	173.8	4.1	0.1	0	0	**178.0**
W	2.5	22.8	16.0	5.3	0	4.2	**50.8**

The following are quoted from the brief map unit descriptions generated by the USDA soil survey database for Lafourche Parish, Louisiana Version 14, published in 2019 (Soil Survey Staff). All soils mapped within the Bank are listed are predominantly hydric by the NRCS and hydric characteristics have been confirmed in the field.

AN - Allemands-Larose association

The Allemands-Larose association has a 100 percent hydric rating according to the NRCS.

The Allemands, very frequently flooded component makes up 45 percent of the map unit. Slopes are 0 to 0 percent. This component is on coastal freshwater marshes, coastal plains. The parent material consists of and/or clayey herbaceous organic material and/or backswamp deposits derived from interbedded sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is very high. This soil is very frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 58 percent.

The Larose component makes up 40 percent of the map unit. Slopes are 0 to 0 percent. This component is on coastal freshwater marshes, coastal plains. The parent material consists of thin herbaceous organic material over fluid clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is very high. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 58 percent.

BB - Barbary muck, 0 to 1 percent slopes, frequently flooded

The Barbary, frequently flooded component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on back swamp flood plains, delta plains. The parent material consists of fluid clayey alluvium derived from sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is very high. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 50 percent. This soil has a 100 percent hydric soil rating according to the NRCS.

FA - Fausse-Schriever association

The Fausse-Schriever association has an 85 percent hydric soil rating according to the NRCS.

The Fausse component makes up 65 percent of the map unit. Slopes are 0 to 1 percent. This component is on low ponded backswamps on delta plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is very high. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 2 percent.

The Schriever component makes up 20 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps on Mississippi River delta plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent.

Ra - Rita muck

The Rita component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on fresh water marshes on low coastal plains. The parent material consists of

nonfluid over fluid clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is moderate. This soil is rarely flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches (depth from the mineral surface is 20 inches) during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 50 percent. This soil has an 86 percent hydric soil rating according to the NRCS.

Sh - Schriever silty clay loam, 0 to 1 percent slopes

The Schriever component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps on Mississippi River delta plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is rarely flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 2 percent. This soil has a 90 percent hydric soil rating according to the NRCS.

Sk - Schriever clay, 0 to 1 percent slopes

The Schriever component makes up 95 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps on Mississippi River delta plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is rarely flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. This soil has a 95 percent hydric soil rating according to the NRCS.

Sr - Schriever clay, 0 to 1 percent slopes, occasionally flooded

The Schriever, occasionally flooded component makes up 93 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on Mississippi River delta plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 2 percent. This soil has a 100 percent hydric soil rating according to the NRCS.

Tn - Gramercy silty clay, frequently flooded

The Gramercy component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on natural levees on Mississippi River delta plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is very low. Available water

to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is very high. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. This soil has a 90 percent hydric soil rating according to the NRCS.

3.3 Hydrology

3.3.1 Contributing Watershed

The Bank is located in the eastern portion of the 3,090 mi^2 West Central Louisiana Coastal watershed (HUC8 08090302, Figure 15), commonly known as the Terrebonne Basin, and is entirely within the Louisiana Coastal Zone. Within the greater watershed, the Bank is located in the upper segment of the 205.1 mi^2 Bayou Cutoff-Lake Fields sub-basin (HUC10 0809030205, Figure 15), which represents the contributing watershed for most of the Bank.

The portion of the sub-basin containing the majority of the Bank is drained into Lake Fields by the historical watercourse of Bayou Folse, which has undergone artificial modification, channelization, and straightening/rerouting. A small portion of Tract F drains to Lake Long via the Hollywood Canal, which is a similar modification of the historical watercourse of Bayou Grand Coteau. For both lakes, outgoing drainage and tidal exchange occur via the 432.4 mi^2 Bayou Pointe au Chien-Frontal Timbalier Bay sub-basin (HUC10 0809030207, Figure 15), through a network of natural distributary channels, manmade canals, and fragmented salt marshes.

3.3.2 Historical Hydrology and Drainage Patterns

The geomorphology of the Terrebonne basin reflects depositional processes that formed the abandoned Lafourche Delta, beginning approximately 2,500 years ago, in the form of natural levees and interdistributary backswamps. The basin has experienced transgressive deltaic processes such as marine reworking, dewatering, and subsidence following the avulsion of the Mississippi River beginning approximately 1,000 years ago. While Bayou Lafourche continued to divert a portion of Mississippi River water after migration of the main stem, the Lafourche Delta complex became disconnected from the river due to the obstruction of the Bayou Lafourche outlet in 1814, permanent plugging of the outlet 1904 and construction of the modern Mississippi River levee system in the 1930's. The Bank includes the remnant channels, natural levees, and splays associated with Bayou Folse (Tracts A and B) and Bayou Grand Coteau (Tract F), which were distributary channels within the Bayou Lafourche delta complex. Historically, the remainder of the Bank consisted of interdistributary flats with lower elevations, clay loam soils, and frequent inundation characteristic of a swamp (Coleman et al 1998).

Historical hydrology and drainage patterns prior to human impacts are shown in Figure 16. The Bank historically would have received surface water as channelized inflow from Bayous Folse and Grand Coteau, as well as overland flow from runoff and Bayou Lafourche floodwater which flowed from the natural levees towards the swamps, and eventually southeastward into the Gulf of Mexico through the coastal marshes. The Bank also would have received tidal exchange from the Gulf of Mexico via Lakes Fields and Long. When Bayou Lafourche was plugged at its junction with the Mississippi, freshwater sources to the Bank became entirely derived from local rainfall and runoff. The Bayou Cutoff and Bayou Folse Canals were constructed through the historic Bayou

Folse watercourse in the early 1900's to drain properties along the natural levee of Bayou Lafourche. Artificial levees have restricted these canals to defined channels and hydrologically isolated them from the surrounding land except for lateral inflow from intersecting drains.

By 1940 (Figure 5), the Bank was impounded to the north and east by levees of the Bayou Cutoff and Bayou Folse Canals, to the northwest by a road extending 0.7 from the Bayou Cutoff Canal into the backswamp, and to the southeast by LA-182. The "Central Canal," which conveys water from Tract D northward across the ridge into the Bayou Folse Canal, had also been constructed by 1940. By 1953 (Figure 6), the road to the west was extended to Bayou Grand Coteau, fully impounding Tracts A-E to the west. The majority of Tract F was cleared of trees by 1953, lowering roughness and therefore reducing the travel time of runoff/overland flow. A natural sub-distributary channel of Bayou Grand Coteau was also impeded within Tract F by an east-west road constructed by 1953. By 1980 (Figure 7), US-90 had been constructed along the southern boundary of Tracts B, D and E, and an entrance road near the southern boundary of Tract C, completely impounding the Bank to the south. Artificial channels were constructed in the eastern and central portions of the Bank, draining Tract C into the Bayou Folse Canal, and draining the western side of the remnant Bayou Folse ridge southwest into Tract D.

3.3.3 Existing/Current Hydrology and Drainage Patterns

Rainfall is the primary water input to the Site. Based on 30-year climate normals (1991-2020) for the Thibodaux 4 SE weather station, annual precipitation averages 71.1 in. The driest and wettest 30% of years receive less than 65.8 in and more than 77.9 in, respectively (NCEI 2021). June, July, and August are typically the wettest months, although significant rainfall totals are possible throughout the year. Evapotranspiration (ET), estimated from average monthly temperature (Thornwaithe and Mather 1955; Dunne and Leopold 1978), is also typically highest during the summer months. Average precipitation exceeds average ET for all months. Surface inflow is generally excluded from the Site by levees and flap gate culverts, although a small amount of runoff enters from the adjacent property to the west. Storm surges and hurricane winds could produce reverse flow from Lake Fields into the site via the drainage canals due to the low elevations throughout the site, but these conditions are not typical. However, water levels in Lake Fields produce tailwater effects on the hydrology of the Site, including potential backwater flooding and tidal fluctuations. At CRMS Station 0367, located near the southeast end of Lake Fields, mean water surface elevation between 2006 and 2022 was 1.0 ft NAVD88, with a mean daily fluctuation (i.e. tidal range) of 0.2 ft. Infiltration is negligible, due to the low permeability of the Fausse-Schriever, Gramercy, and Rita soils and the near-permanent inundation of the Allemands-Larose and Barbary soils. Annual climate hydrographs for average, dry, and wet years are shown in Figure 17a-c.

Current drainage patterns are described separately for the parcel comprised of Tracts A-E, and Tract F.

Tracts A-E

Figure 18 illustrates the drainage patterns for Tracts A-E. The major public drainageways from Tracts A-E are the Bayou Folse and 182 Canals. The Bayou Folse Canal diverges from the remnant Bayou Folse channel towards the east, running adjacent to the northern boundary of Tract C. At

the eastern edge, the channel turns south and runs adjacent to the eastern boundary of Tract C before continuing south/southeast towards Lake Fields. The 182 Canal, from which borrow material was excavated to build the roadbed of LA-182 and thus runs parallel to the highway. The canal begins near Tract F and conveys water to the northeast. It runs adjacent to the southeast boundary of Tract C for approximately 1,230 ft before intersecting the Bayou Folse Canal. The Bayou Cutoff Canal also runs adjacent to the northern boundary of Tract A and is connected to the Bayou Folse Canal via the Theriot Canal, but does not have a direct hydraulic connection to the Site.

The remnant Bayou Folse channel and its natural levee/ridge is contained within Tracts A and B. To achieve the site's current land use of cattle production, the ridge is drained by a series of swales running perpendicular to the channel. These swales are sloped towards the center between the remnant channel and the crest of the natural levee, and sloped outward toward the surrounding marshes beyond the crest. The channel itself is segmented by six culverts below earthen crossings. The culverts are heavily silted in, restricting flow within the channel. However, water does flow sluggishly in the channel, to the southeast in Tract A and to the northwest in Tract B. The channel is completely impounded by US-90 at the southern end of Tract B.

A series of private, internal drainage features convey water from Tracts A-E into the Bayou Folse and 182 Canals. The "Central Canal" drains Tract D south of the ridge, running 1.0 mi due north across the ridge where it is connected to the remnant Bayou Folse channel through a set of culverts, and finally intersecting the Bayou Folse Canal. There is also an inline culvert in the Central Canal, located 175 ft south of the remnant Bayou Folse channel. The "Z Canal" runs parallel to the Central Canal for 1.0 mi to the east and also intersects the Bayou Folse Canal, but begins north of the ridge in Tract C and is curved for the southernmost 900 ft. Tract C is also drained by the "Northeast Canal" which runs for about 0.6 mi and intersects Bayou Folse Canal, and the "Southeast Canal" which runs 0.9 mi along the access road and intersects the 182 Canal. Along with three additional outlets along the northern and eastern boundaries of Tract C with no defined channel, the Z, Northeast, and Southeast Canals are controlled by flap gate culverts. In Tract C south of the access road, runoff drains to the 182 Canal as overland flow. Finally, in the southwest portion of Tract D, there is a culvert below US-90. As its invert is set above typical water levels, it functions as an emergency drainage feature to prevent flood waters from overtopping the highway, but does not regularly convey water to the south.

The construction of drainage swales on the remnant Bayou Folse ridge results in faster travel time of runoff as compared to natural conditions. Water flow is impeded by berms along the banks of the drainage channels, roads (US-90 to the south and access roads both on and off the property), natural high ground (the crests along the banks of remnant Bayou Folse as well as remnant sub-distributary splays extending perpendicularly from the ridge), and culverts. The intersection of these high ground features has resulted in the impoundment of multiple separate areas in Tracts A-E. The presence of culverts raises headwater elevations within the Site due to constriction of flow as well as high water in the Bayou Folse and 182 Canals; this effect has been aggravated by sediment and vegetation causing blockages of culverts. Therefore, surface water becomes ponded and stagnant throughout the marsh areas on either side of the ridge, eliminating the natural wet-dry cycle required to support bottomland hardwood and cypress swamp habitat, and diminishing the quality and functionality of freshwater marsh habitat.

The Sponsor will utilize detailed elevation data and hydrodynamic modeling to guide the planning and implementation of the mitigation work plan. The high-resolution data will minimize the ecological risks for the BLH, SWP, and FM habitat. The implementation of the project as an Umbrella Bank will allow for flexibility in implementing the work plans based on the timing of approvals and/or as seasonal site conditions allow. The Sponsor will utilize marsh buggies, small dump trucks, and excavators of various types/sizes which are proven tools for implementing coastal wetland restoration projects.

Tract F

The current drainage patterns of Tract F are shown in Figure 19. The parcel is bisected by an access road running east-west in the northern portion of the tract. North of this road, runoff travels either into the 182 Canal via Bayou Grand Coteau, or into a retention area near the entrance. Southwest of the entrance road, a small ditch continues along LA-182 to the Hollywood Canal, but there is no culvert below the driveway connecting the 182 Canal to this "182 Ditch." South of the access road within Tract F, all runoff enters the Hollywood Canal, either through the 182 Ditch, a series of natural swales, or through a drainage channel within an adjacent mitigation bank to the west. A large depressional area near the center of the tract collects most of the runoff generated on the property. Two natural channels – one running north-southeast of the depression and one running east-west south of the depression – convey water towards the 182 Ditch. There are three culverts present in Tract F, which facilitate ATV access throughout the tract but do not otherwise impact drainage patterns. No challenges to hydrologic restoration are present in Tract F.

Hydrologic Monitoring

Water level monitoring stations were installed during the summer of 2022 at 16 locations throughout the Bank (Figure 20). Of these stations, 13 are surface water gages and 3 are groundwater wells. The reasons for hydrologic monitoring include wetland identification, baseline data collection prior to mitigation, demonstration of success of wetland restoration/hydrologic improvements, and identification of patterns in flood duration, frequency, and seasonality. Given that directly observable hydrology may vary over days to months, continuous monitoring over a period of typically three to five years provides a direct measurement of site conditions. The distribution of monitoring wells within the various Tracts of the Site are shown in Table 4 below. All hydrographs as well as a discussion of the water level data collected thus far is provided in Appendix A.

Table 4: HOBO Monitors by Tract

	Tract A	Tract B	Tract C	Tract D	Tract E
Station ID	11, 14	9, 10, 12, 13, 15, 16	1- 8	N/A	N/A
# of Stations	2	6	8	0	0
Surface Water	1	4	8	0	0
Ground Water	1	2	0	0	0

3.3.4 Jurisdictional Wetlands

A Preliminary Jurisdictional Determination (JD) for the Bank was issued on December 1, 2023 (MVN-2022-01283-SK; Appendix B). Within the Bank, the Sponsor has identified 4,018.0 acres of wetlands and 203.2 acres of Other Waters of the US (Figure 21).

3.4 Vegetation

3.4.1 Historical Plant Community

The Site is located within the Mississippi River Alluvial Plain Ecoregion of Louisiana (Holcomb et al 2015). Based on a review of the Natural Communities of Louisiana (LDWF 2009) and historic aerial photography, the Site would have historically been comprised of Bottomland Hardwood Forest, Cypress-Tupelo-Blackgum Swamp, Freshwater Marsh, and Freshwater Floating Marsh. Bottomland Hardwood habitat would have contained the "Overcup Oak-Water Hickory" and/or "Hackberry-American Elm-Green Ash" Associations. The higher elevation depositional ridges within Tracts A, B, E and F would have contained Bottomland Hardwood and Cypress-Tupelo-Blackgum Swamp communities, while the interdistributary areas of Tracts C, D, and F would have contained Freshwater Marsh, Freshwater Floating Marsh, and Cypress-Tupelo-Blackgum Swamp.

The Overcup Oak – Water Hickory association occurs in low-lying poorly drained flats, sloughs in the lowest backwater basins, and on low ridges with clay soils that are subject to inundation. Semi-permanently inundated or saturated soils are generally present for a major portion of the growing season. Co-dominant species include overcup oak (*Quercus lyrata*) and water hickory (*Carya aquatica*), while associate species include green ash (*Fraxinus pennsylvanica*), sugarberry (*Celtis laevigata*), swamp dogwood (*Cornus foemina*)*, swamp privet* (*Forestiera acuminata*), plannertree (*Planera aquatica*), buttonbush (*Cephalanthus occidentalis*) and vines. This community type has a long successional stage.

The Sugarberry-American Elm-Green Ash association occurs in floodplains of major rivers on low ridges, flats, and sloughs in first bottoms. Soils are seasonally inundated or saturated periodically for 1 to 2 months during the growing season. In addition to sugarberry, America elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*), other species include water hickory (*Carya aquatica*), Nuttall oak (*Quercus texana*), willow oak (*Q. phellos*), water oak (Q. *nigra*), overcup oak, sweetgum (*Liquidambar styraciflua*), box elder (Acer *negundo*), winged elm (*Ulmus alata*), red maple (*Acer rubrum*), water locust (Gleditsia *aquatica*), and American sycamore (*Plantanus occidentalis*). Understory species include swamp dogwood, Hawthorn (*Crataegus* spp.), and red mulberry (*Morus rubra*). Many vines and herbaceous plants are present.

Baldcypress-Tupelo swamps are forested, alluvial swamps growing on intermittently exposed soils. Soils are inundated or saturated by surface water or groundwater on a nearly permanent basis throughout the growing season except during periods of extreme drought. The historic SWP species present would have included baldcypress (*Taxodium distichum*), tupelo gum (*Nyssa aquatica*), swamp blackgum (*Nyssa biflora*), green ash, red maple, water locust, buttonbush, pumpkin ash (*Fraxinus profunda*), black willow (*Salix nigra*), plannertree, and Virginia willow (*Itea virginica*).

Freshwater Marsh is normally located adjacent to intermediate marsh along the northernmost extent of coastal marshes. Species composition is highly variable and heterogeneous and is primarily governed by microtopography-driven differences in frequency and duration of flooding. Freshwater marsh has the greatest species diversity and soil organic matter of all marsh types. The dominant species is usually maidencane (*Panicum hemitomon*), with other characteristic species including spikerush (*Eleocharis* spp.), bulltongue (*Sagittaria lancifolia*), alligatorweed (*Alternanthera philoxeroides*), wiregrass (*Spartina patens*), roseau cane (*Phragmites communis*), water hyssop (*Bacopa monnieri*), coontail (*Ceratophyllum demursum*), fragrant flatsedge (*Cyperus odoratus*), water hyacinth (*Eicchornia crassipes*), pickerelweed (*Pontederia cordata*), arrow arum (*Peltandra virginica*), pennyworts (*Hydrocotyle* spp.), common duckweed (*Lemna minor*), water milfoils (*Myriophyllum* spp.), white waterlily (*Nympheaea odorata*), cattails (*Typha* spp.), bladderworts (*Ultricularia* spp.), deer pea (*Vigna luteola*), and giant cutgrass (*Zizaniopsis miliacea*). A significant portion of freshwater marsh is floating marsh (flotant). Salinities are usually less than 2 parts per thousand (ppt) and usually average between 0.5 to 1 ppt.

Conversion of the historical plant communities to current conditions took place in order to support the Site's land use for cattle farming. Aerial imagery indicates that clearing of the Bottomland Hardwood and Cypress-Tupelo-Blackgum Swamp habitat from the remnant Bayou Folse ridge had already begun by 1940 (Figure 5). More habitat remained within Tract A, while most of the ridge in Tract B was already converted to pasture. The ridge within Tract A was gradually converted to pasture throughout the 1950's (Figure 6) and was comparable to current conditions by 1980 (Figure 7). The lower-lying areas of Tracts C and D would have consisted of Freshwater Marsh and/or Freshwater Floating Marsh interspersed with Cypress-Tupelo-Blackgum Swamp, as evidenced by the sparse presence of standing dead trees and buried stumps in these areas. The 1940-1953 aerial photographs show an approximately 26-acre stand of forested habitat along the northern boundary of Tract C; however, by 1980 this area had converted to fragmented marsh and open water, with sparse woody vegetation remaining. This area is directly west of the "Z" canal spoilbank which had been constructed between 1953 and 1980. Along with the internal spoilbanks, the Bayou Folse Canal spoilbanks built prior to 1940 and the US-90 roadbed built in 1980 impounded the Site and created prolonged flooding in Tracts C and D. The forested community appears to have increased significantly between 1980 and 2007 (Figure 8) but exhibits progressive deterioration in 2010 (Figure 9), 2015 (Figure 10) and current (Figure 11) images.

While the cause of these landscape-scale population dynamics cannot be directly determined due to lack of data, it is the opinion of the Sponsor that they are associated with tropical cyclone impacts. According to NOAA's historical hurricane mapper (https://coast.noaa.gov/hurricanes/), six tropical systems passed within 30 miles of the Bank between 1980 and 2007, all of which were tropical storms or depressions at the time. In contrast, 7 storms have passed within 30 miles of the Bank since 2007, four of which were hurricanes: Gustav (2008, Category 2); Isaac (2012, Category 1); Zeta (2020, Category 3); and Ida (2021, Category 4). The storm surges of Gustav, Isaac, and Ida caused prolonged high water at Lake Fields, which would have prevented drainage from the Bank. The combination of wind damage and prolonged flooding within the Bank likely contributed to tree mortality and the conversion of attached marsh to flotant and/or open water.

The 1940 aerial imagery depicts Bottomland Hardwood, Cypress-Tupelo-Blackgum Swamp, and Freshwater Marsh habitat throughout Tract F; however, by 1953 the majority of the tract was cleared and converted to pasture and has remained as such through the present. A forested community surrounding the depressional area developed between 1980 and 2015; however, significant deterioration and mortality is visible in the current imagery. This is likely due to the effects of Hurricane Ida in 2021.

3.4.2 Existing Plant Community

The Sponsor utilized in-house resources such as the Natural Resources Conservation Service (NRCS) *Web Soil Survey*, U.S. Geological Survey (USGS) 7.5-minute topographic maps, and aerial photography to determine areas of the Site to investigate for existing plant communities. Within each area of interest, a general field survey was conducted to investigate the existing habitat. The main field indicators that were investigated during each survey were the existing plant communities, soil characteristics, and general hydrology. Observations of the dominant plant species, maximum diameter at breast height (dbh) of each dominant species, overall health of the plant community, soil characteristics, and general hydrology indicators were documented throughout each area of interest. Along with the field survey data and in-house resources, aerial drone imagery was taken and used to delineate areas where the existing habitat transitioned from one type to another.

The survey discovered that the Site consists of four main landscape types: maintained cattle pastures, mixed forested wetlands, freshwater marsh, and open water. Each landscape type has varying soil types, hydrology, and plant communities. The vegetation appears to trend more hydrophytic in areas that are low-lying and frequently/permanently flooded, while remaining more facultative in areas that are occasionally flooded in higher elevations.

Within the maintained cattle pastures and mixed forested wetlands landscape types, eight distinct habitat types were identified. Within the open water and freshwater marsh landscape types, three distinct freshwater marsh types were identified: established marsh, thin-mat flotant, and thick-mat flotant.

Habitat Type 1

This habitat type totals 4.7 acres and is a mixed bottomland hardwood forest. Overall, the general hydrology appears occasionally/frequently flooded. The trees within this habitat type are young and even-aged BLH species. The dominant tree layers consist of 30% green ash (maximum dbh 14”), 30% sugarberry (maximum dbh 8”), 25% water hickory (maximum dbh 6”), and 15% Nuttall oak (maximum dbh 4”). The young trees are healthy and show few signs of stress; however, water marks on the trees indicate that this area is flooding more frequently and for long periods of time, which could eventually begin to stress and kill the BLH species that can’t handle long flooding periods. The midstory has a 10% coverage of few saplings of the above-mentioned species and <3% cover Chinese tallow (*Triadica sebifera*) saplings. The understory has 40% cover of FAC-OBL herbaceous species such as Texas frogfruit (P*hyla nodiflora*), peppervine (*Ampelopsis arborea*), false nettle (*Boehmeria cylindrica*), American germander (*Teucrium canadense*), lizard’s tail (*Saururus cernuus*), Virginia buttonweed (*Diodia virginiana*), and buttertop (*Packera glabella*).

Habitat Type 2

This habitat type totals 24.6 acres and is bottomland hardwood forest found within some of the highest elevations of the Site. Within Tract E, this habitat is found along the ridge of a remnant waterway. Overall, the general hydrology appears rarely/occasionally flooded. The dominant tree layers consist of mature 30% water oak (maximum dbh 26”), 25% sweetgum (maximum dbh 22”), 20% American elm (maximum dbh 16”), 20% sugarberry (maximum dbh 16”), and 5% live oak (*Quercus virginiana*) (maximum dbh 72”). The trees are healthy and show no signs of flooding stress. The midstory has a 35% coverage of dwarf palmettos (*Sabal minor*), trumpet creeper (*Campsis radicans*), deciduous holly (*Ilex decidua*), with < 10% Chinese tallow, box elder, and water oak saplings. The understory has <10% coverage of FACU/FAC herbaceous species such as Jerusalem cherry (*Solanum pseudocapsicum*), Carolina horsenettle (*Solanum carolinense*), snakeroot (*Ageratina altissima*), American joint vetch (*Aeschynomene americana*), and blanket grass (*Oplismenus hirtellus*).

Habitat Type 3

This habitat type totals 44.7 acres and is mixed bottomland hardwood forest. Overall, the general hydrology appears occasionally/frequently flooded. The dominant tree layers consist of 30% sugarberry (maximum dbh 20”), 25% green ash (maximum dbh 22”), 20% sweetgum (maximum dbh 18”), 15% water oak (maximum dbh 16”), 5% American elm (maximum dbh 12”), and 5% box elder (maximum dbh 8”) . Some of the dominant trees are beginning to show signs of crown dieback and stress, likely from longer periods of inundation. The midstory has a 55% coverage of saplings of the above-mentioned species with <5% Chinese tallow and <3% deciduous holly. The understory has 80% coverage of FAC-OBL herbaceous species such as cottonmouth grass (*Phanopyrum gymnocarpon*), green flatsedge (*Cyperus virens*), lizard’s tail, southern blackberry (*Rubus argutus*), buttertop, yellow thistle (*Cirsium horridulum*), Virginia buttonweed, and false nettle.

Habitat Type 4

This habitat type totals 120.1 acres and is degraded forested wetlands found in lower-lying areas. These areas were historically healthily forested but are now degrading and transitioning to established freshwater marsh habitat due to extended inundation periods and possible subsidence. It represents a transition between Habitat Type 3 and freshwater marsh. Overall, the general hydrology appears permanently flooded. The only tree species still occupying these areas are black willow (*Salix nigra*) (maximum dbh 10”), red maple (maximum dbh 10”), and green ash (maximum dbh 8”) for a total coverage of 60%. Significant crown dieback and mortality are occurring within all species, likely from the stress of longer periods of inundation. The midstory has a 20% coverage of buttonbush and saplings of the above-mentioned species, with all sapling species being in poor health. The understory has 95% coverage of OBL herbaceous wetland species such as alligatorweed, swamp smartweed (*Persicaria hydropiperoides*), cattail, cottonmouth grass, pickerelweed, maidencane, and marsh mallow (*Hibiscus lasciocarpus*).

Habitat Type 5

This habitat type totals 56.5 acres and is found in some of the highest elevations of the Site. Within Tract A, this habitat is along each side of Bayou Folse. Overall, the general hydrology appears

occasionally flooded. The dominant overstory tree layers consist of 35% dominant bald cypress (maximum dbh 68”), with an overall co-dominant tree layer coverage of 65% consisting of sugarberry (maximum dbh 8”), American elm (maximum dbh 6”), green ash (maximum dbh 8”), box elder (maximum dbh 4”), and water oak (maximum dbh 4”). There is less <5% Chinese tallow presence. The midstory has a 15% coverage of sparsely distributed saplings of the above-mentioned species and woody shrubs such as deciduous holly and invasive Chinese privet (*Ligustrum sinense*). The understory has a 60% coverage of FACU-FACW herbaceous species such as Cuban jute (*Sida rhombifolia*), common beggarticks (*Bidens alba*), false nettle, peppervine, Texas frogfruit, American germander, blanket grass, Virginia buttonweed, buttertop, and sawtooth blackberry.

Habitat Type 6

This habitat type totals 290.0 acres and is found within the higher elevations of the maintained cattle pastures. Within Tracts A and B, this habitat is found along each side of the Bayou Folse ridge. Overall, the general hydrology appears occasionally flooded. There are no trees or woody shrubs within this habitat type. The understory exceeds 100% cover of a variety of planted forbs and grasses with few native FAC/FACU herbaceous species. The most prevalent planted species were Dallis grass (*Paspalum dilatatum*) and Bahia grass (*Paspalum notatum*). The most prevalent native herbaceous species were curly dock (*Rumex crispus*), golden rod (*Solidago altissima*), Santa Maria aster (*Parthenium hysterophorus*), rough cocklebur (*Xanthium* strumarium), Brazilian vervain (*Verbena brasiliensis*), and gallium (*Galium aparine*). There is an approximate 85% coverage of planted herbaceous species and 15% coverage of native herbaceous species.

Habitat Type 7

This habitat type totals 217.7 acres and is found within the lower elevations of the maintained cattle pastures. Within Tracts A and B, this habitat is found along each side of the Bayou Folse ridge. Overall, the general hydrology appears frequently flooded. There are no trees or woody shrubs within this habitat type. The understory exceeds 100% cover of a variety of planted forbs and grasses and few native FACW/OBL herbaceous species. The most prevalent planted species were Dallis grass and Bahia grass. The most prevalent native herbaceous species were rough-fruited buttercup (*Ranunculus muricatus*), Texas frogfruit, dollarweed (*Hydrocotyle* spp.), Frank’s sedge (*Carex frankii*), shortleaf spikesedge (*Kyllinga brevifolia*), and common rush. There is an approximate 75% coverage of planted herbaceous species and 25% coverage of native herbaceous species.

Habitat Type 8

This habitat type totals 1.4 acres and is a slight depression that is permanently flooded and surrounded by established freshwater marsh. This habitat type has no overstory or midstory. The understory of this exceeds 100% cover of giant cutgrass, alligatorweed, maidencane, and cattail.

Habitat Type 9

This freshwater marsh type totals 1,245.2 acres and is found in low-lying areas all throughout the Site that remain permanently flooded and has vegetation that is rooted in the soil. The dominant vegetative species found within this marsh type is maidencane, with an overall coverage of 75%. The remaining 25% vegetative coverage consists of herbaceous wetland/marsh plants such as

alligatorweed, fragrant flat sedge, cattail, water pepper (*Persicaria hydropiper*), marsh mallow, deer pea, lizard's tail, and pickrelweed. There are some areas within the established marsh that are sparsely forested with young degraded black willow, red maple, and green ash, for an estimated overall coverage of 15%.

Habitat Type 10

This thin-mat floating marsh (flotant) type comprises 544.4 acres. It is found in low-lying areas all throughout the Site that remain permanently flooded, has vegetation that is not rooted into the soil, and has significantly low end-of-season biomass (Sasser et al 1995). This marsh type grows on thin (<25 cm), seasonally floating mats that would not support the weight of a person during most of the growing season (Sasser et al 1995, Sasser et al 1996). This marsh, as well as Habitat Type 11, is supported by substrates that contain very low mineral density and high organic matter content (Sasser et al. 1996). There are some areas within the established marsh that are sparsely forested with young degraded black willow, red maple, and green ash, for an estimated overall coverage of 30%.

The dominant vegetative species within this marsh type is spikerush (*Eleocharis baldwinii*). Other plant species observed within this marsh type are alligatorweed, angle-stem primrose (*Ludwigia leptocarpa*), arrowhead *(Sagittaria latifolia)*, bulltongue arrowhead (*Sagittaria lancifolia*), buttonbush, cattail, deer pea, dog-fennel (*Eupatorium capillifolium*), floating pennywort (*Hydrocotyle ranunculoides*), fragrant flat sedge, smooth beggar-tick, white spikerush (*Eleocharis albida*), spikerush (*Eleocharis baldwinii*), lance-leafed frogfruit (*Phyla lanceolata*), maidencane, many-spiked sedge (*Cyperus polystachyos*), marsh fern (*Thelypteris palustris*), marsh mallow, marsh pennywort (*Hydrocotyle umbellate*), marsh St. John's wort (*Triadenum virginicum*), mistflower (*Conoclinium coelestinum*), rice cutgrass (*Leersia oryzoides*), sensitive joint vetch (*Aeschynomene indica*), and wax myrtle (*Myrica cerifera*).

Habitat Type 11

This thick-mat flotant marsh type comprises 1,547.2 acres. It is found in low-lying areas all throughout the Site that remain permanently flooded, has vegetation that is not rooted into the soil, and has significantly high end-of-season biomass (Sasser et al 1995). This marsh type grows on a thick mat (~50 cm) of tightly woven roots in a mostly organic matrix that floats continuously on a layer of usually clear water (Sasser et al 1995, Sasser et al 1996). There are some areas within the established marsh that are sparsely forested with young degraded black willow, red maple, and green ash, for an estimated overall coverage of 30%.

The dominant vegetative species within this marsh type is maidencane. Other plant species observed within this marsh type are alligatorweed, angle-stem primrose, arrowhead, bulltongue arrowhead, buttonbush, cattail, coastal waterhyssop (*Bacopa monnieri*), deer pea, false nettle (*Boehmeria cylindrica*), fragrant flat sedge, southern waterhemp (*Amaranthus australis*), white spikerush, largespike spikerush (*Eleocharis macrostachya*), spikerush (*Eleocharis baldwinii*), lance-leafed frogfruit, maidencane, many-spiked sedge, marsh fern, marsh mallow, marsh pennywort, marsh St. John's wort, mistflower, mock Bishop's weed (*Ptilimnium capillaceum*), pickerelweed, rice cutgrass, saltmarsh morning glory (*Ipomoea sagittate*), seashore marsh mallow (*Kosteletzkia virginica*), and wax myrtle.

The habitat types throughout the Site are mapped in Figure 22. The acreages of each habitat type within each Tract are shown in Table 5 below.

Table 5: Existing Habitat Acreages by Tract							
Habitat	*Tract A*	*Tract B*	*Tract C*	*Tract D*	*Tract E*	*Tract F*	***Total***
Type 1	4.7	0	0	0	0	0	**4.7**
Type 2	0.6	0	0	2.1	21.9	0	**24.6**
Type 3	11.0	0	0	0	29.9	4.0	**44.9**
Type 4	7.8	0	0	49.4	62.9	0	**120.1**
Type 5	55.1	0	0	0	0	2.3	**57.4**
Type 6	73.0	133.2	0	1.5	0	82.6	**290.3**
Type 7	32.6	161.8	0	0	0	23.7	**218.1**
Type 8	0	0	0	0	0	1.3	**1.3**
Type 9	114.8	266.5	326.0	489.9	43.0	9.5	**1249.7**
Type 10	0	49.7	0	497.2	2.2	0	**549.1**
Type 11	155.4	76.8	958.0	343.0	2.7	0	**1535.9**
Open Water	10.6	35.2	89.8	20.4	7.3	0	**163.3**
Roadways	0	0	3.2	0	0	0	**3.2**

3.5 General Need for the Project in this Area

The Site is located in the Deltaic Plain, within HUC #08090302 which is in the larger Central Louisiana Accounting Unit and Lower Mississippi Subregion as described by the USGS. This area is also referred to as the Terrebonne River Basin.

Despite the importance of wetlands within the Terrebonne Basin and the benefits they provide, the Terrebonne Basin has experienced the greatest decrease in wetland area in the State of Louisiana within approximately 321,730 acres of net loss since 1932 (BTNEP 2008). While the primary driver of this land loss is due to a lack of sedimentation due to the construction of the Atchafalaya and Mississippi River Levees, other contributing factors sea level rise, erosion, and human activities such as dredging/maintenance of artificial canals, protection levees, and human development activities.

There is a critical need in the Terrebonne Basin to restore, enhance, and preserve BLH due to functions and values they provide. Inherently diverse in tree, shrub, and vine species, bottomland hardwoods provide habitat for a rich fauna and function to abate floodwater and improve water quality (Gardiner and OIiver 2005). Overbank flooding and concomitant deposition of nutrient-rich sediments make these ecosystems some of the most productive on earth (Brinson 1990, Harris and Gosselink 1990, Mitsch and Gosselink 2000). Bottomland forests produce detritus for aquatic food chains and can support 2–5 times more wildlife species than upland forests (Allen and Kennedy 1989). Furthermore, approximately 20% of endangered or threatened plant and animal species inhabit bottomland forests (Want 1989). Ecological and hydrologic processes occurring in these ecosystems provide diverse values, including high biodiversity, groundwater recharge and discharge, flood flow alteration, water quality enhancement through sediment stabilization, sediment and toxicant retention, and nutrient removal, transfer, and retention

(Walbridge 1993). Artificial hydrologic modifications associated with development have caused drier conditions in Louisiana BLH systems, leading to changes in species composition (Holcombe et al 2015).

Swamp forests represent a unique and important ecosystem in the southeastern United States. According to the LDWF, these swamps provide important ecosystem functions including maintenance of water quality, productive habitat for a variety of fish and wildlife species, and regulation of flooding and stream recharge. Bald cypress was the dominant tree when settlers first arrived in the coastal plain of the southern United States (Matoon 1915). Early estimates of the area of bald cypress forests range from 0.67-3.64 million ha (1.66-8.99 million ac), but following intensive timber harvesting activities from 1890-1925, this number was reduced drastically to only 0.14 million ha (.35 million ac). In addition to timber harvesting, other causes of decline include hydrology modifications, invasive species, and natural subsidence (Conner and Toliver 1990). It has been projected that by the year 2050, nearly half of all the existing swamp in Louisiana could be lost (Souther and Shafer 2000).

In most of Louisiana, bald cypress swamps have not naturally regenerated (Mancil 1980). Natural regeneration does not occur every year because of variations in seed production and water level. Seeds are not produced every year by every tree, and they will not germinate under standing water. Also, seedlings cannot tolerate long inundation (Brandt and Ewel 1989). Other physical and biological factors such as nutrient limitation, increased flooding due to subsidence and/or hydrologic alteration, increased salinities, interspecific competition and herbivory can also attribute to low rates of natural regeneration (Myers et al 1995). Because the loss of historic cypress swamps took place over such a short period of time and the need to restore these swamps is also ever-increasing, it is critical that projects – such as the proposed Site – are conducted. Essentially, these projects involve a "jump-start" to natural succession which in the case of natural cypress swamp systems took many years to develop. By conducting SWP enhancement, rehabilitation, and re-establishment within 285.5 acres of the Bank, along with long-term protection and management, the need for SWP habitat within the Terrebonne Basin will be partially addressed as ultimately a sustainable SW habitat will be established within the Bank.

Freshwater marshes represent the greatest loss in acreage of any marsh type in Louisiana (LDWF 2009). Coastal marshes have experienced loss due to sea-level rise, erosion, subsidence, and artificial impoundment. Freshwater marshes are particularly vulnerable due to the additional stressor of saltwater intrusion, caused by sea-level rise, deterioration of more saline coastal marshes and barrier islands, and construction of artificial channels which connect saltwater areas to historically freshwater systems (Boesch et al 1996). Restoration of fresh marshes can be accomplished or assisted using techniques such as marsh/ridge creation using dredged sediment, diversion of the Mississippi River to increase sediment and freshwater inputs, restoration of hydraulic connectivity, and rebuilding barrier islands using dredged sediment (BTNEP 2008). Marsh preservation, enhancement and re-establishment of 3,404.4 acres within the Site will contribute to needed restoration of freshwater marsh in the Terrebonne Basin.

In order to reverse the historic and current trends of wetland loss within Louisiana and the Terrebonne River Basin, wetland restoration, enhancement, and preservation projects - such as the proposed Site - must be conducted, maintained, and managed for the long term. However, to support the socioeconomic values that exist due to the presence of these wetlands, a

sustainable approach to land use must also take place. The following organizations have formed to develop plans to address the needs of the watershed:

- ***Terrebonne Parish, Office of Coastal Preservation and Restoration***-Terrebonne Parish has developed a "Comprehensive Plan" for Coastal Restoration that has four objectives: increase integrity of barrier island systems, increase vertical accretion of wetland soils, maximize habitat diversity of coastal wetlands, and ensure development in the Parish is consistent with this plan.
- ***Barataria-Terrebonne National Estuary Program (BTNEP)* –** Some of the goals of the BTNEP includes: preserving and restoring wetlands and barrier islands, promoting environmentally responsible economic activities that sustain estuarine resources, realistically supporting diverse, natural biological communities, and developing and maintaining comprehensive watershed planning.

Perhaps the most important programs to ensure a sustainable approach to land-use in the Terrebonne Basin are the Section 404 and Coastal-Use Permitting Programs. As unavoidable impacts to wetlands are authorized in order to satisfy the public need of a particular project, compensatory mitigation must be secured prior to the impact occurring. The Site will provide this mitigation, in effect allowing the benefit of the project to be realized while at the same time meeting the public need for mitigation. This will certainly expand on the efforts of the Terrebonne Parish Comprehensive Plan and the BTNEP.

The Site will address the needs of the watershed and contribute to the economy of Louisiana by offering mitigation for Section 404 and Coastal-Use Permits. It will also contribute to the aquatic environment within the Terrebonne River Basin by providing a variety of biotic and physical functions to the watershed. These improved wetland functions will allow for the values of wetlands to be realized in the short and long-term.

4.0 Establishment of the Mitigation Bank

4.1 Site Restoration Plan

4.1.2 Soils/Hydrologic Work

The hydrologic work plan is depicted in Figure 23 and Figures 29-35. Primary objectives, as discussed further below, will be to restore overland flow on the remnant Bayou Folse ridge, and to improve hydraulic connectivity between the surrounding marsh areas and Lake Fields via the Bayou Folse, Bayou Cutoff, and 182 Canals.

Tracts A-B

Six culverts within the remnant Bayou Folse channel and one inline culvert within the Central Canal will be removed. The berms along the Central Canal will be degraded, except for the forested portion of the west bank north of the ridge, which will be gapped. The Central Canal channel itself will remain within Tracts A and B. For the reach of the Bayou Folse Canal inside Tract A, the berms on each bank will be gapped in four locations. 24-inch culverts will be installed in the southern berm of the Bayou Cutoff Canal in Tract A, as well as the southern berm of the Bayou

Folse Canal within Tract B. A total of five artificial swales which drain the ridge within Tracts A and B will be plugged using material from the degraded/gapped berms. To maintain access to all work areas, these features will be constructed sequentially from northwest to southeast. Additionally, all work within Tracts A and B will take place prior to vegetative plantings.

Tracts C-E

Within Tract C, the flap-gate culverts at the outlets of the Z, Northeast, and Southeast Canals, as well as the three culverts draining directly from the marsh along the northern and eastern boundary, will be removed and replaced with open culverts of equivalent size. Two additional 24-inch culverts will be installed between the Z and Northeast Canal outlets, at approximately 2,900 ft intervals, to facilitate additional hydrologic exchange between the marsh and Bayou Folse Canal. The berms/roads along the Z, and Northeast Canals, as well as the reach of the Central Canal within Tract D, will be degraded and the material used to backfill the channels themselves. At approximately 2,700 ft from the entrance bridge, a 24-inch culvert will be installed below the access road running along the Southeast Canal. Features in Tracts C and D will be constructed sequentially in a clockwise direction beginning closest to the Central Canal, in order to maximize access and efficiency of construction.

Tract F

The hydrology and drainage patterns of Tract F will not be meaningfully altered. However, the Sponsor will remove artificial features which delay/obstruct flow or would require future maintenance, specifically 4 culverts and 53.4 linear ft of access road which cross an existing swale. The phasing of Tract F activities can take place at any time during implementation of the work plan.

The majority of excavated material will be used to plug or backfill channels or be placed on adjacent sections of berms to remain. Where such use is not feasible, the material will be spread at grade in the adjacent marsh habitat. Culverts, rather than gaps, will be used where necessary to improve hydraulic connectivity across the perimeter spoilbanks and to facilitate access for maintenance by the North Lafourche Levee District. Pending the results of the topographic survey and hydrodynamic model, additional culverts and/or gaps may be added to the work plan to ensure an improvement of both inflows and outflows.

The numbers and lengths of all features within the hydrologic work plan are summarized in Table 6 below.

Table 6: Hydrologic/Soil Work Plan Components by Tract

Feature	Tract A	Tract B	Tract C	Tract D	Tract E	Tract F
Culverts to be Removed	1	6	0	0	0	4
Culverts to be Replaced	0	0	6	0	0	0
Culverts to be Installed	3	1	3	0	0	0
Levee Gaps	5	0	0	0	0	0
Earthen Plugs	2	3	0	0	0	0

Berms/Roads to be Degraded (ln ft)	4850	1883	5345	3747	0	53
Berms/Roads to be Degraded (cy)	2903	9949	5427	7753	0	88
Channels to be Filled (ln ft)	0	0	5610	0	0	0
Channels to be Filled (cy)	0	0	5427	0	0	0

Hydrodynamic modeling will be employed to inform the final design of the hydrologic work plan and will demonstrate its effects including the spatial extent of wetland enhancement and impacts to adjacent properties. A 2-dimensional unsteady flow model of the Bayou Cutoff and Lake Fields HU12 sub-basins will be developed in HEC-RAS. The 2D grid cells will be aligned along high ground and barriers to flow using breaklines. One or more refinement regions containing the Site will be developed with a higher mesh resolution. Data sources for model parameterization and calibration are summarized in Table 7. A Future Without Project (FWOP) model will depict current conditions and will be calibrated to gage data recorded at the Site. The Future With Project (FWP) model will depict the implemented mitigation work plan by modifying the terrain, infiltration, and/or roughness layers. Unsteady flow simulations for 1-year, 5-year, 10-year, and 25-year precipitation events will be run for both the FWOP and FWP models. Results will be presented in the form of maps, hydrographs, and data tables of water surface elevations, inundation frequencies, and other output variables as needed. Calculated map layers will also be generated to visualize differences in these results between the FWP and FWOP models for identical rain events.

Table 7: Summary of Data Sources for Hydrodynamic Modeling

Parameter	Data Source
Terrain	USGS 1-m LIDAR, elevation surveys
Manning's n	National Land Cover Database, aerial/satellite photography, literature tables e.g. Chow 1959
Infiltration	USDA Soil Survey, Saxton & Rawls 2006
Upstream Stage Boundary	USGS gages (B. Lafourche at Lockport & Thibodaux)
Downstream Stage Boundary	USGS gage (Company Canal at Hwy 1)
Precipitation Boundary	NOAA RTMA model output, SCS Type III distribution
Calibration/Validation Points	HOBO gages within Site (16)

Figures 24A-C illustrate the post-work hydrology of the Site, and Figures 29 to 35 show typical cross sections of each construction feature. Following implementation of the hydrology work plan in Tracts A-E (Figure 24A), direct rainfall onto the remnant Bayou Folse ridge will move as overland flow either towards the marshes in Tracts C and D, or into the remnant Bayou Folse channel. Water in this channel will be conveyed to the Central Canal and ultimately the Bayou Folse Canal, without impedance from culverts. The removal of spoilbanks will allow the Central Canal to overflow into the adjacent marshes at high stages. Lowered water surface elevations in the

Central Canal and the removal of the inline culvert will allow more efficient drainage from the marsh habitat south of the ridge in Tract D. The removal of spoilbanks and installation/replacement of culverts in Tracts A, B, and C will alleviate impounded conditions, allowing for water level fluctuations that reflect conditions in the Bayou Folse Canal and Lake Fields. During low stages, water will drain from the Site through the degraded spoilbanks and open culverts. At high stages, the Site will receive backwater flooding and/or tidal influx, which in turn will drain as floodwaters recede. These efforts will convert the flood regime in the marshes of Tracts A-D from permanently to seasonally flooded, providing a hydrologic enhancement to these areas. The hydrology of Tract F will remain equivalent to current conditions, except that all flow will be unimpeded by culverts (Figure 24B).

The Bank will also provide flood storage to the surrounding watershed which was previously unavailable due to its impoundment by spoilbanks and roads. GIS analysis of the USGS 1-meter LIDAR indicates that throughout Tracts A-E, the Bank will provide approximately 3,580 acre-feet of storage below the 2 ft NAVD88 contour (the minimum crest elevation of the remnant Bayou Folse ridge), and approximately 15,750 acre-feet of storage below the 5 ft NAVD88 contour (Figure 24C).

4.1.2 Vegetative Work

The Sponsor will plant BLH, SWP, and FM species within 580.7 acres of the Bank. Planting will occur during the non-growing season (approximately December 15 to March 15) for BLH and SWP. The timing of the FM species plantings will be determined in accordance with Bank approvals and subsequent ordering of the species through a nursery.

Seedlings will be mixed upon arrival to ensure a mosaic of species planted. The planted area will be monitored and maintained; however, on an as-needed basis, chemical and/or mechanical means will be implemented to control exotic/noxious species, such as Chinese tallow. Nuisance wildlife species will also be monitored and controlled as necessary.

Following the removal/relocation of the cattle, site preparation along each side of the Bayou Folse ridge within the BLH planting areas will consist of bush-hogging/ripping where necessary. A pre-emergent herbicide (OustXP) will be applied either before or immediately after planting. Planting type areas will be clearly marked on-site with wooded stakes, flagging, or other similar methods to ensure an accurate planting and facilitate baseline monitoring establishment. The Sponsor anticipates that wildlife herbivory will be minimal; however, as part of the ongoing maintenance and monitoring operations, the Sponsor will continuously check for signs of herbivory and implement remedial actions as necessary. The Sponsor will also continuously control invasive vegetation/noxious weeds using foliar and/or basal herbicides. As seedlings grow and natural recruitment occurs, it is anticipated that the need to control weeds/exotic vegetation will decrease over time.

Species associations will be based on the natural communities defined by the Louisiana Natural Heritage Program (LDWF 2009). Specific species assemblages, densities, and percentages will be approved by CEMVN, LDNR, and the IRT.

Areas to be planted within the Site are mapped in Figure 25. After a review of water level data in the Bayou Folse and Bayou Cutoff Canals (2020-2022) as well as existing habitat data, the Sponsor

has determined that planting of BLH habitat is appropriate for areas currently containing Habitat Type 6, with elevations generally above 2 feet NAVD88. Water surface elevations in the Bayou Folse Canal exceeded this stage for 5% of the period of record, near the low range of flood tolerances for BLH species (Pierce 2015). The Sponsor will plant a total of 276.9 acres of BLH.

Degraded forested wetland and pastures/herbaceous areas containing Habitat Types 1, 3, and 7, generally between 1-2 ft NAVD88, will be planted with Bald Cypress Swamp species for a total of 288.6 acres. Of this total, 23.7 acres will be fully planted with a cypress-tupelo mix (SWP), 49.6 acres will receive understory planting of cypress only (SWP2U), and 215.3 acres will be fully planted with cypress only (SWP2). Coastal Fresh Marsh-Tidal Habitat consisting of a maidencane-seashore paspalum mix (FM) will be planted on the footprint of degraded berms/backfilled channels within the existing marsh habitat, generally at or below 1 ft NAVD88, for a total of 15.2 acres.

Table 8 below lists the planting acreages of each community type within each tract.

Table 8: Vegetative Planting Acreages by Community

Habitat Type	Tract A	Tract B	Tract C	Tract D	Tract E	Tract F	Total
BLH	71.0	123.4	0	0	0	82.5	**276.9**
SWP	0	0	0	0	0	23.7	**23.7**
SWP2	33.4	181.9	0	0	0	0	**215.3**
SWP2U	15.7	0	0	0	29.9	4.0	**49.6**
FM	3.4	0.8	7.9	3.1	0	0	**15.2**
Total Acres to be Planted							**580.7**

Within 276.9 acres of Habitat Type 6, the Sponsor intends to plant species that correspond with the Overcup Oak-Water Hickory association, shown in Table 9 below. This association represents the most flood-tolerant BLH community, as described in LDWF 2009. Hard mast species will account for at least 60% of all BLH plantings with the remaining 40% consisting of soft mast species. One-year-old bare-root seedlings will be obtained from a registered, licensed Louisiana nursery grower and properly stored and handled prior to planting. Planting densities will be approximately 538 stems per acre (9-foot x 9-foot spacing). Seedling composition, types, and densities must be approved by the CEMVN, LDNR, and IRT.

Table 9: Overcup-Water Hickory BLH Type

BLH Species	Softmast	Hardmast	Composition
Quercus lyrata (Overcup Oak)		X	20%
Carya aquatica (Water Hickory)		X	20%
Quercus texana (Nuttall Oak)		X	20%

Acer rubrum (Red Maple)	X		10%
Celtis laevigata (Sugarberry)	X		10%
Taxodium distichum (Bald Cypress)	X		20%

SWP1 plantings will be located within Tract F containing Habitat Type 7 and represents 23.7 acres. Within this area, the Sponsor intends to plant species that reflect natural Bald Cypress-Tupelo Swamp habitat (SWP), as shown in Table 10 below. One-year-old bare-root seedlings will be obtained from a registered, licensed Louisiana nursery grower and properly stored and handled prior to planting. Planting densities will be approximately 302 stems per acre (12-foot x 12-foot spacing).

Table 10: SWP1 Bald Cypress-Tupelo Type (SWP Rehabilitation Areas)

SWP Species	Softmast	Hardmast	Composition
Taxodium distichum (Bald Cypress)	X		70%
Nyssa biflora (Swamp Tupelo)	X		10%
Acer rubrum (Red Maple)	X		10%
Fraxinus pennsylvanica (Green Ash)	X		10%

SWP2 is located within portions of Tracts A and B containing Habitat Type 7 and represents 215.3 acres. Within this area, the Sponsor will plant 100% bald cypress seedlings at a density of approximately 302 stems per acre, (12-foot x 12-foot spacing).

SWP2U represents 49.6 acres and is located within portions of Tracts A, B, and F containing Habitat Types 1 and 3, which represent degrading BLH habitat experiencing flooding stress. Within this area, the Sponsor will conduct understory plantings of 100% bald cypress seedlings at a density of approximately 175 stems per acre (16-foot x 16-foot spacing). Within these areas, the Sponsor will also apply a basal herbicide to all Chinese tallow as well as any black willow under 4" dbh.

Within the FM Rehabilitation and Re-establishment areas (15.2 acres), the Sponsor intends to plant 60% seashore paspalum (*Paspalum vaginatum*) and 40% maidencane (*Panicum hemitomon)* at a density of approximately 871 plugs per acre (5-foot x 10-foot spacing), as shown in Table 11 below. Plants will be obtained from a registered, licensed Louisiana nursery grower and properly stored and handled prior to planting. Plants will arrive in 2" containers and will be planted within 48 hours of delivery.

Table 11: Fresh Marsh Type (FM Rehabilitation, Re-Establishment Areas)	
FM Species	Composition
Paspalum vaginatum (Seashore Paspalum)	60%
Panicum hemitomon (Maidencane)	40%

Following the implementation of the vegetation work plan and through active management and maintenance, the Sponsor anticipates that natural regeneration will occur. The planting of species listed in BLH, SWP, and FM habitat areas will provide genetic material, forest/marsh structure, and ultimately seed producing trees and marsh grasses. Natural regeneration will also be aided by the implementation of the soils/hydrologic work plan.

4.2 Technical Feasibility

The activities proposed in this prospectus are practicable and represent well-established techniques that have resulted in successful mitigation projects in other areas of coastal Louisiana. The implementation of the soils and hydrologic work plan will allow for improved hydrologic connectivity to the surrounding watershed, tidal flux, sheet flow, and stormwater retention/detention within the site. Existing site conditions indicate favorable conditions for BLH, SWP, and FM plantings due to the hydric soils present and existing wetland habitat within and around the Bank.

4.3 Current Site Risks

There are minimal risks present that would prevent the successful establishment of a self-sustaining BLH, SWP, and FM ecosystem. Potential flooding risks will be minimized by conducting hydrodynamic modeling to confirm the location and extent of the BLH, SWP, and FM mitigation features. Major disruptive weather such as large rainfall events or hurricanes, which could result in planting failure, would be addressed by developing an adaptive management plan. There are no issues in regard to water rights. There is one pipeline ROW (9.2 ac) within the Bank, which is illustrated in Figure 26. The listed acreage of the ROW is based on an estimated 50 ft width from aerial imagery; the precise dimensions will be mapped as part of the detailed land survey contracted by the Sponsor. There are also 50.3 acres of drainage servitudes and internal access roads. However, these areas will not be included in credit calculations and would not negatively affect the restored, enhanced, and preserved wetland habitats.

4.4 Long-Term Sustainability of the Site

Following the implementation of the mitigation work plan, the Site will be sustainable, as wetland hydrology (sheet flow, retention/detention, tidal connectivity) will be improved, and native wetland plant species will be established. The soils within the Site are hydric and therefore suitable for the establishment of a self-sustaining BLH, SWP and FM ecosystem, which will in turn provide improved wetland functions and the realization of the wetland values within the

watershed. The Sponsor is also the landowner of the Site and will therefore have full authority to monitor and maintain the Site for the long-term.

5.0 Proposed Service Area

The Sponsor proposes to use the Terrebonne River Basin as the Service Area (Figure 27). Impacts to coastal wetlands must be compensated with coastal credits within the Site. As impacts to BLH, SWP, and FM occur within this area, securing credits from the Site will result in a no-let loss of wetland/aquatic resources within the watershed. Use beyond these service areas/habitat types will be determined by CEMVN and LDNR on a case-by-case basis.

6.0 Operation of the Mitigation Bank

The Bank shall be established as an umbrella mitigation bank in accordance with 33 CFR Parts 332. Each Tract shall have its own Mitigation Work Plans. However, the operation and management of the Bank shall be governed by a single Mitigation Banking Instrument (MBI). Additional sites within the Terrebonne Basin may also be added to the Umbrella Mitigation Bank as approved by CEMVN, LDNR, and the IRT.

6.1 Project Representatives

Sponsor: Terrebonne Basin Conservation, LLC
7330 Highland Road, Suite B-1
Baton Rouge, LA 70808

Agent: Natural Resource Professionals, LLC
7330 Highland Road, Suite B-1
Baton Rouge, LA, 70808
Attn: Gregg Fell; gfell@nrpllc.com

Current Landowner: Otto Candies, LLC
17271 US-90
Des Allemands, LA 70030

Future Landowner: Lucky 13 Land Company, LLC
17271 US-90
Des Allemands, LA 70030

6.2 Qualifications of the Sponsor

The Sponsor, Terrebonne Basin Conservation, LLC, is comprised of members of the same team as the existing/approved mitigation bank, Spanish Lake Restoration Mitigation, LLC (SLR), including Stephen R. Wallace, Scott Nesbit and Gregg Fell. Natural Resource Professionals, LLC (NRP) is acting as agent for the project which also has experience in the successful establishment and management of mitigation banks. Otto Candies, LLC is the landowner of the project and has managed the property since December 1994 in addition to other land holdings and businesses

throughout the region. Collectively, the Sponsor, NRP, and Otto Candies have the necessary financial resources, experience, and technical expertise to successfully implement the project.

6.3 Proposed Long-Term Ownership and Management Representatives

Terrebonne Basin Conservation, LLC will serve as the Sponsor of the Site but will reserve the option of appointing a long-term steward which must be approved by the CEMVN, LDNR, and IRT. Otto Candies, LLC is the current landowner; Prior to finalizing the Mitigation Banking Instrument, Otto Candies, LLC will transfer ownership to Lucky 13 Land Company, LLC, which will be wholly owned by Otto Candies, LLC, but will be a disregarded entity for legal and tax purposes.

The Sponsor and the landowner have developed a long-term business agreement that will ensure the goals and objectives of the Bank will be achieved. The Sponsor anticipates that the long-term management requirements will be boundary control, trash/debris cleanup, invasive species control, general maintenance, and monitoring.

6.4 Site Protection

The Site will be protected in perpetuity by a conservation servitude pursuant to Louisiana Revised Statute 9:1271 et seq. The servitude will be held by a non-profit conservation-oriented 501(c) (3) organization that will be approved by CEMVN. The servitude will inure and run with the property title. The servitude will prohibit activities, such as clear cutting, fill discharges, cattle grazing, or other commercial surface development that would diminish the quality or quantity of restored wetlands. Figure 28 illustrates the land areas (4,262.6 acres) that will be protected by the Conservation Servitude.

6.5 Long-Term Strategy

The Sponsor will provide long-term management of the Site in accordance with 33 CFR §332.7. The Sponsor will provide site protection by establishing conservation servitude over the Site, which will be held by a third-party non-profit corporation. Following the establishment period, the Site would only require long term management activities such as invasive species control, boundary maintenance, and general site inspections. However, the Sponsor - through coordination with CEMVN, LDNR, and the IRT - will employ an Adaptive Management Plan if monitoring or other information indicates that the Site is not progressing towards meeting its anticipated performance standards. The Sponsor will also establish a long-term management fund/long term escrow account which will be funded annually/incrementally as credit sales are made to ensure that monies are available to perform any anticipated management and maintenance needs.

7.0 References

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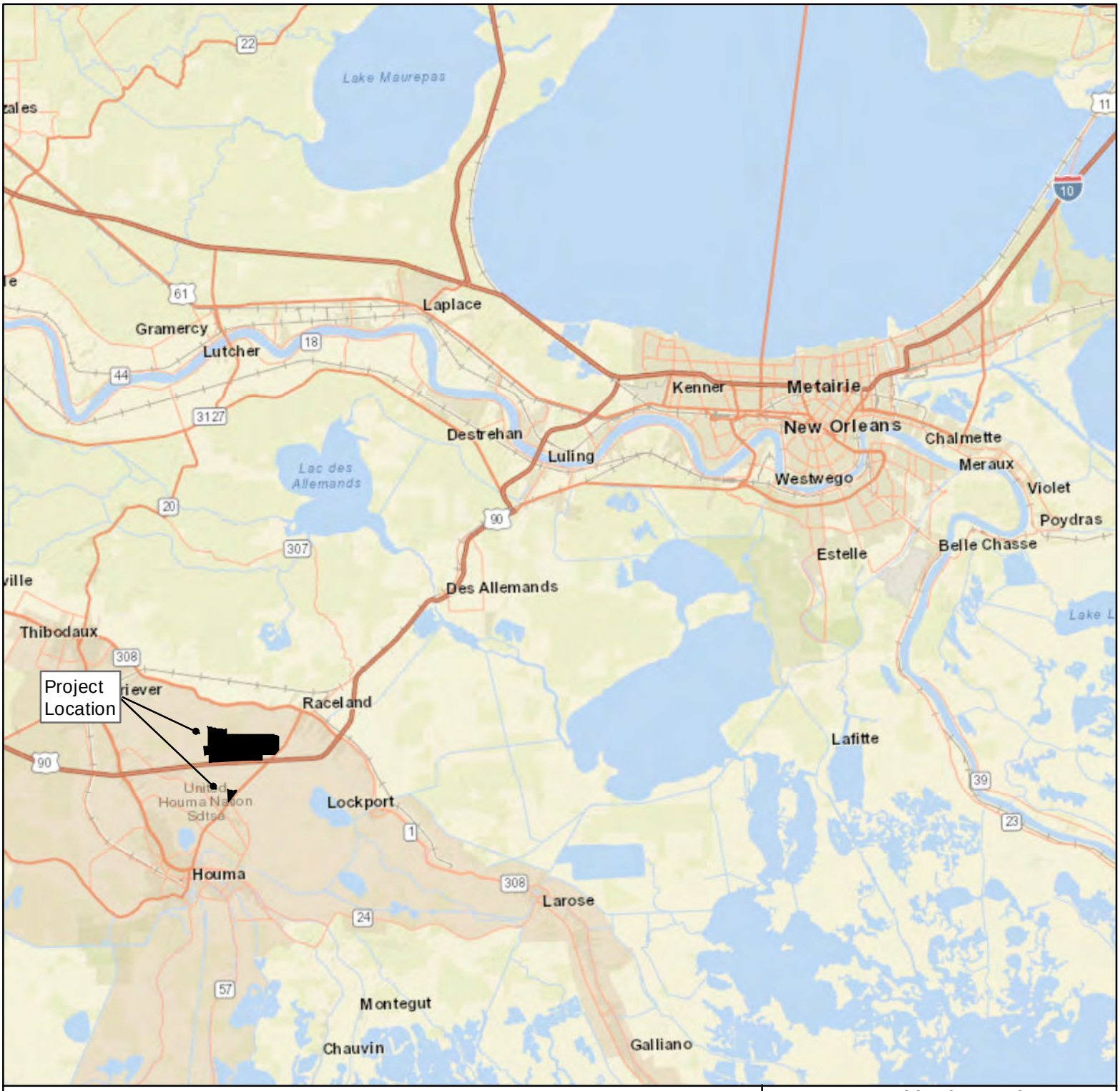
Figures



Legend

Project Area (4,262.6 acres)

8.0 4.0 0 8.0 Miles

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

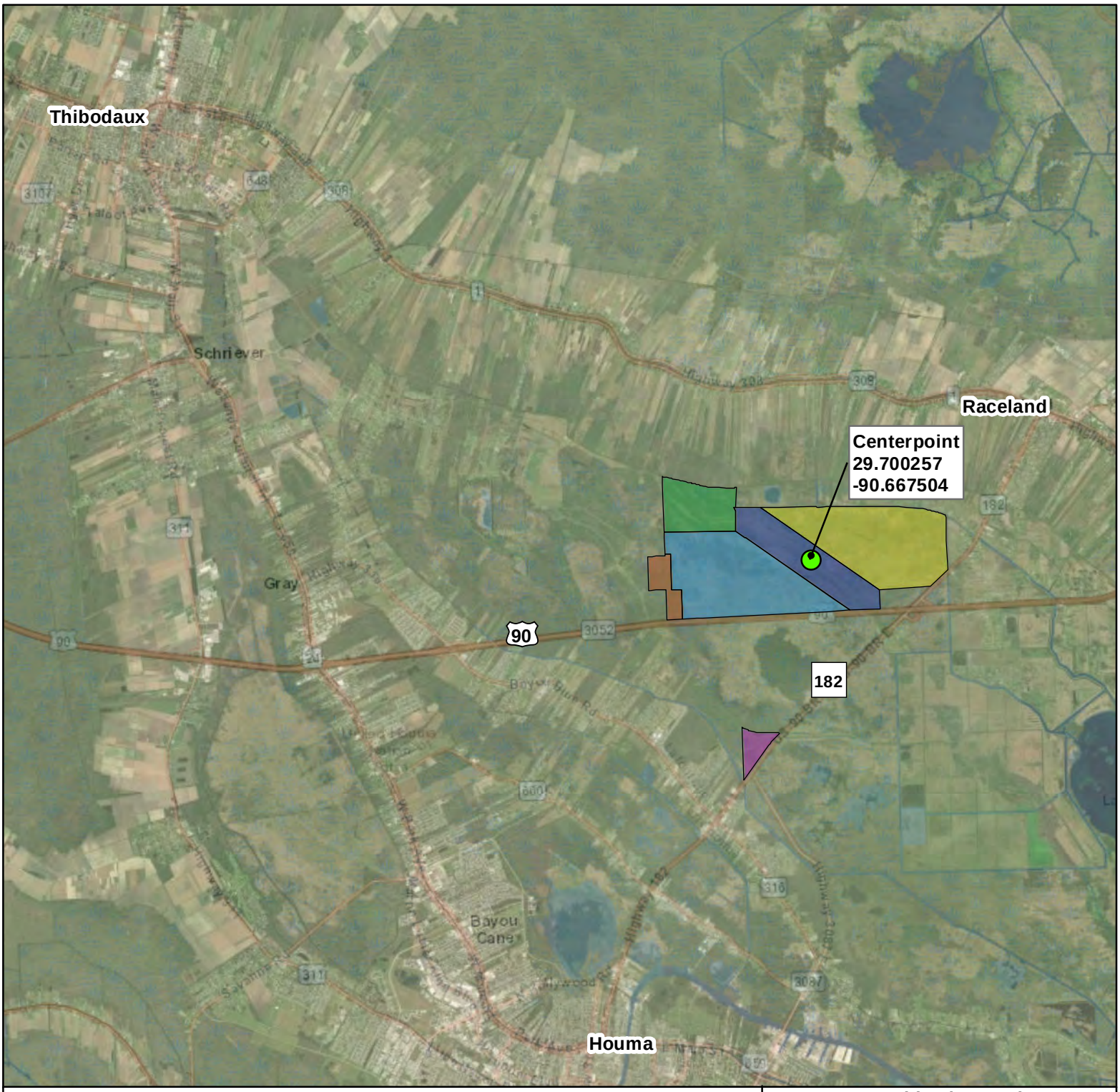
Raceland, LA

VICINITY MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 1



Legend

Project Area (4,262.6 acres)

2.0 1.0 0 2.0 Miles

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

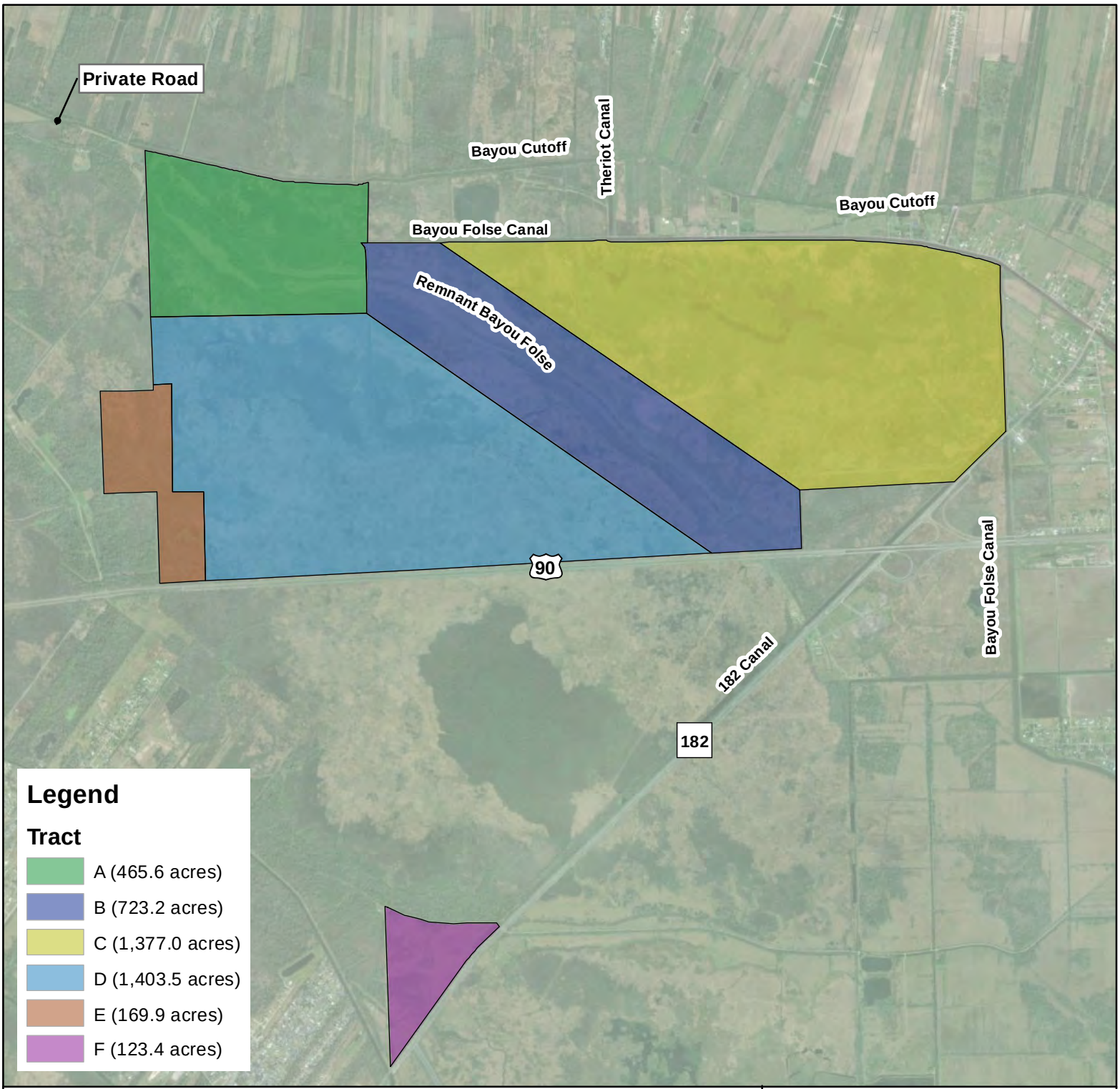
Raceland, LA

AERIAL MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 2



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

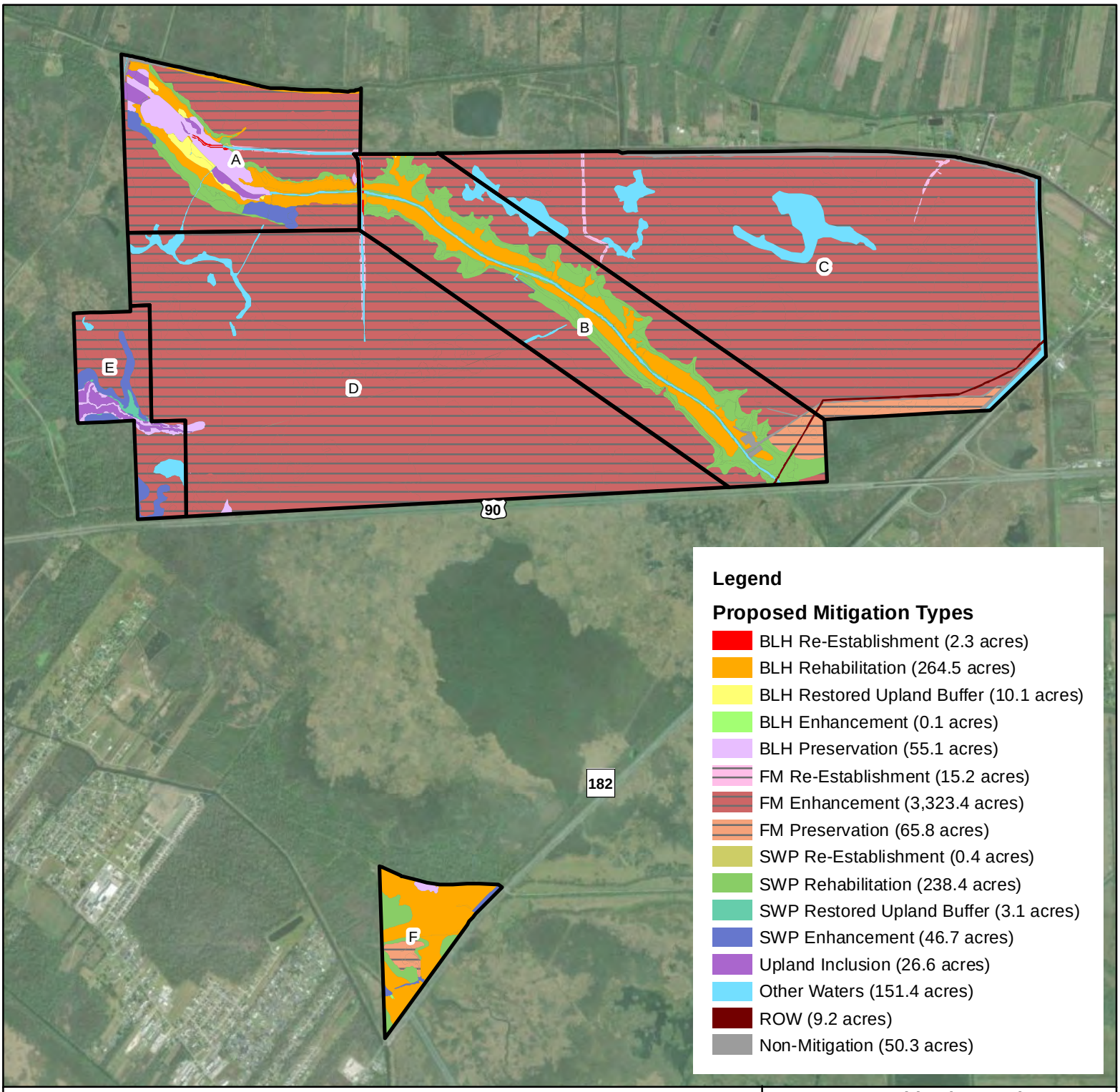
Raceland, LA

ZOOM IN SITE MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 3



Legend

Project Area (4,262.6 acres)

3,000 1,500 0 3,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

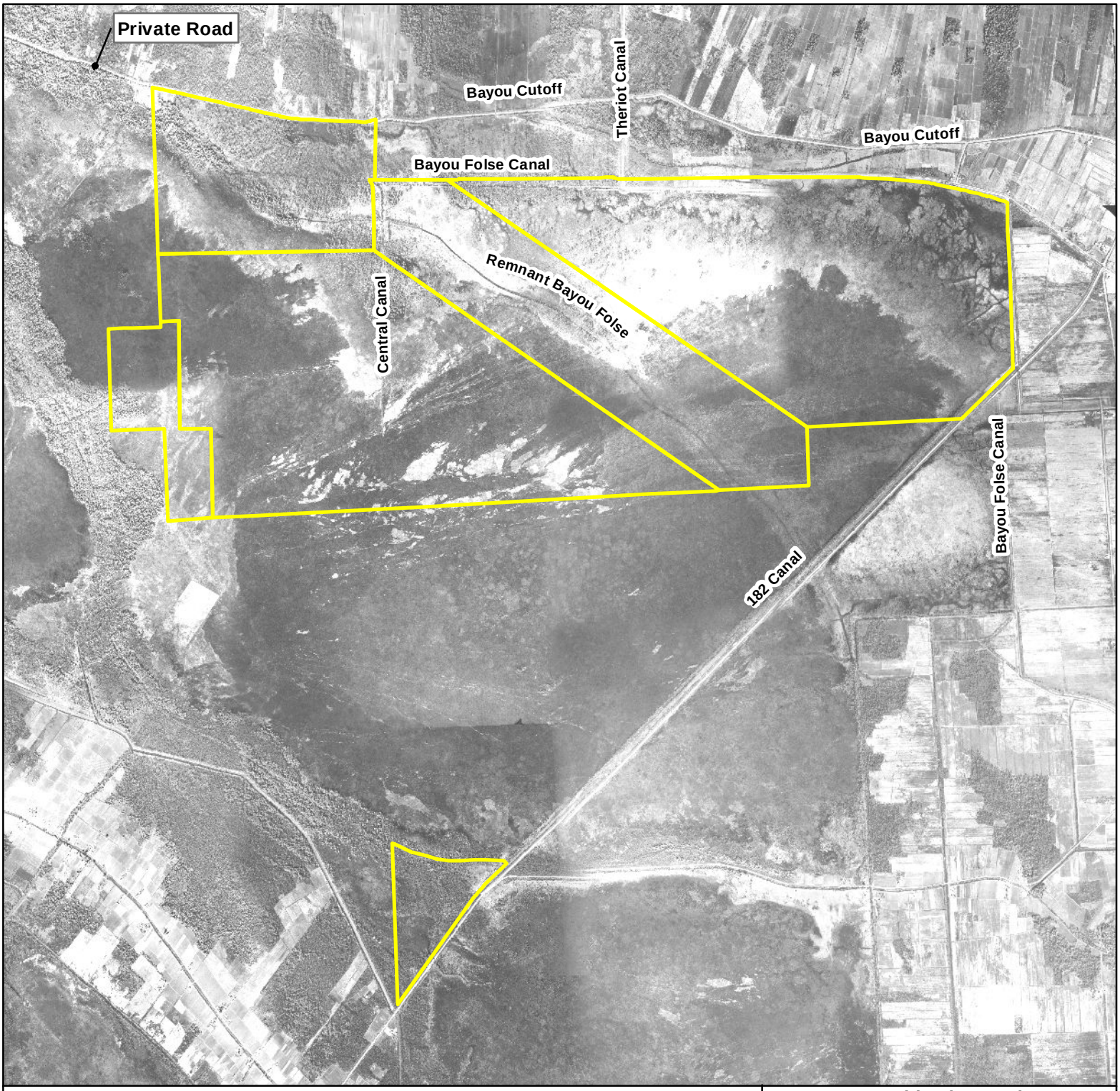
Raceland, LA

PROPOSED MITIGATION FEATURES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/27/2023
Map No. :	

FIGURE 4



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

Raceland, LA

1940 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 5

Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

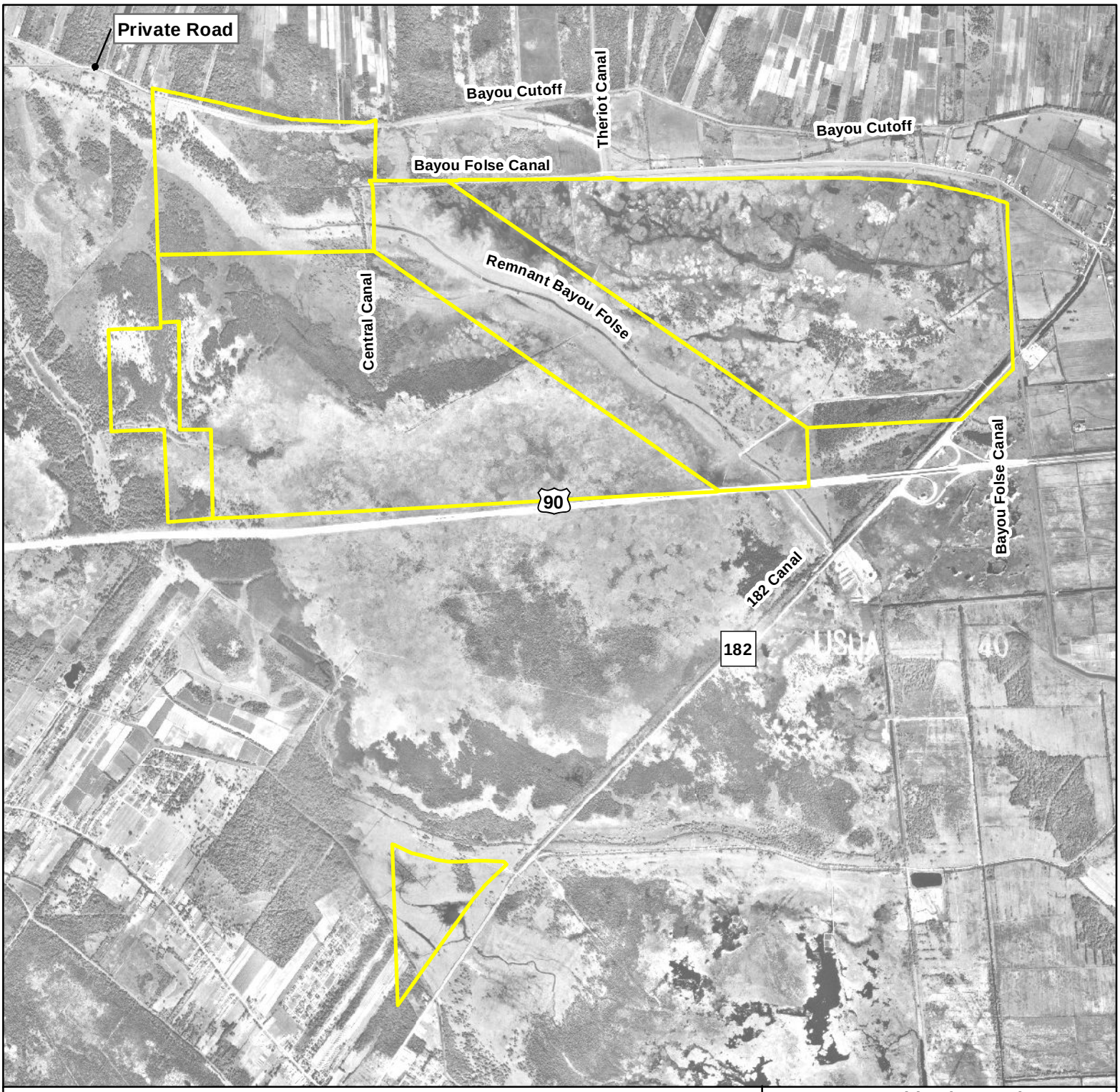
Raceland, LA

1953 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 6



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

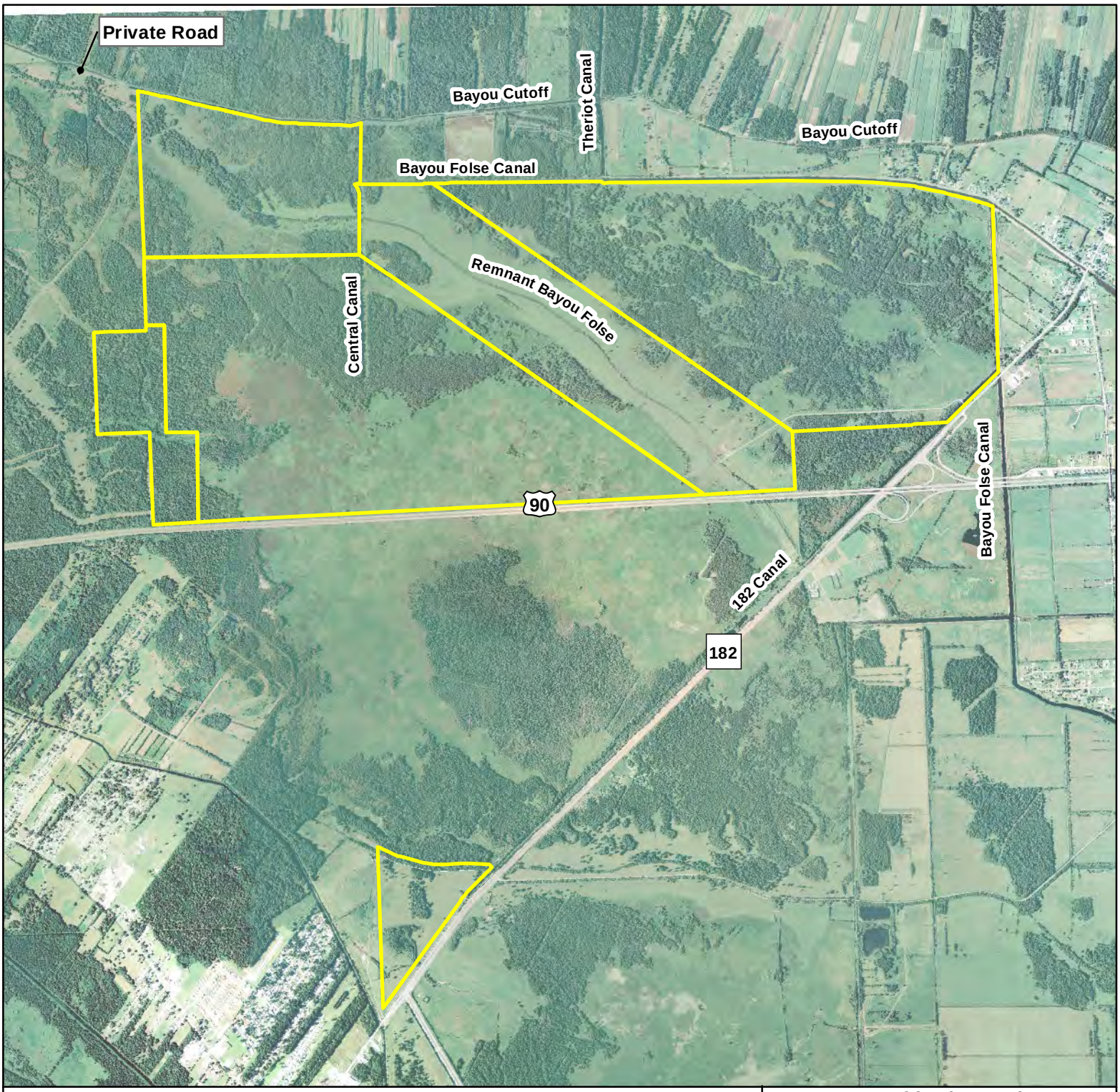
Raceland, LA

1980 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 7



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

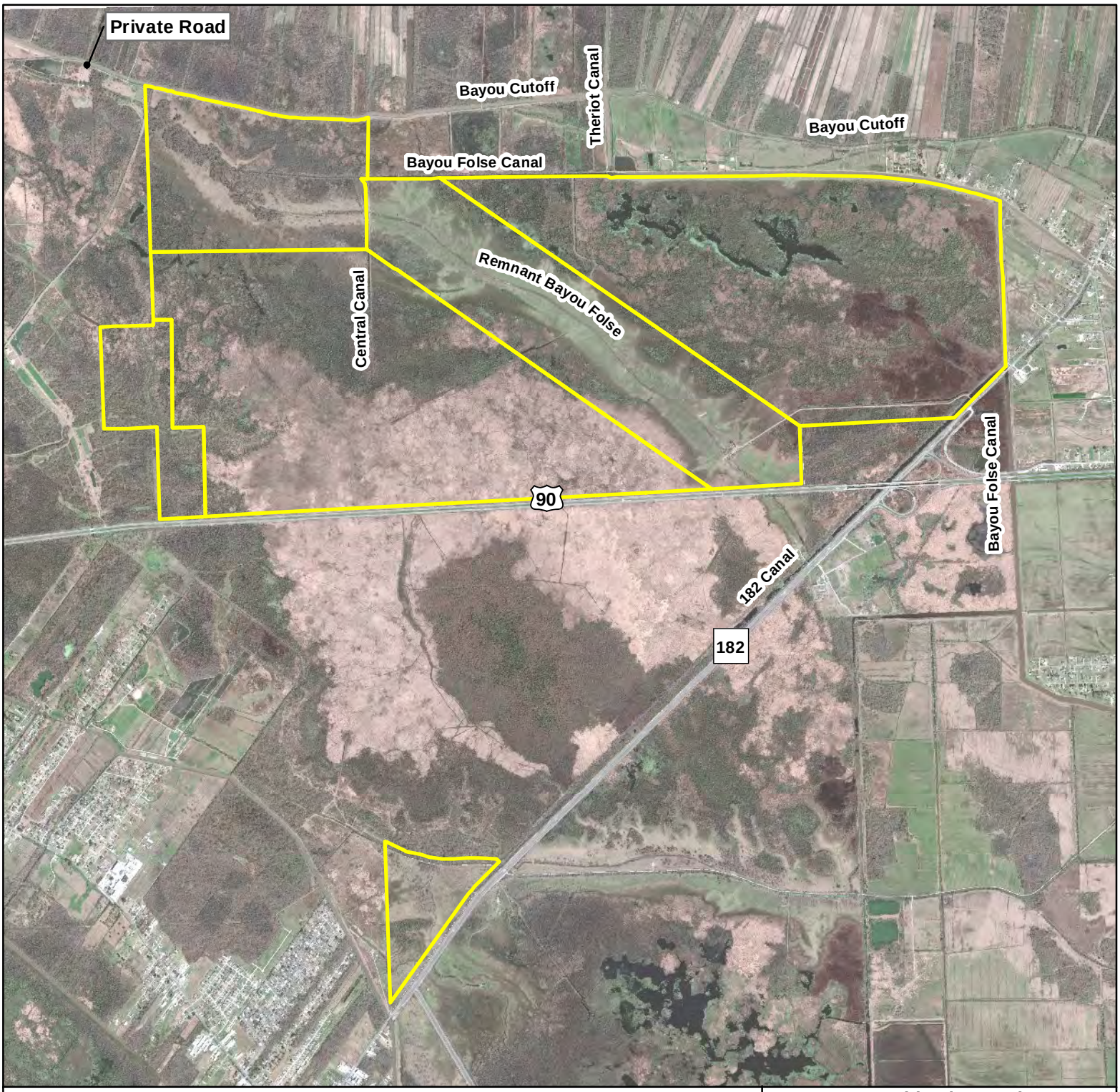
Raceland, LA

OCTOBER 2007 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 8



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

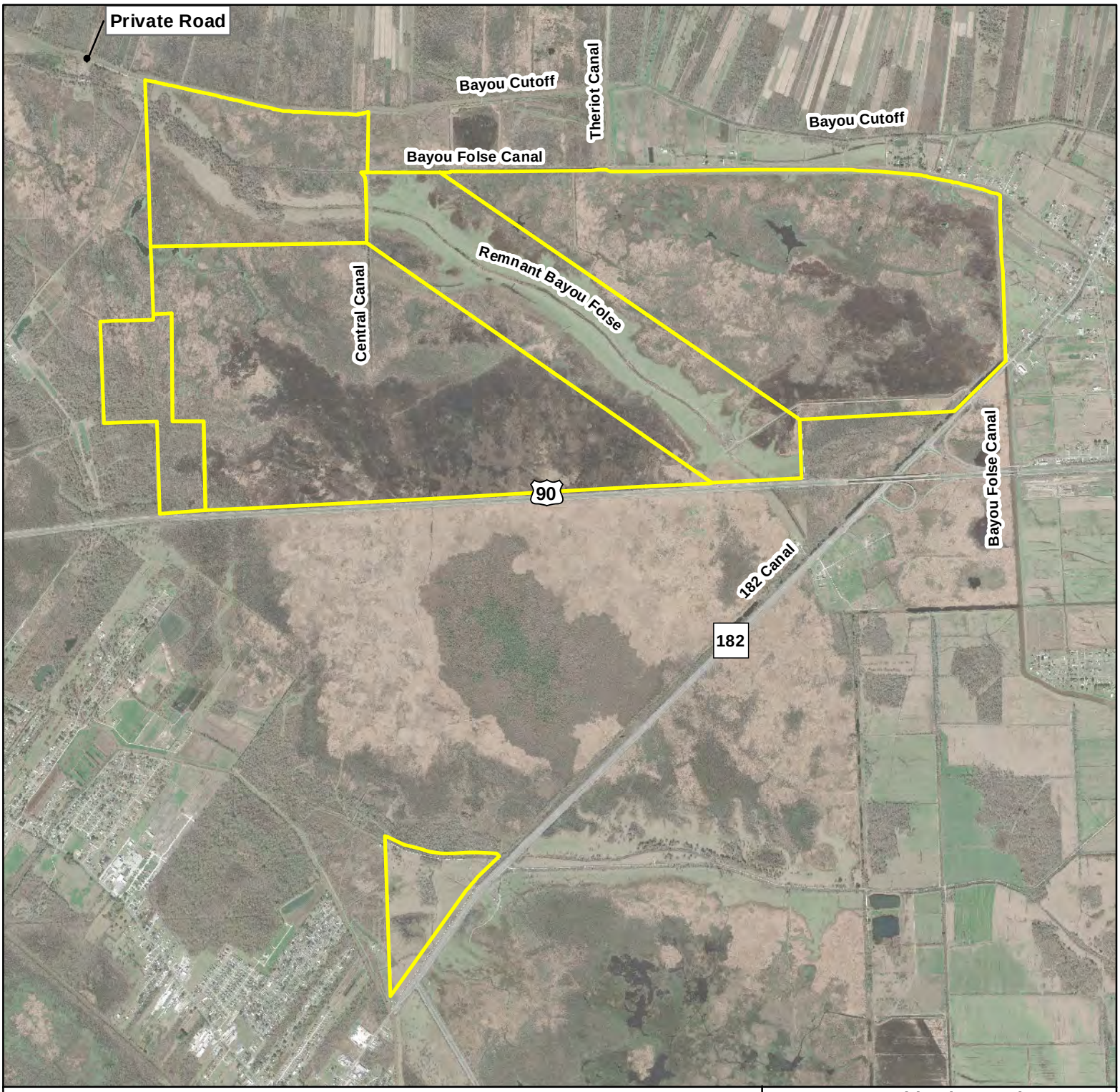
Raceland, LA

MAY 2010 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 9



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

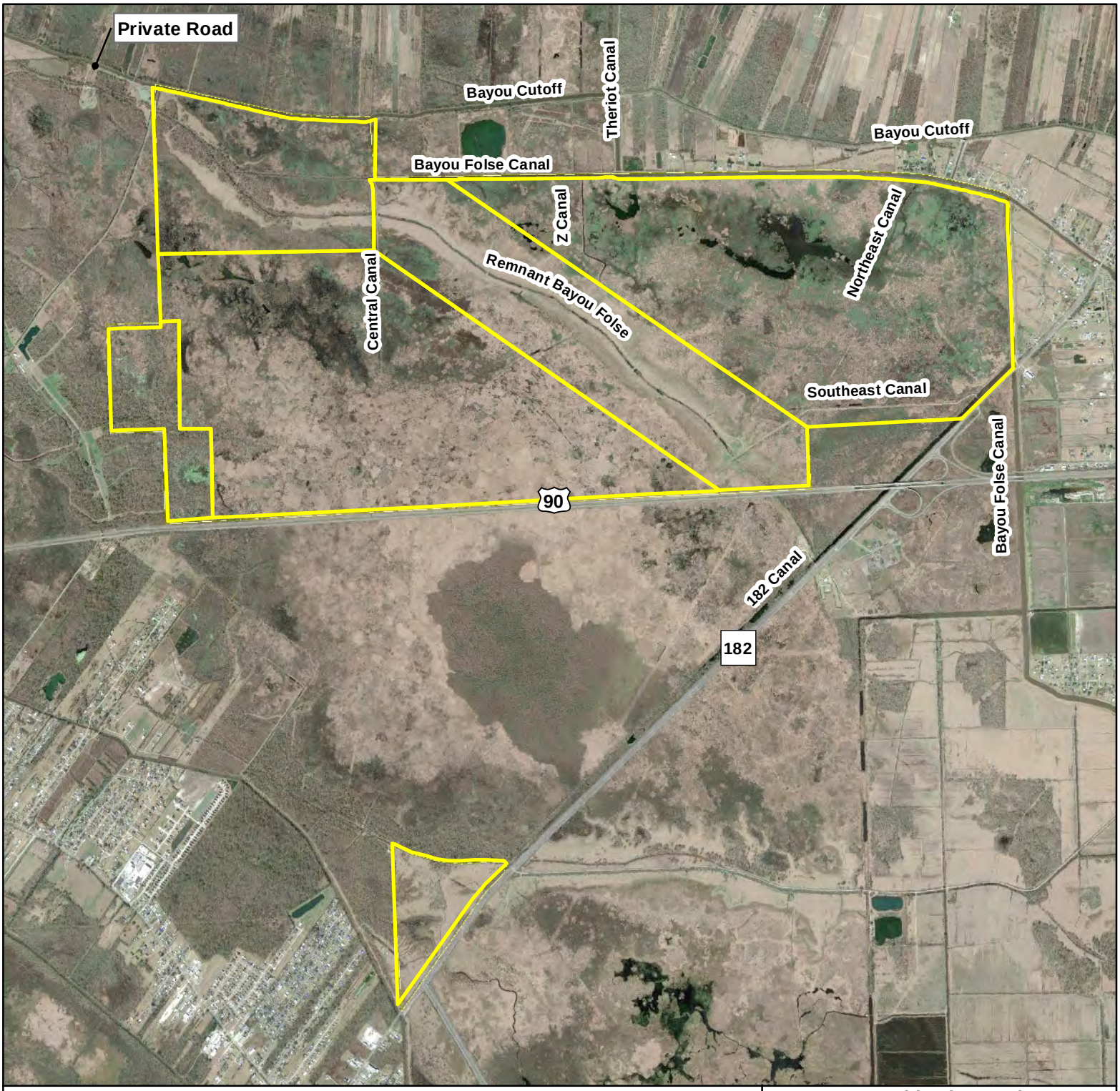
Raceland, LA

JANUARY 2015 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 10



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

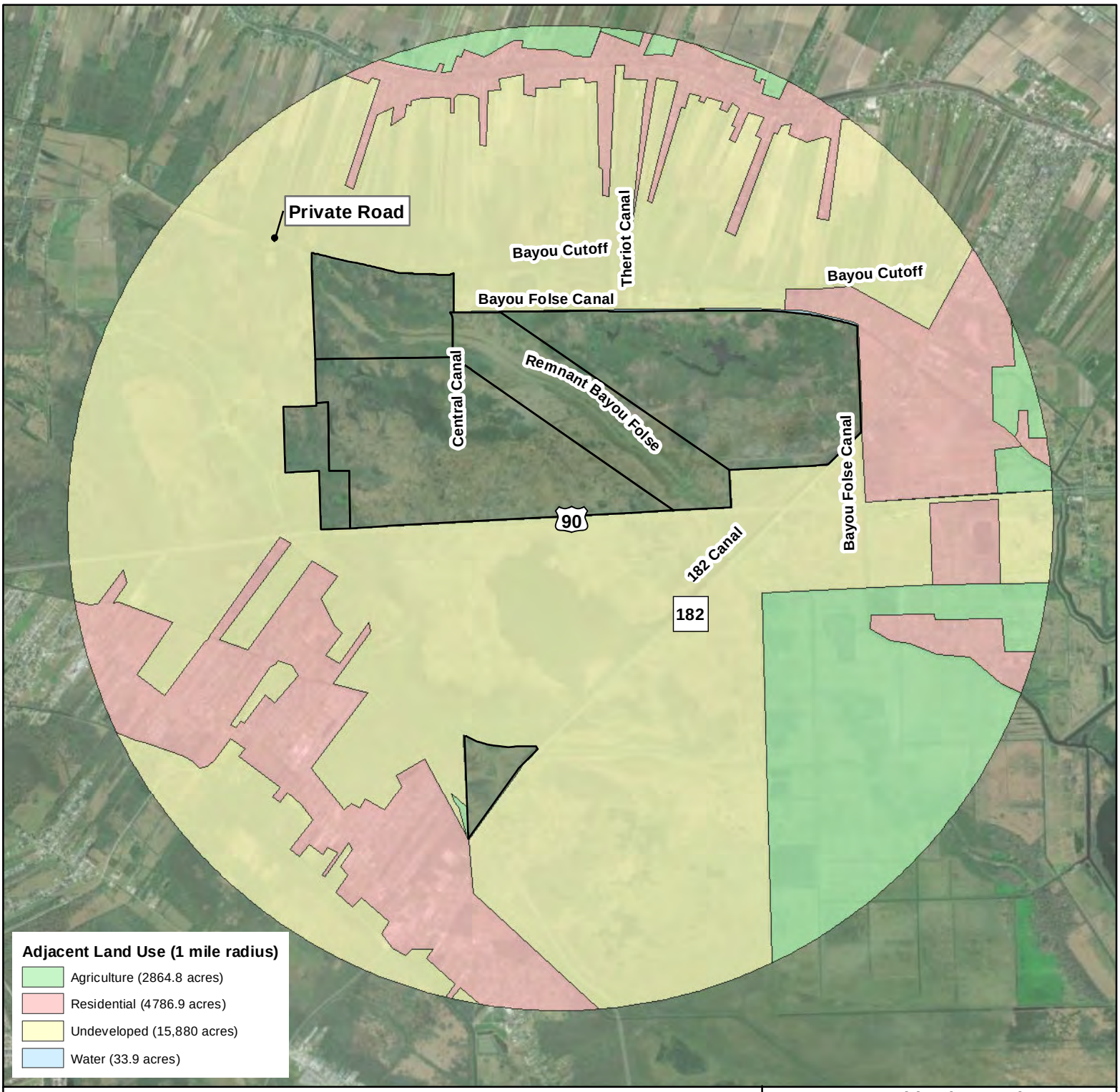
Raceland, LA

2021 GOOGLE EARTH AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 11



Legend

Project Area (4,262.6 acres)

1.0 0.5 0 1.0 Miles

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

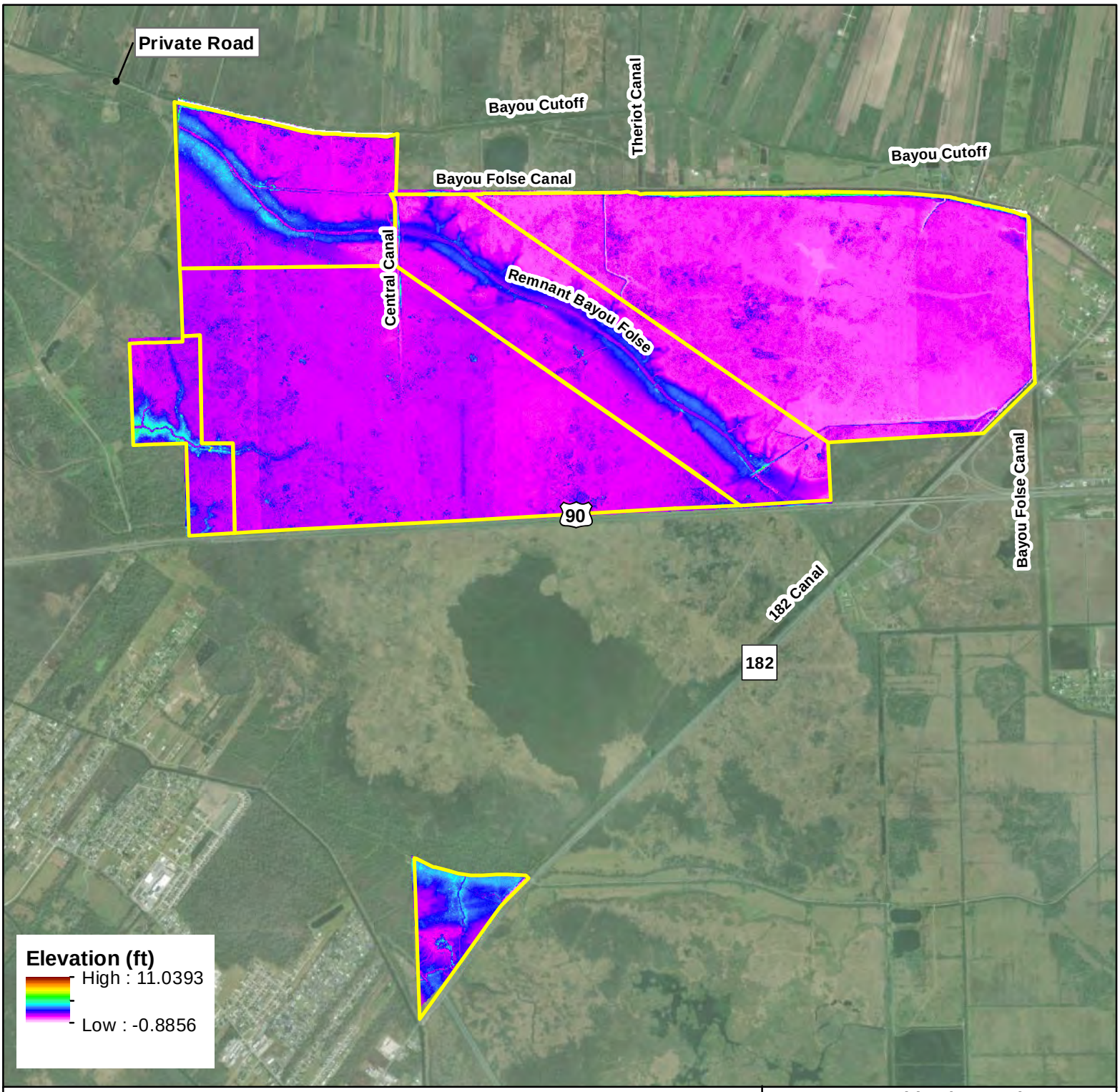
Raceland, LA

ADJACENT LAND USE

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 12



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

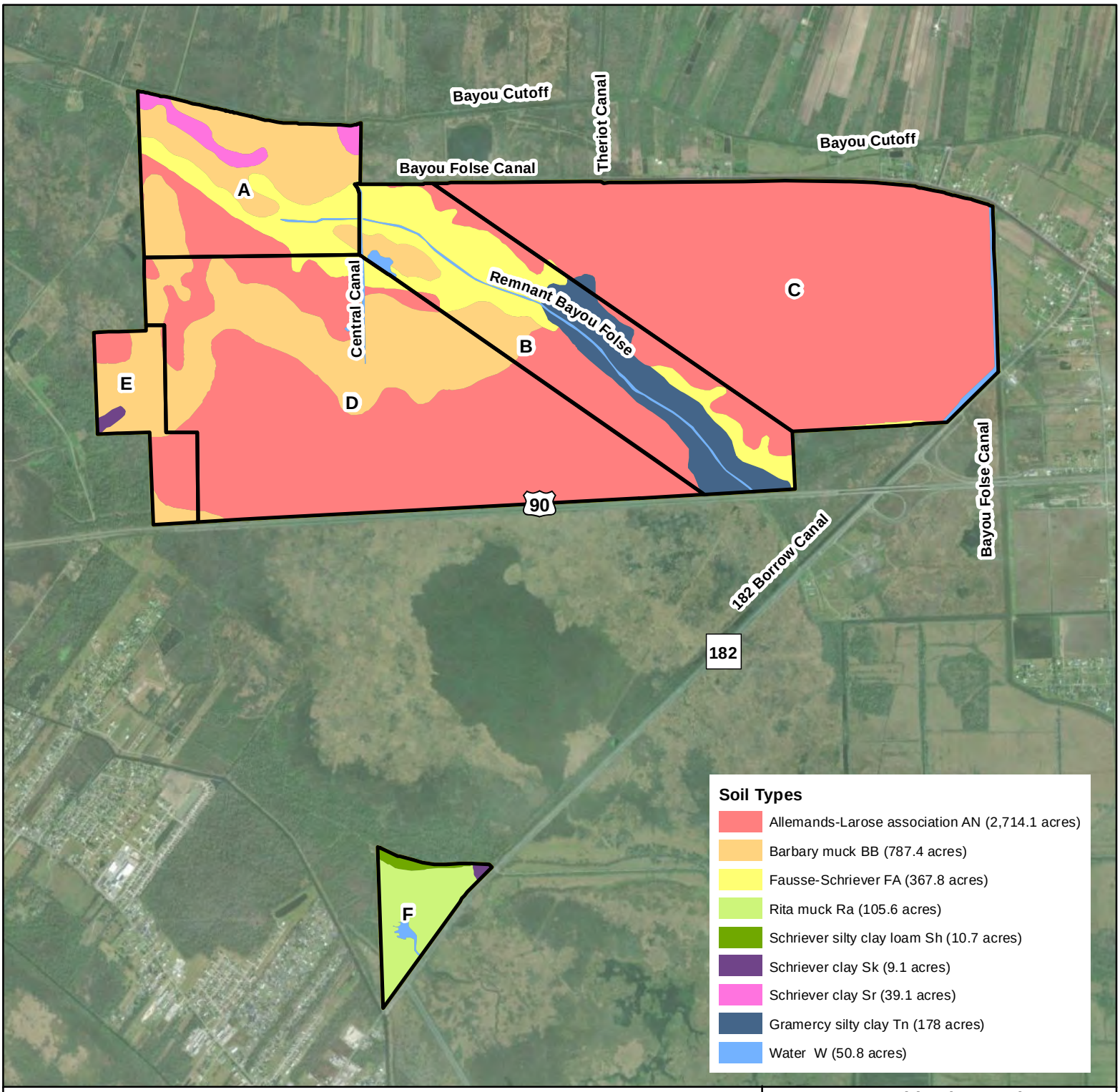
Raceland, LA

LIDAR

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 13



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

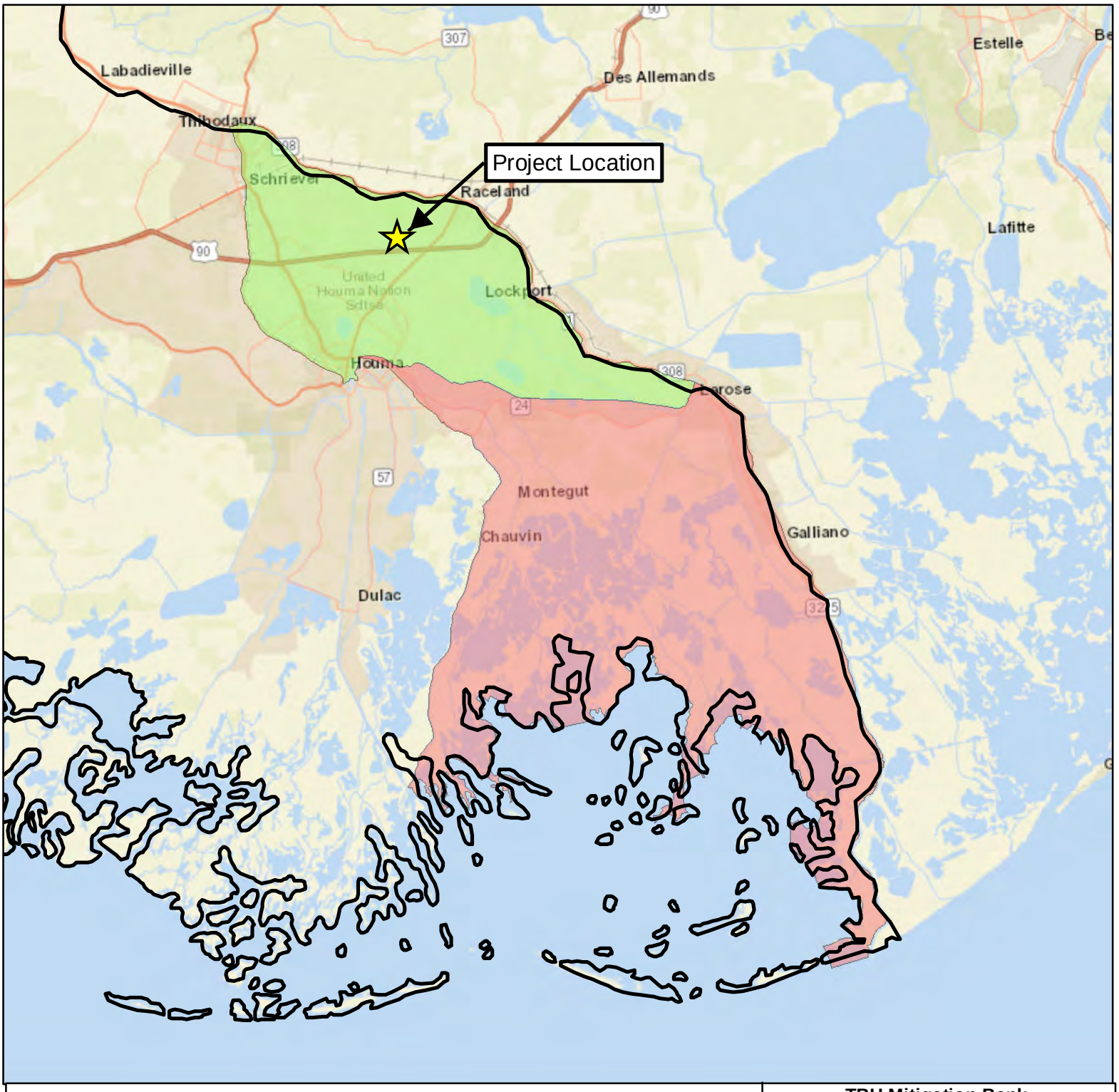
Raceland, LA

SOIL MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 14



Legend

- West Central Louisiana Coastal (08090302)
- Bayou Cutoff-Lake Fields
- Bayou Pointe au Chien-Frontal Timbalier Bay

3,500 1,750 0 3,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

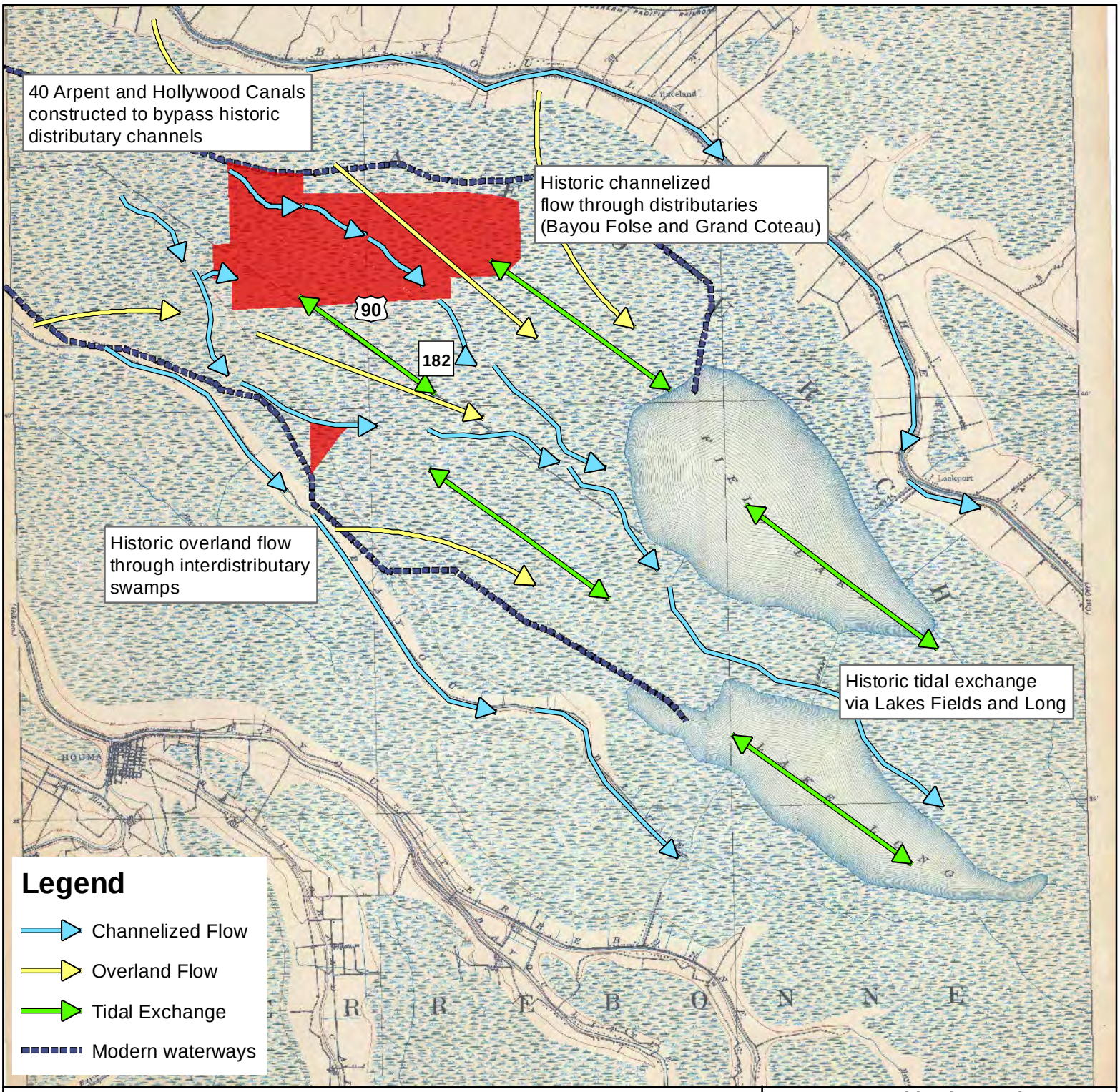
Raceland, LA

WATERSHED MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 15



Legend

Project Area (4,262.6 acres)

2.0 1.0 0 2.0 Miles

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

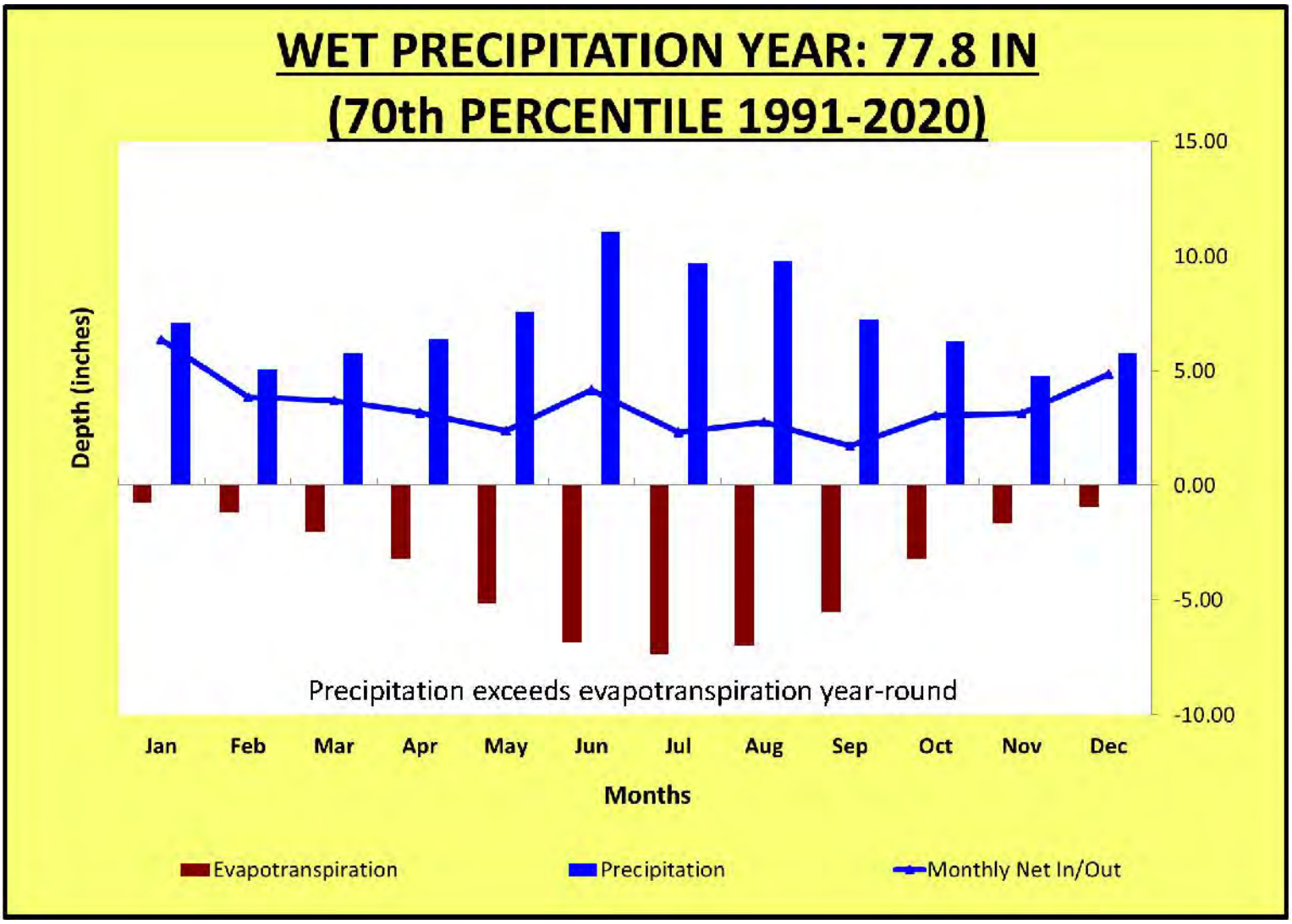
TBU Mitigation Bank

Raceland, LA

HISTORIC HYDROLOGY
1892 USGS TOPO MAP
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 16



Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

NRP

N

TBU Mitigation Bank

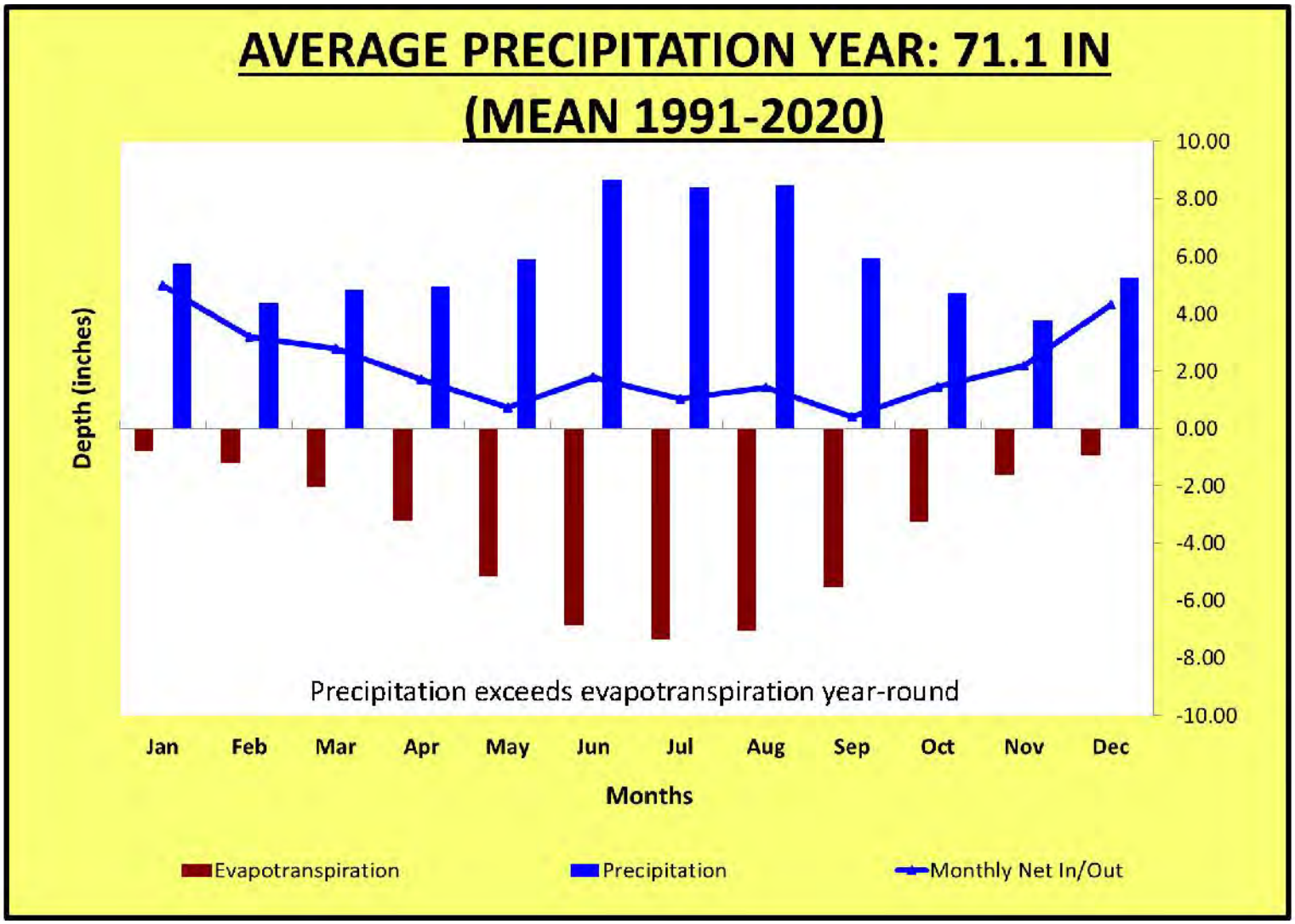
Raceland, LA

CLIMATE HYDROGRAPH

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 17a



Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

NRP

N

TBU Mitigation Bank

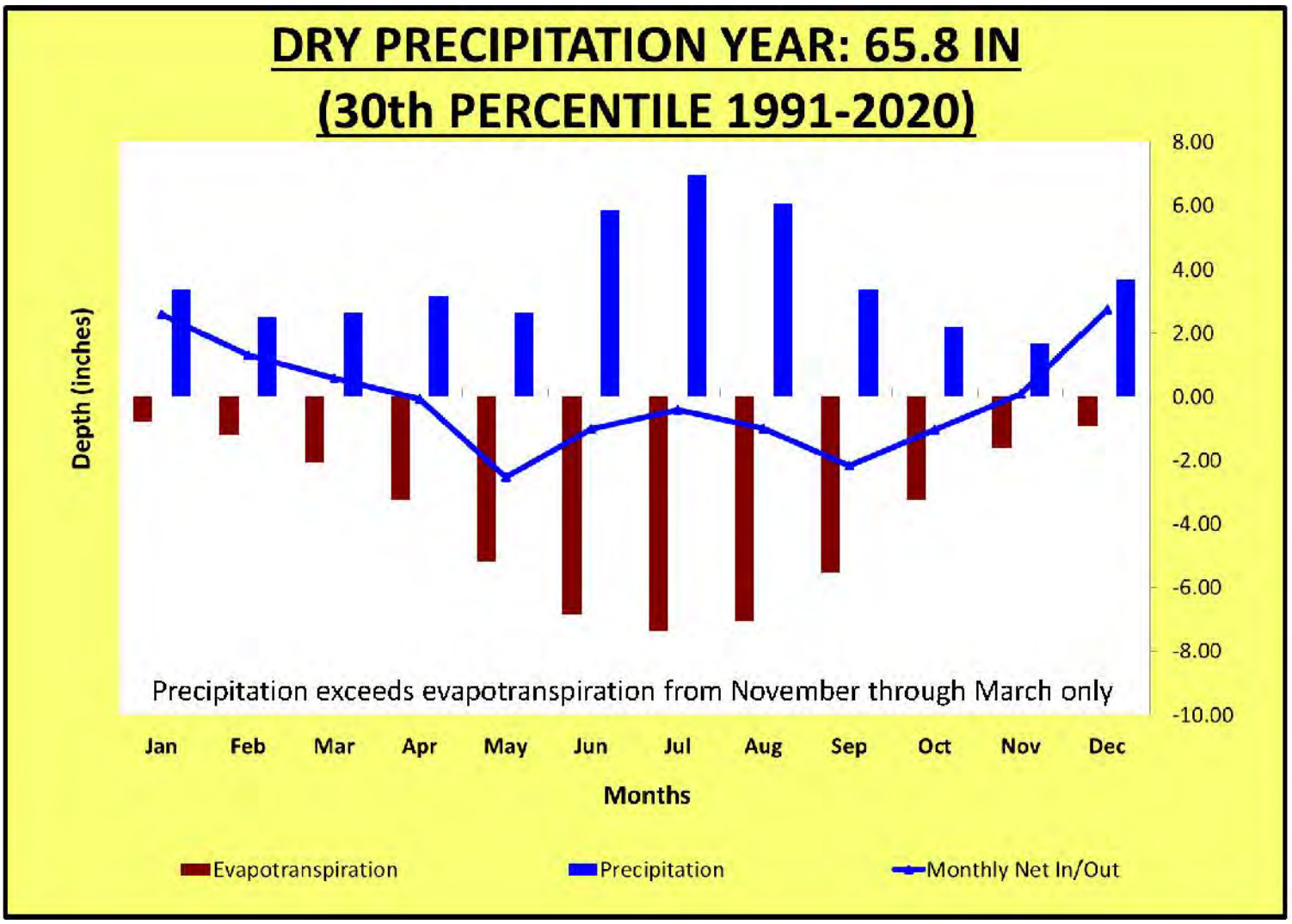
Raceland, LA

CLIMATE HYDROGRAPH

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 17b



Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

NRP

N

TBU Mitigation Bank

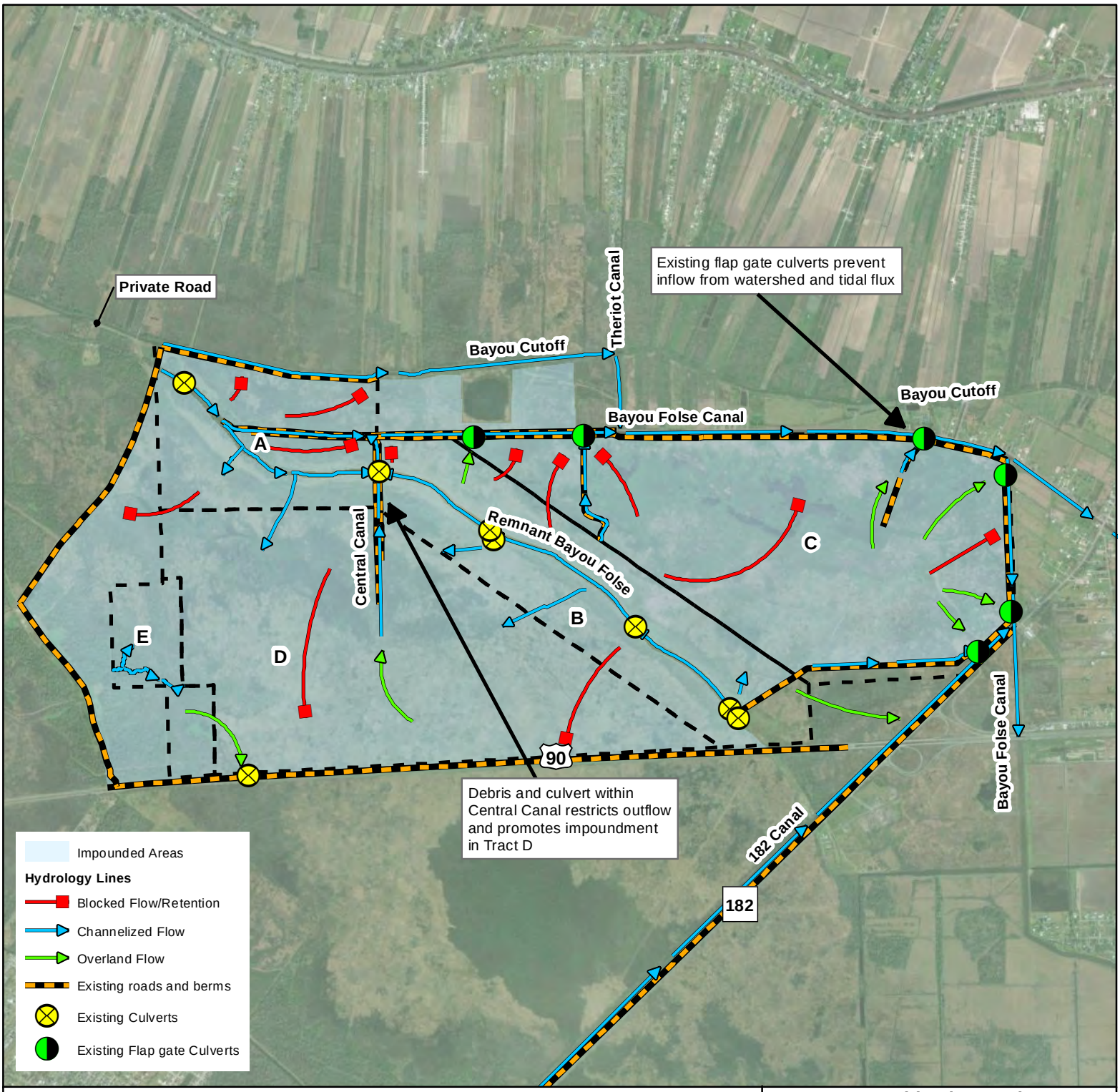
Raceland, LA

CLIMATE HYDROGRAPH

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/16/2023
Map No. :	

FIGURE 17c



Legend

Project Area (4,262.6 acres)

3,500 1,750 0 3,500 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

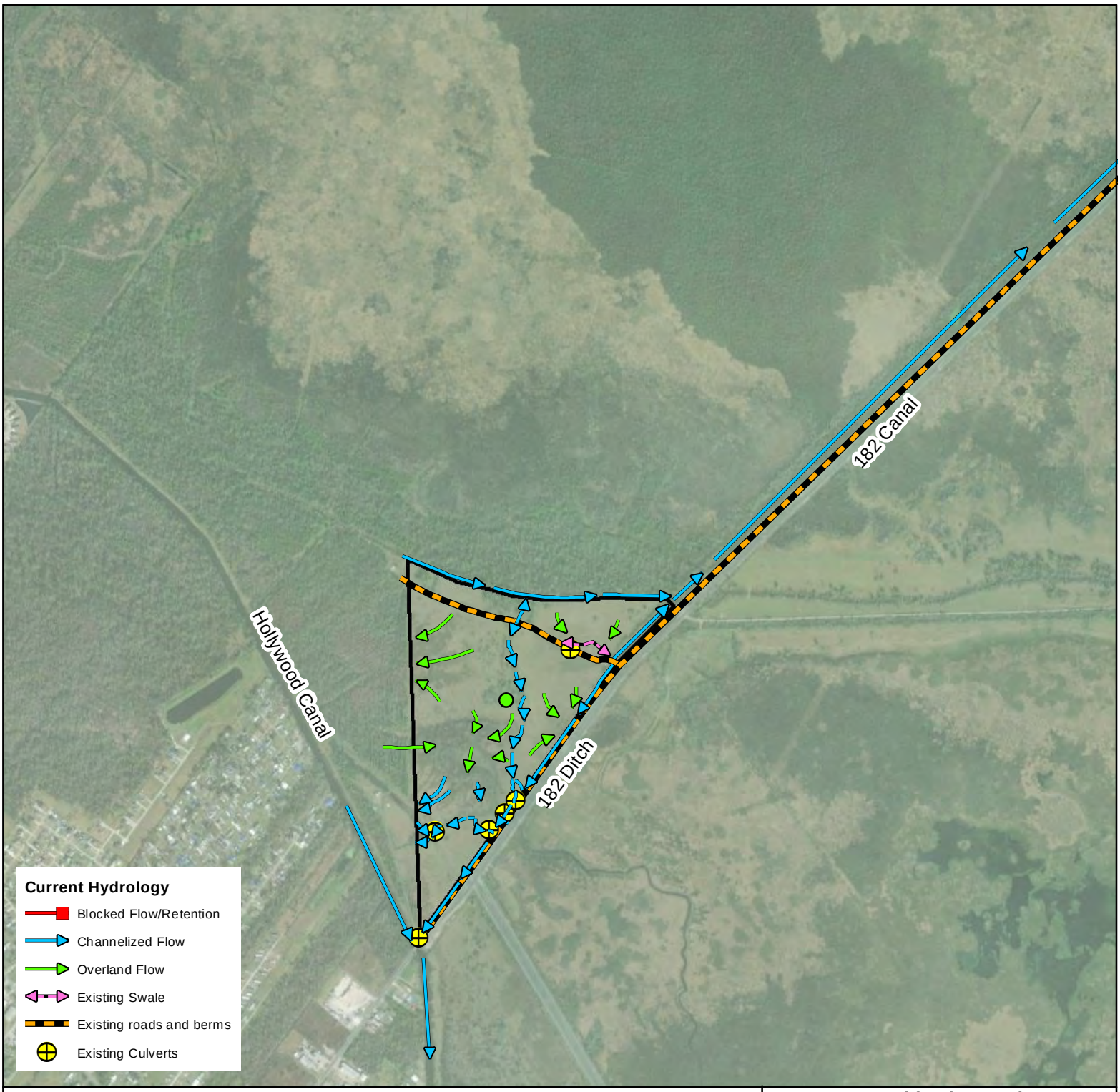
Raceland, LA

TRACT A-E DRAINAGE

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 18



Legend

Project Area (4,262.6 acres)

1,500 750 0 1,500 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

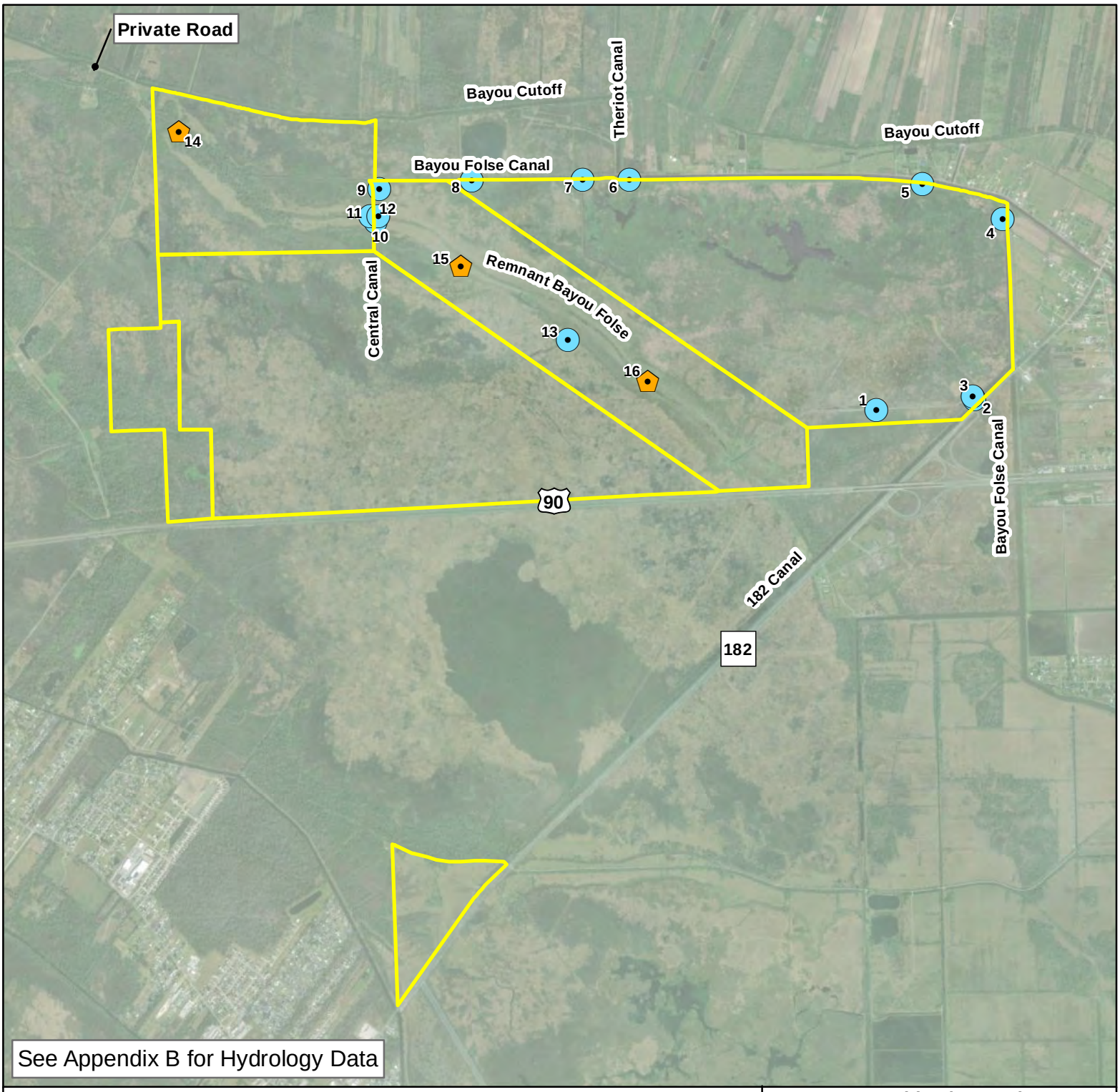
Raceland, LA

TRACT F DRAINAGE

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 19



Legend

- Project Area (4,262.6 acres)
- Groundwater Well
- Surface Water Well

3,500 1,750 0 3,500 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

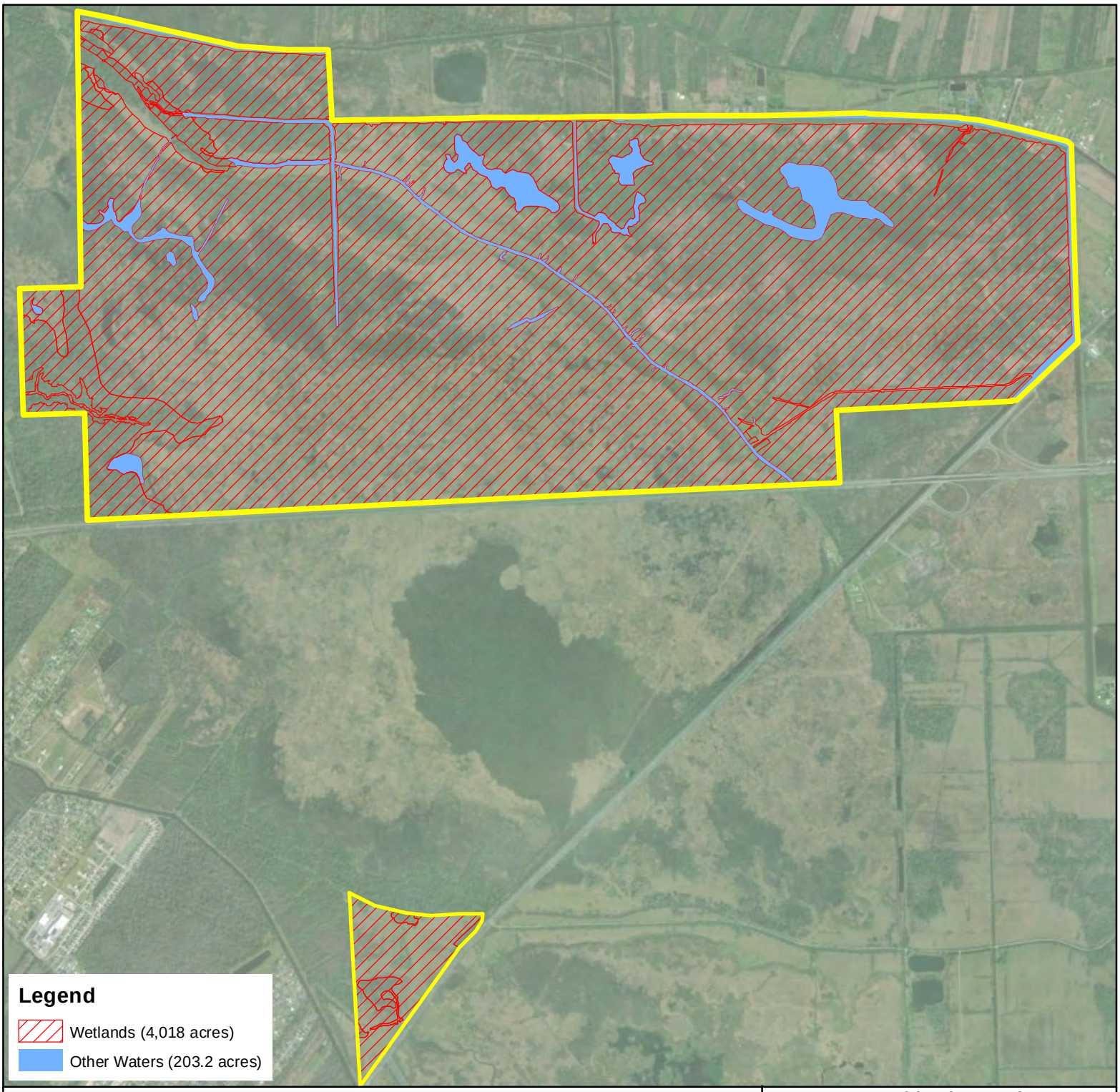
TBU Mitigation Bank

Raceland, LA

SURFACE AND GROUNDWATER WELL LOCATIONS LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/17/2023
Map No. :	

FIGURE 20



Legend

Project Area (4,203 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
4. Jurisdictional Determination (JD) issued 12.01.23 (MVN-2022-01283-SK)
5. See Appendix B for JD letter and Map

TBU Mitigation Bank

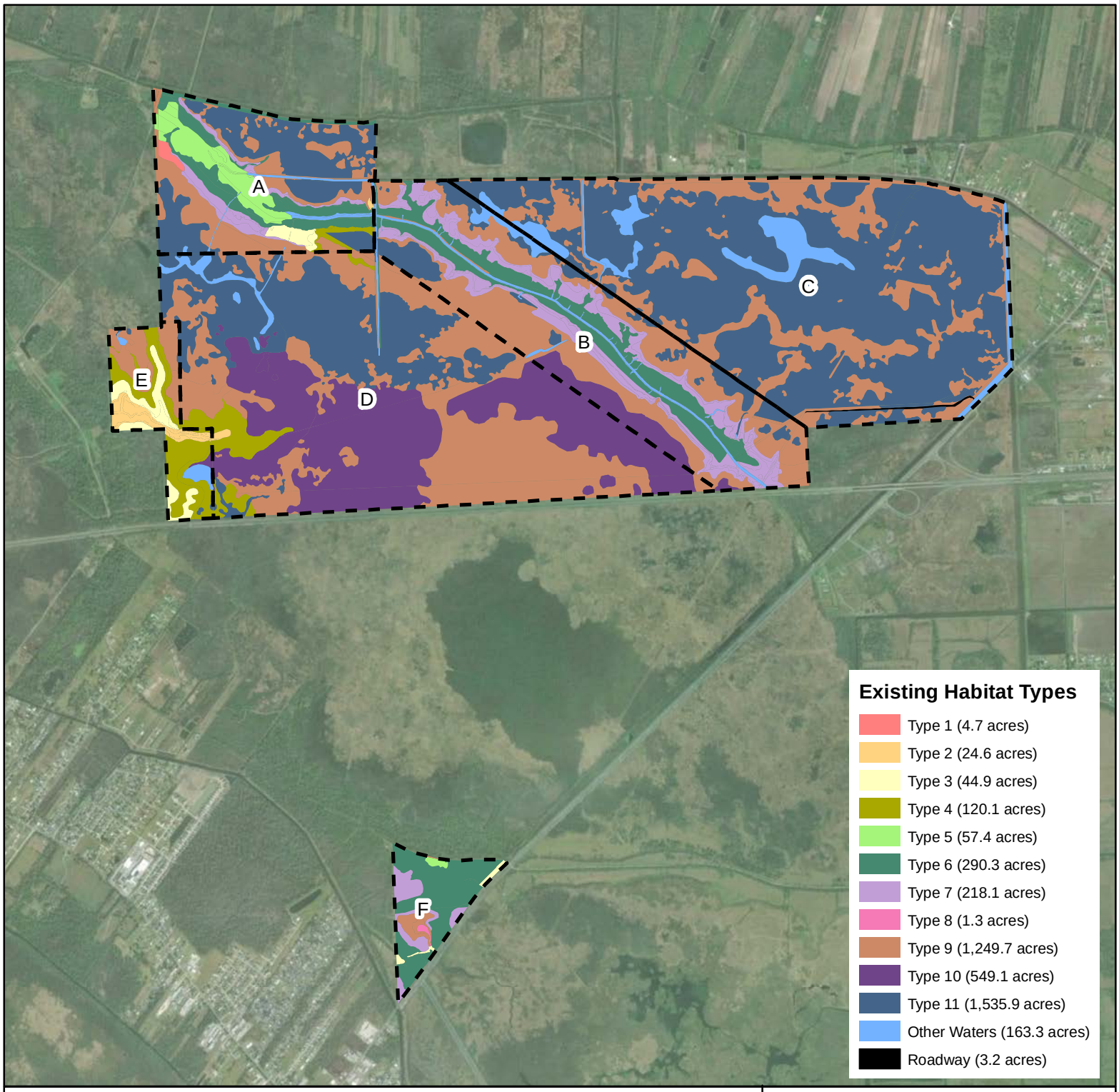
Raceland, LA

WETLAND MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 21



Legend

Project Area (4,262.6 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

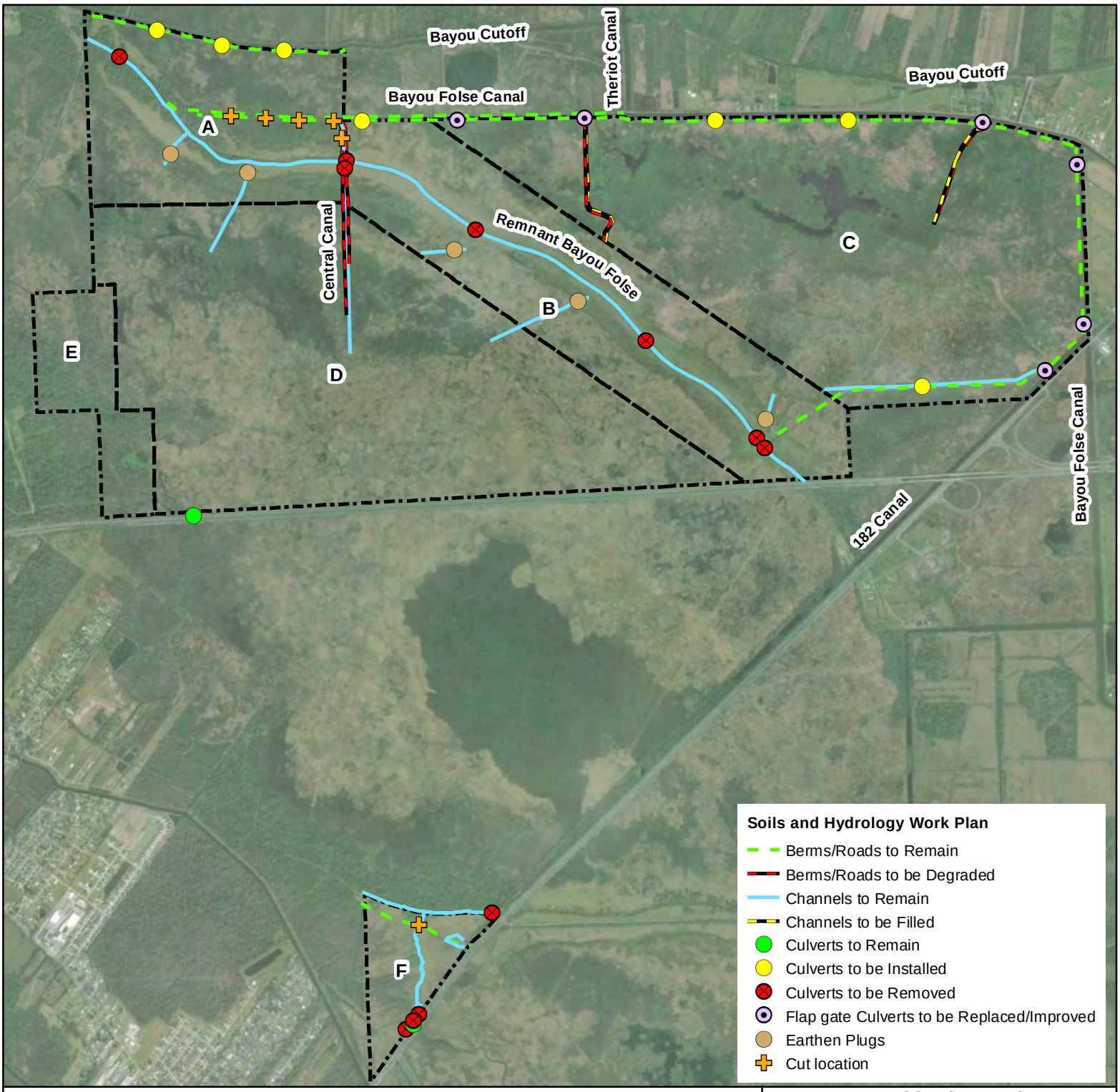
Raceland, LA

EXISTING HABITAT TYPES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 22



Legend

Project Area (4,262.6 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

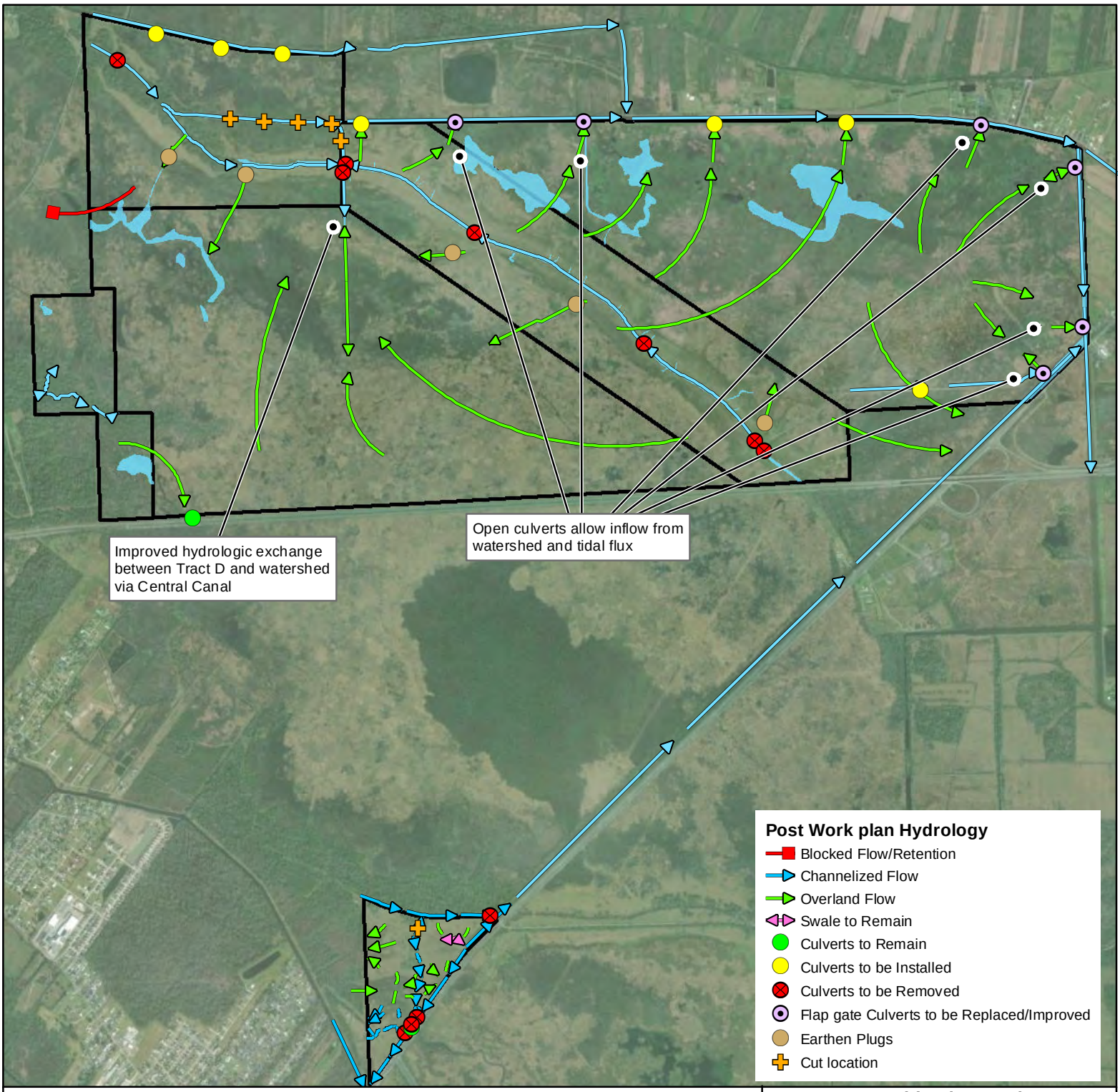
TBU Mitigation Bank

Raceland, LA

SOILS AND HYDROLOGY WORK PLAN LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 23



Legend

- Project Area (4,262.6 acres)
- Other Waters (162.9 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

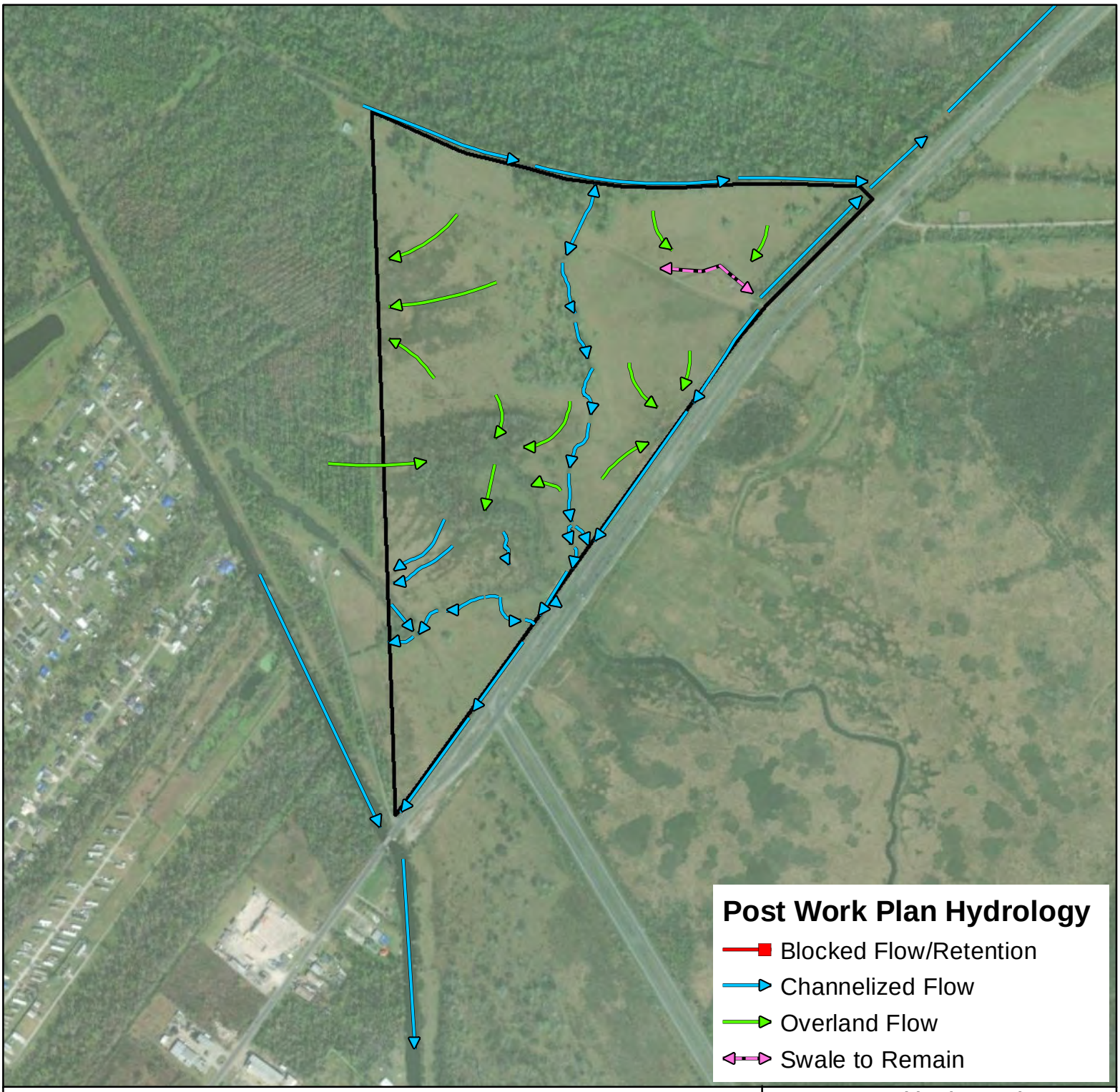
Raceland, LA

POST WORK PLAN HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 24a



Legend

Project Area (4,262.6 acres)

Other Waters (162.9 acres)

800 400 0 800 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

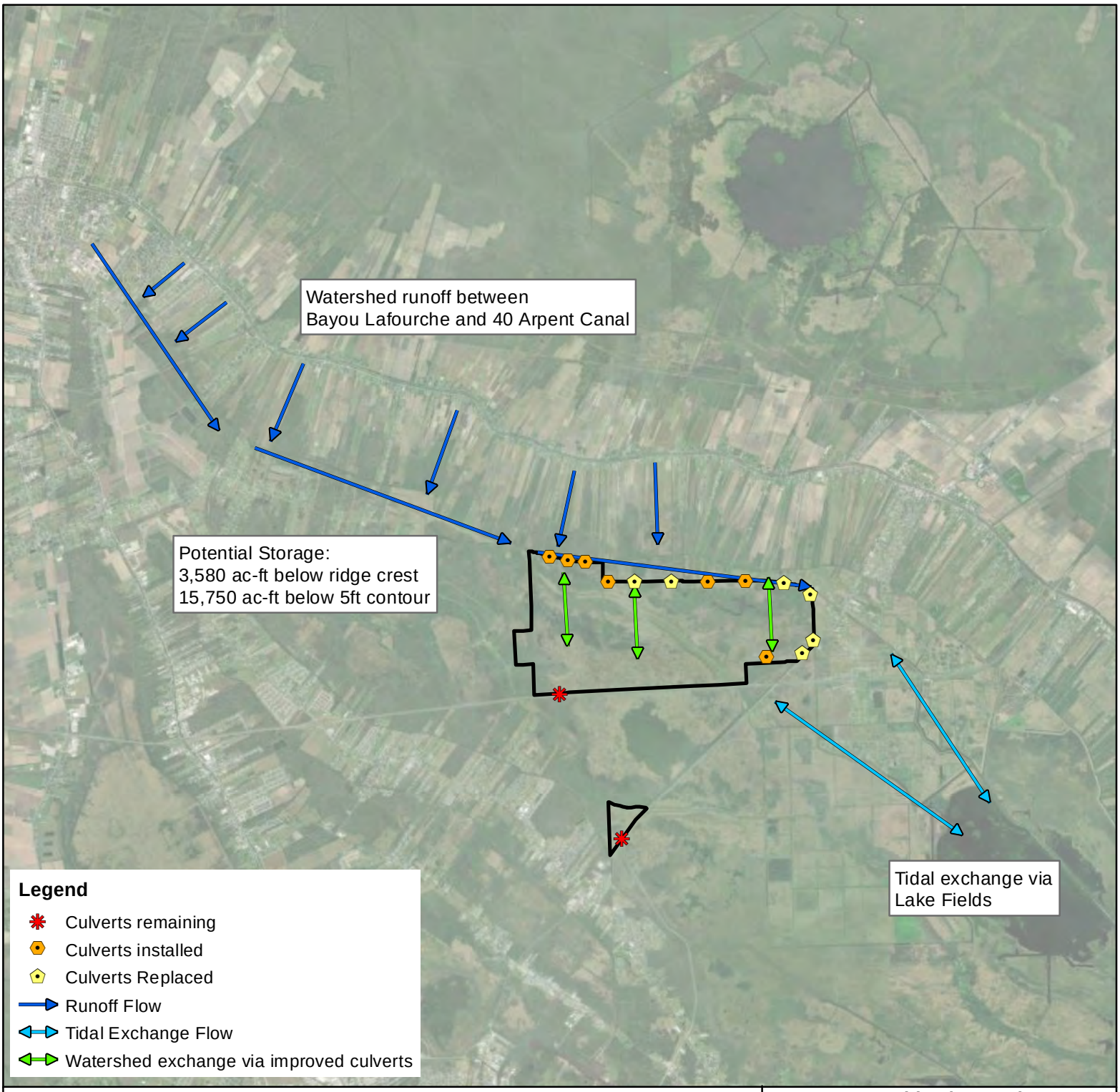
Raceland, LA

POST WORK PLAN HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/17/2023
Map No. :	

FIGURE 24b



Legend

Project Area (4,262.6 acres)

2.0 1.0 0 2.0 Miles

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

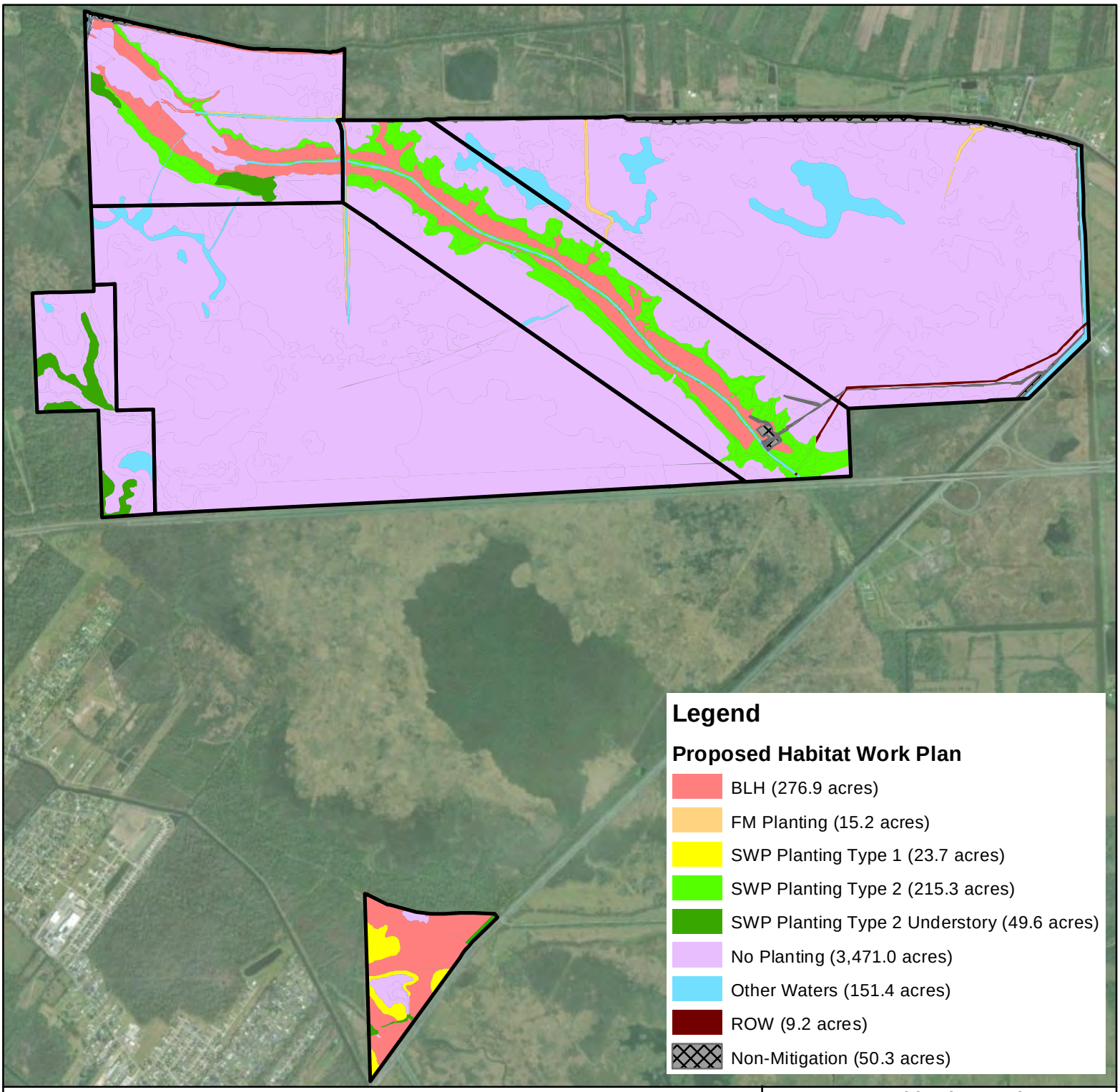
TBU Mitigation Bank

Raceland, LA

POST WORK PLAN
AREA HYDROLOGY
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 24c



Legend

Project Area (4,262.6 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

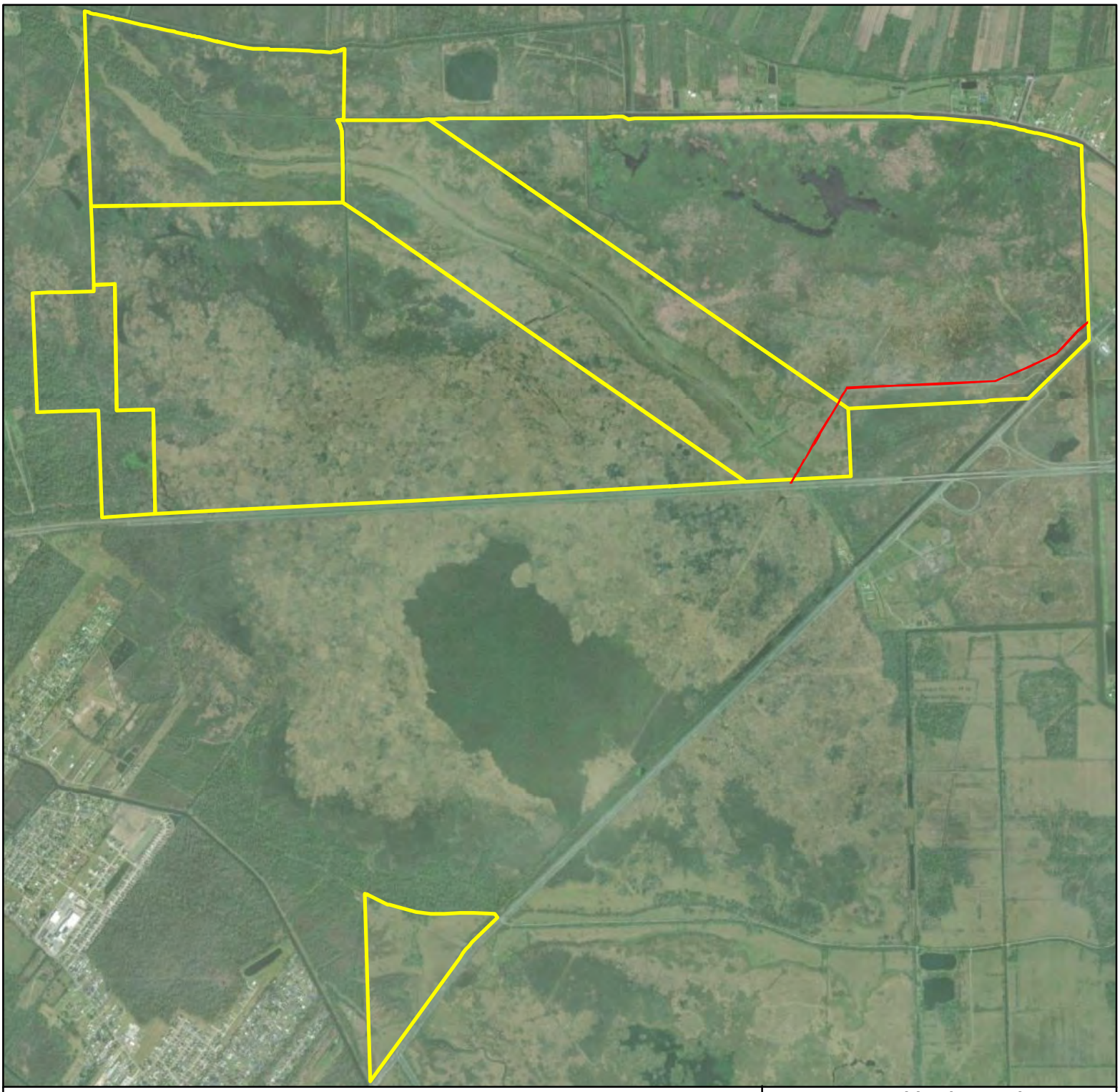
Raceland, LA

HABITAT WORK PLAN

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 25



Legend

Project Area (4,262.6 acres)

Existing 50ft Pipeline ROW

3,000 1,500 0 3,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

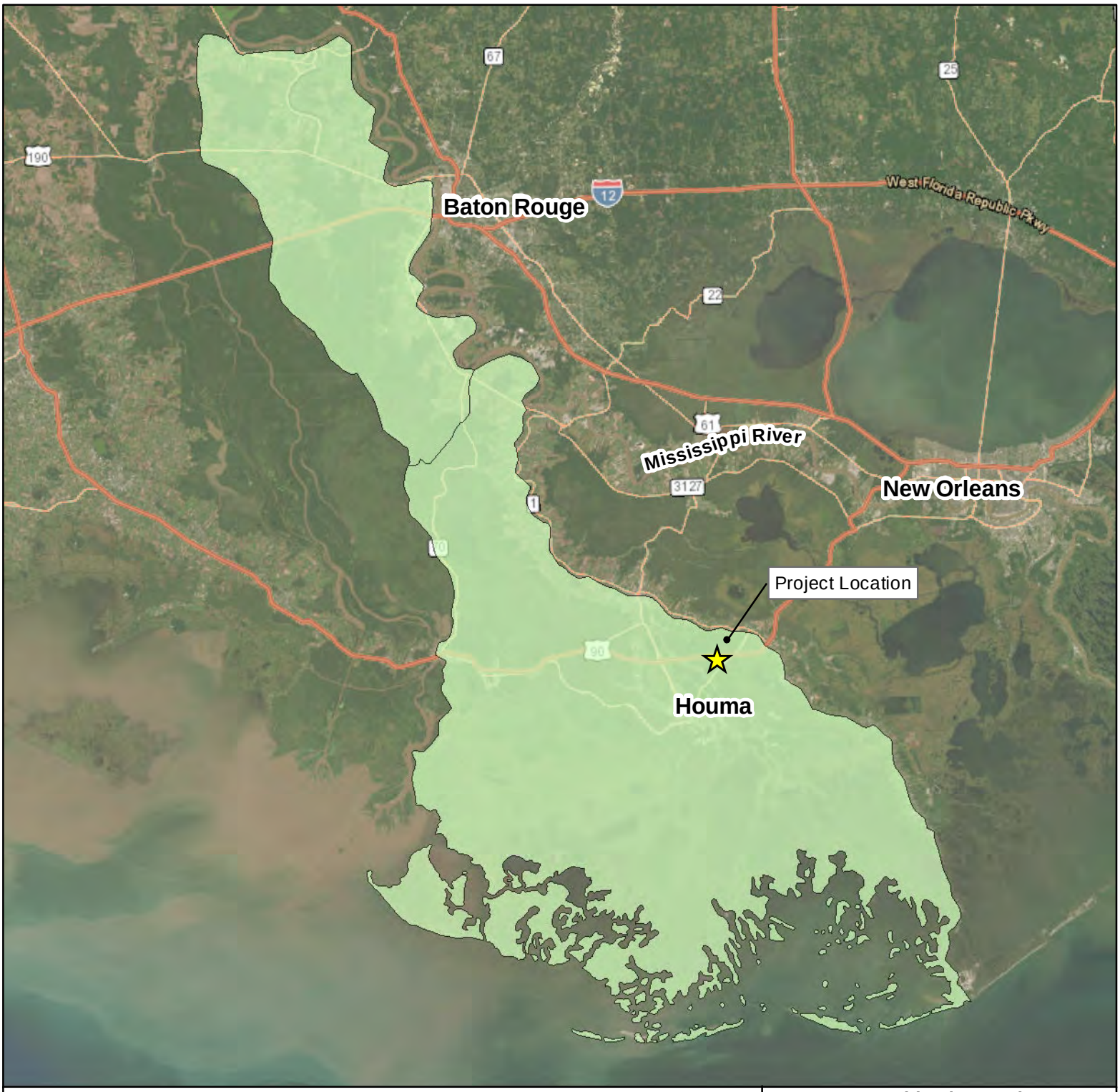
Raceland, LA

PIPELINE ROW MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 26



Legend

Terrebonne Basin

16.0 8.0 0 16.0 Miles

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

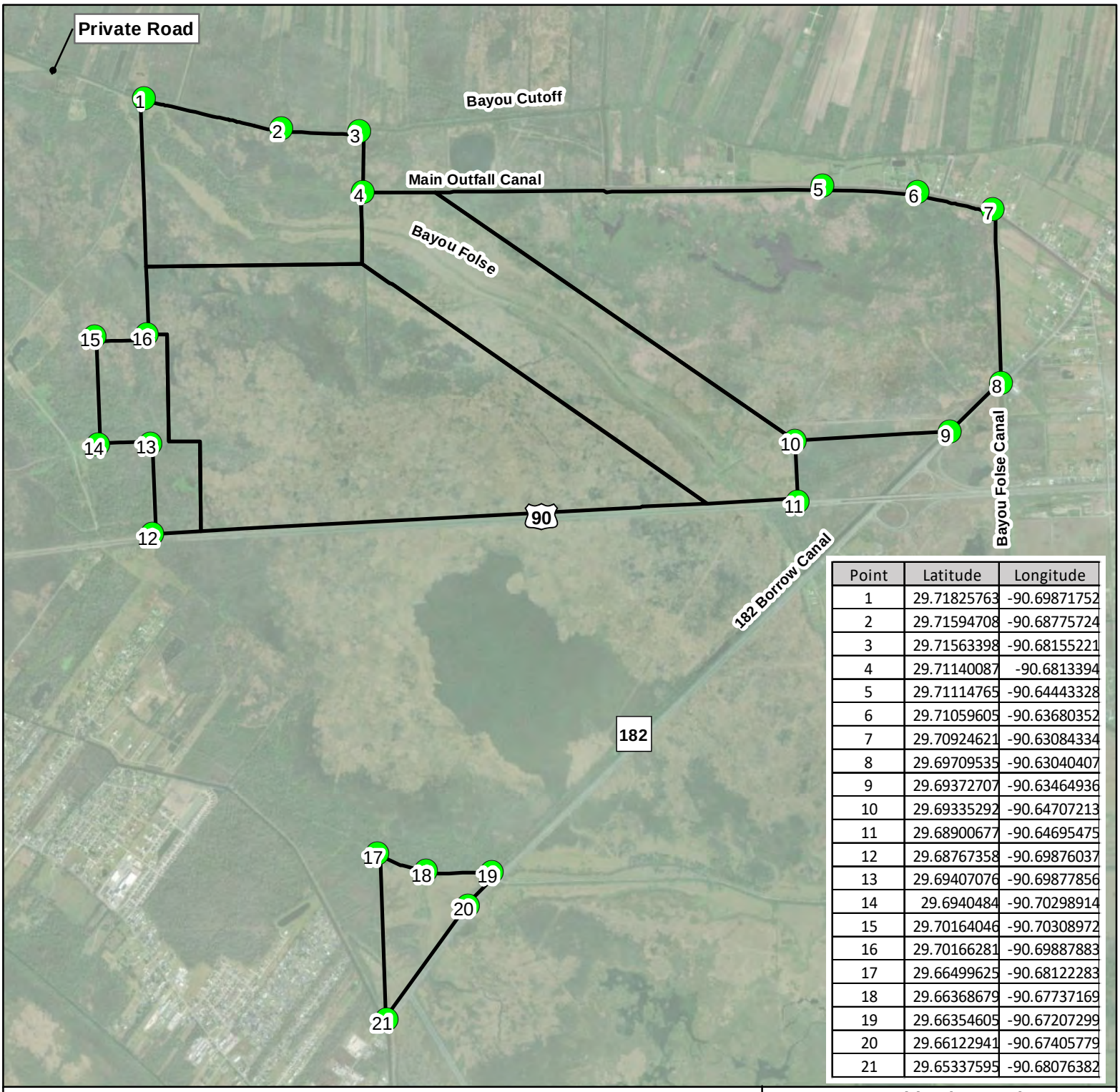
Raceland, LA

SERVICE AREA

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 27



Point	Latitude	Longitude
1	29.71825763	-90.69871752
2	29.71594708	-90.68775724
3	29.71563398	-90.68155221
4	29.71140087	-90.6813394
5	29.71114765	-90.64443328
6	29.71059605	-90.63680352
7	29.70924621	-90.63084334
8	29.69709535	-90.63040407
9	29.69372707	-90.63464936
10	29.69335292	-90.64707213
11	29.68900677	-90.64695475
12	29.68767358	-90.69876037
13	29.69407076	-90.69877856
14	29.6940484	-90.70298914
15	29.70164046	-90.70308972
16	29.70166281	-90.69887883
17	29.66499625	-90.68122283
18	29.66368679	-90.67737169
19	29.66354605	-90.67207299
20	29.66122941	-90.67405779
21	29.65337595	-90.68076382

Legend

Project Area (4,262.6 acres)

Corner Points

3,500 1,750 0 3,500 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

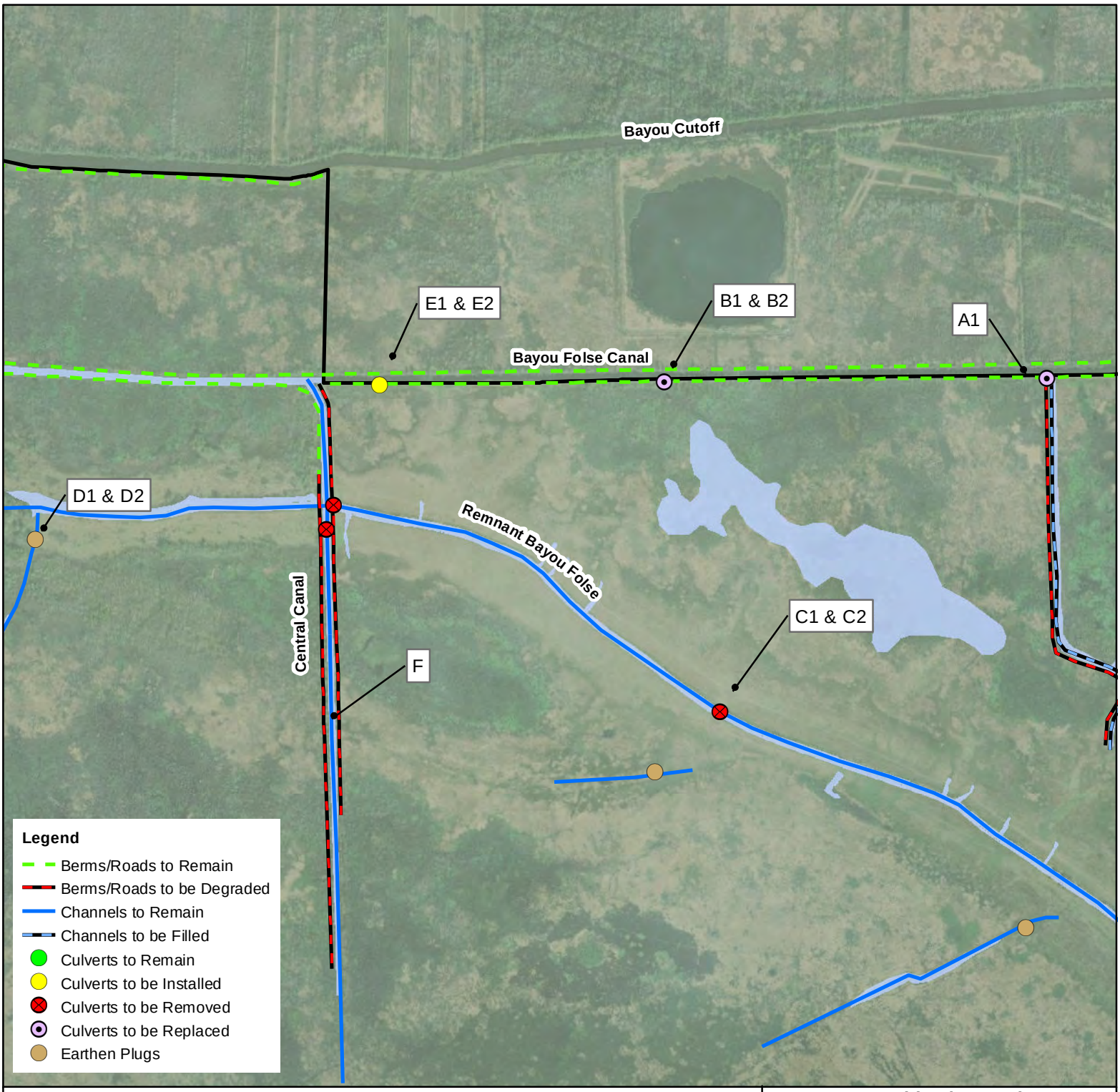
TBU Mitigation Bank

Raceland, LA

CONSERVATION SERVITUDE COORDINATES LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 28



Legend

Project Area (4,262.6 acres)

Other Waters (162.9 acres)

1,000 500 0 1,000 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

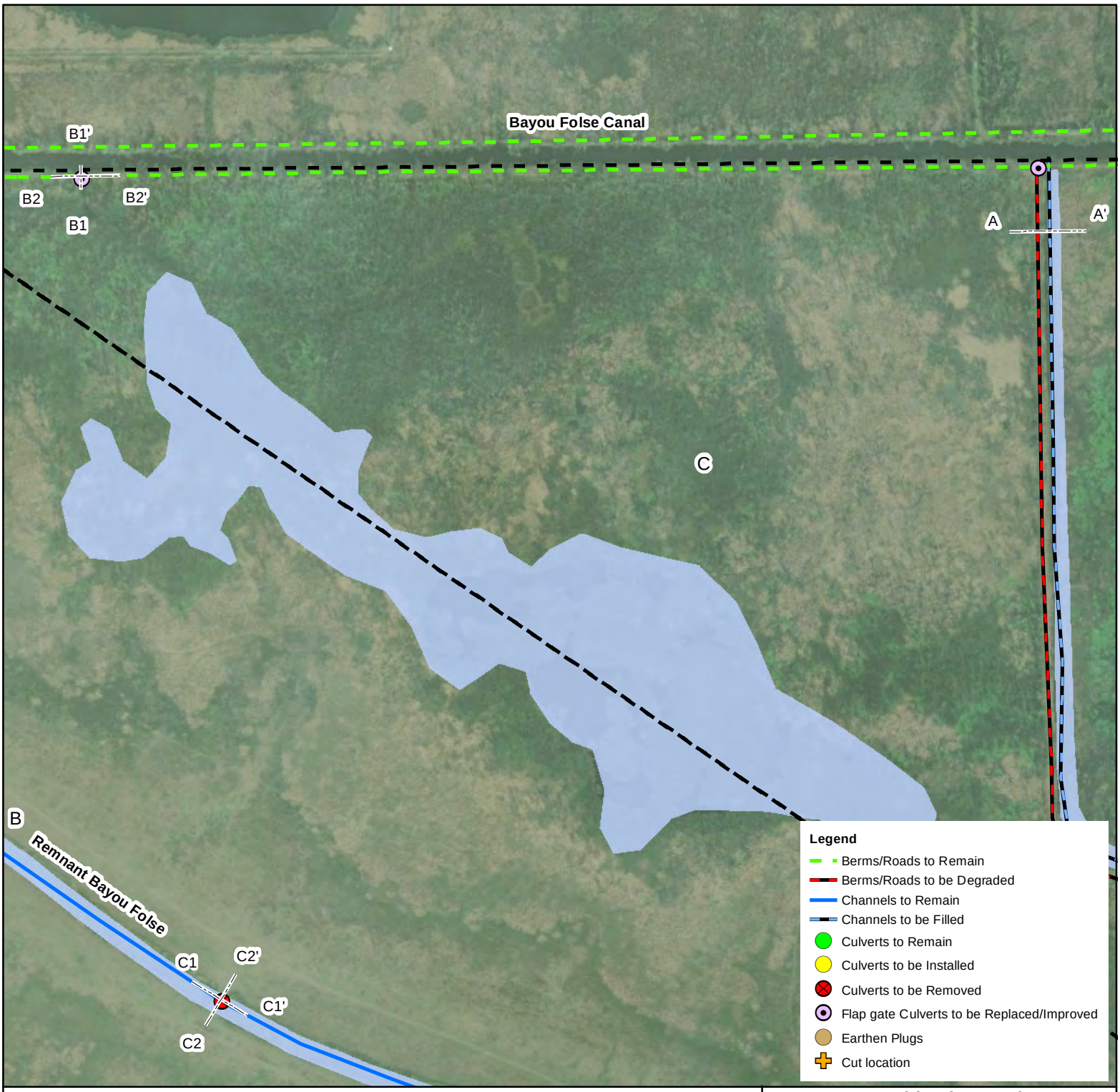
Raceland, LA

CROSS SECTION LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 29a



Legend

- Project Area (4,262.6 acres)
- Other Waters (162.9 acres)
- Cross sections

400 200 0 400 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

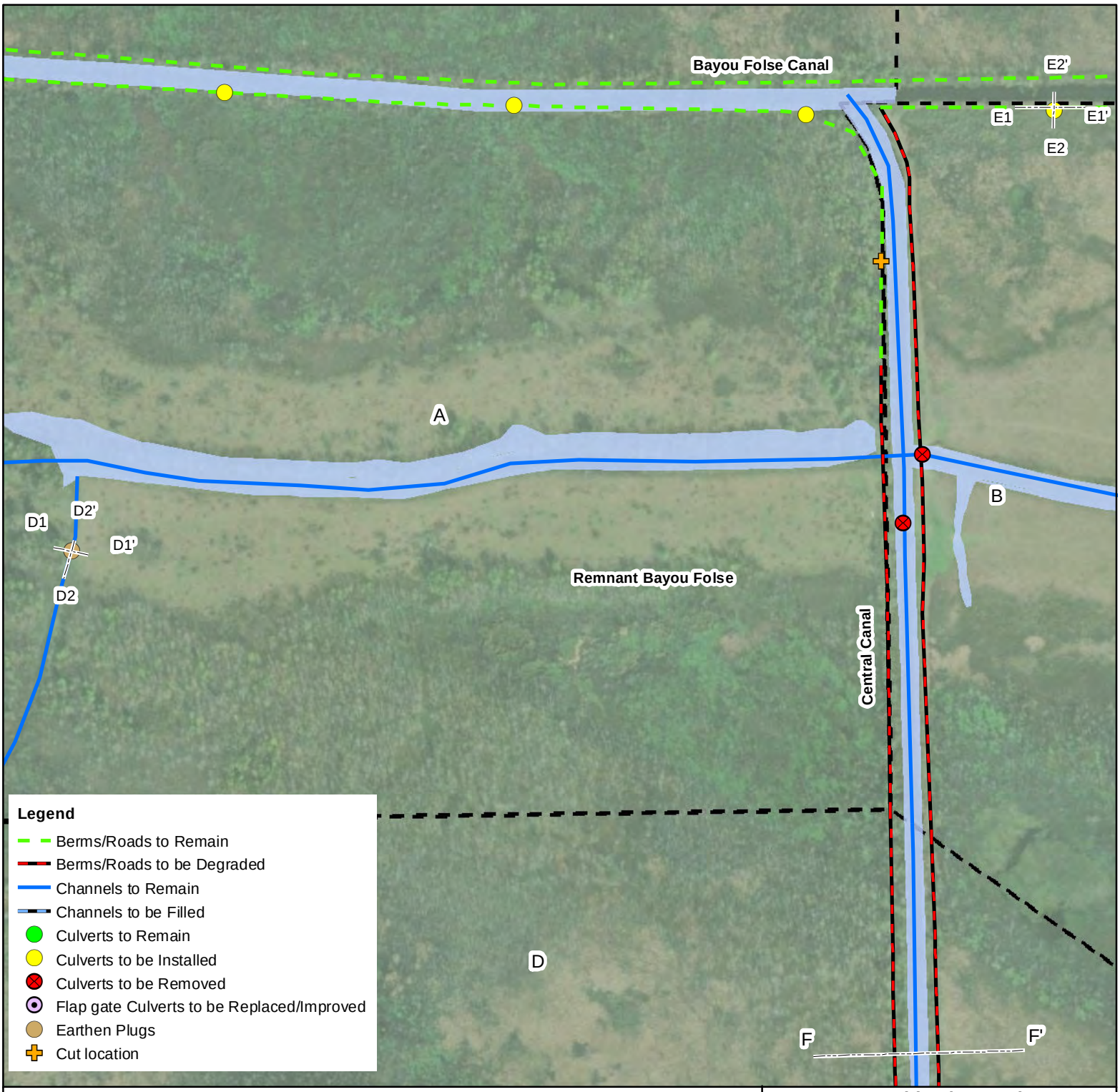
Raceland, LA

CROSS SECTION LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 29b



Legend

- Project Area (4,262.6 acres)
- Other Waters (162.9 acres)
- Cross sections

350 175 0 175 Feet

NRP

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank

TBU Mitigation Bank

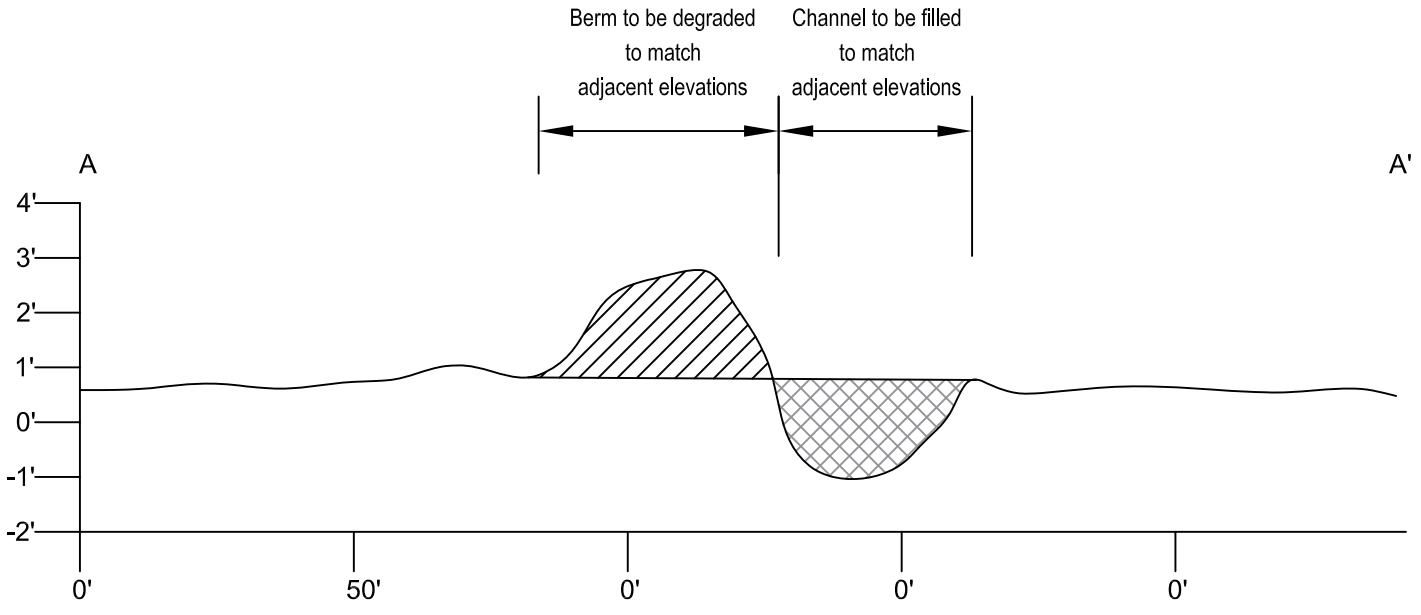
Raceland, LA

CROSS SECTION LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	11/15/2023
Map No. :	

FIGURE 29c



Section A - A': Typical channel to be filled
10:1 Vertical Exaggeration

Fill

Excavation

N

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

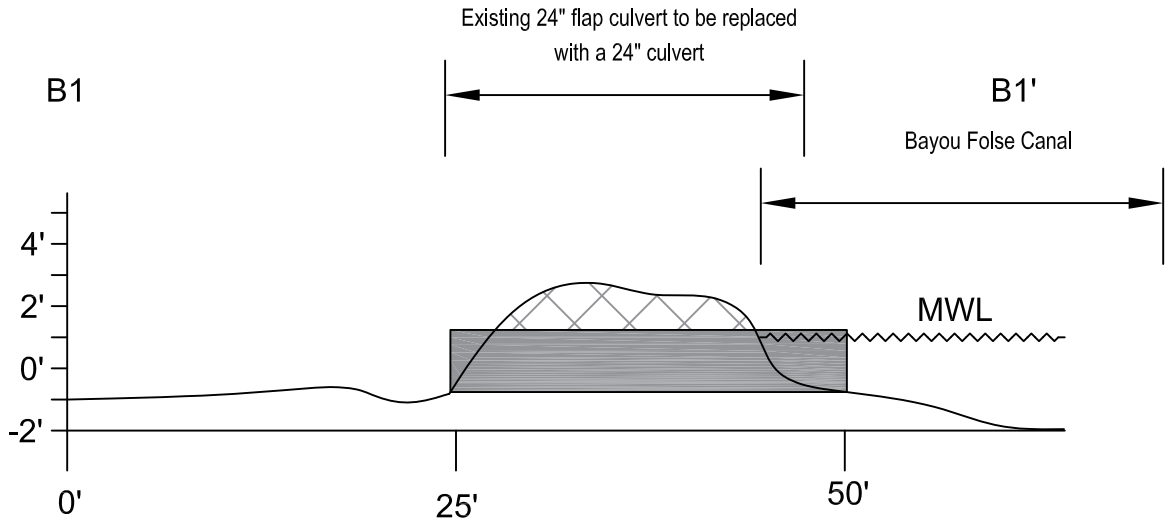
Raceland, LA

CROSS SECTION A

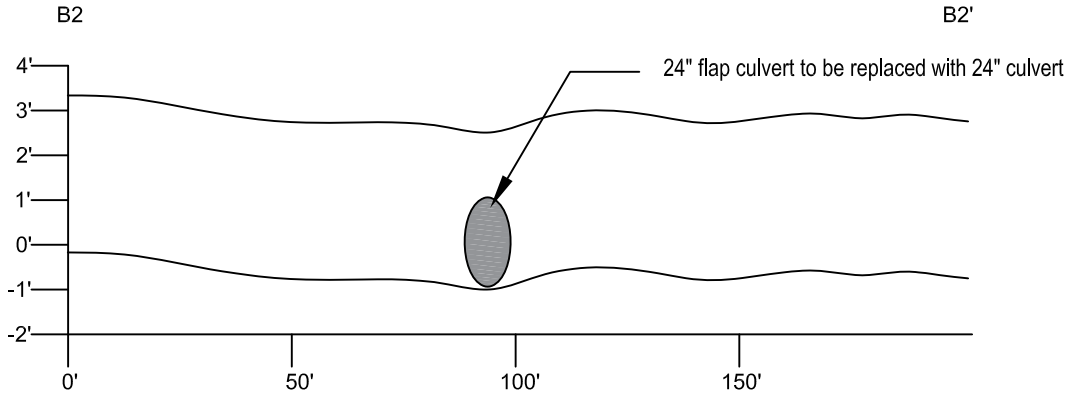
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 30



Section B1-B1': Typical culvert to be replaced
2:1 Vertical Exaggeration



Section B2-B2': Typical culvert to be replaced
10:1 Vertical Exaggeration

Fill

Excavation

N

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

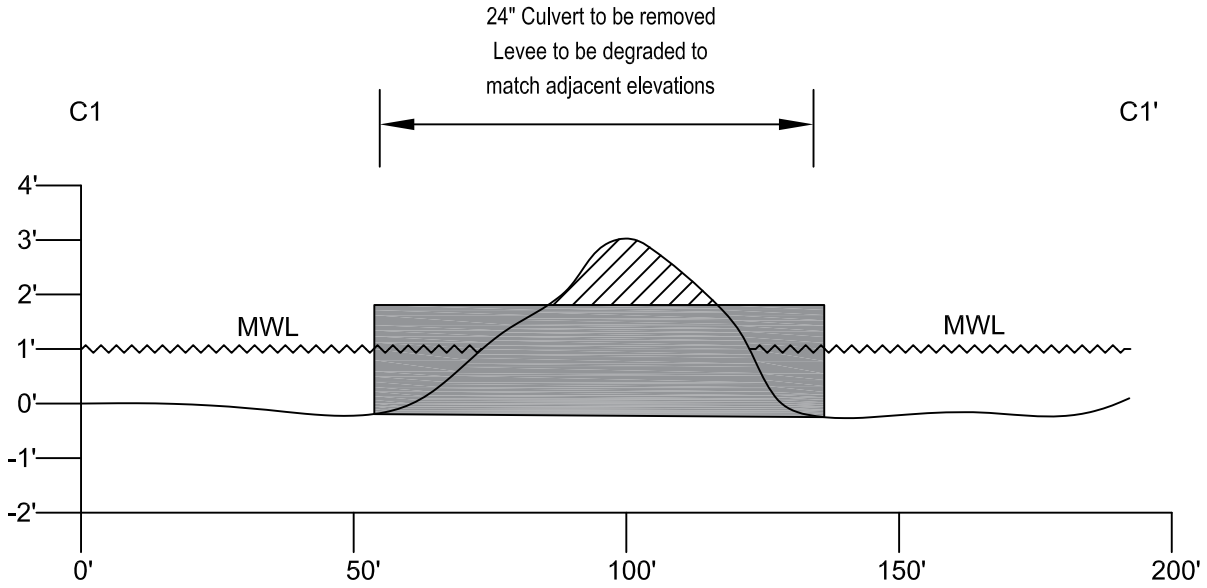
Raceland, LA

CROSS SECTION B1 & B2

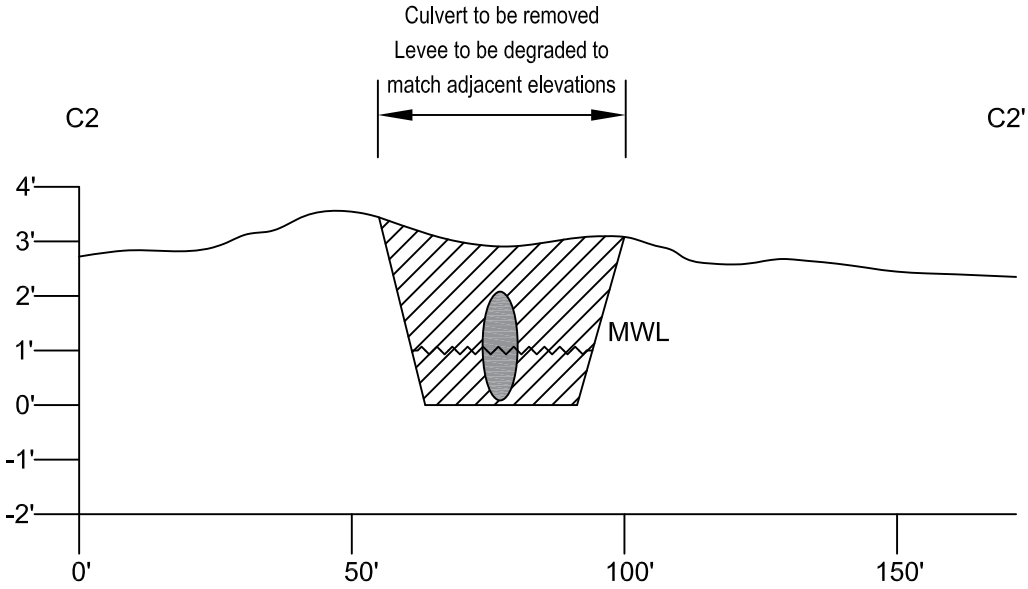
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 31



Section C1-C1': Typical culvert to be removed
10:1 Vertical Exaggeration



Section C2-C2': Typical culvert to be removed
10:1 Vertical Exaggeration

Fill

Excavation

N

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

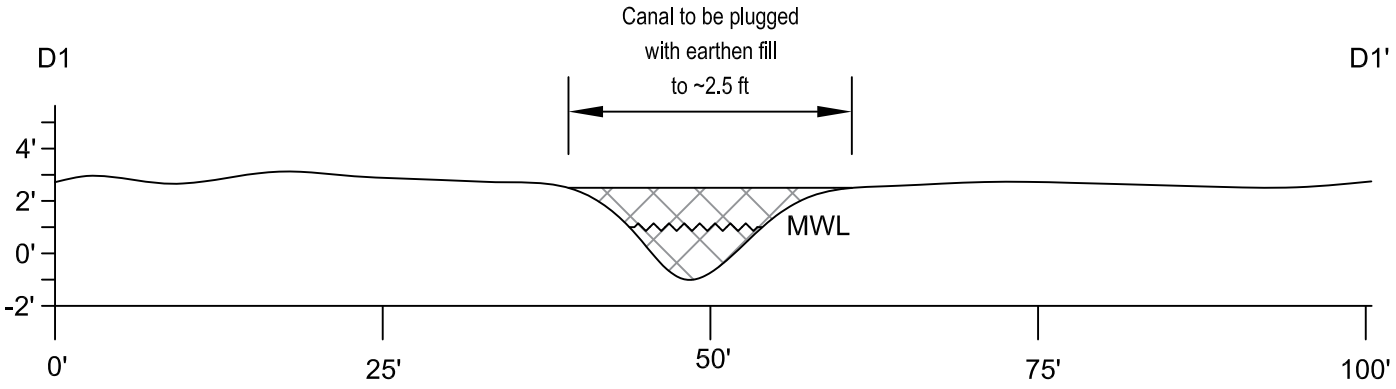
Raceland, LA

CROSS SECTION C1 & C2

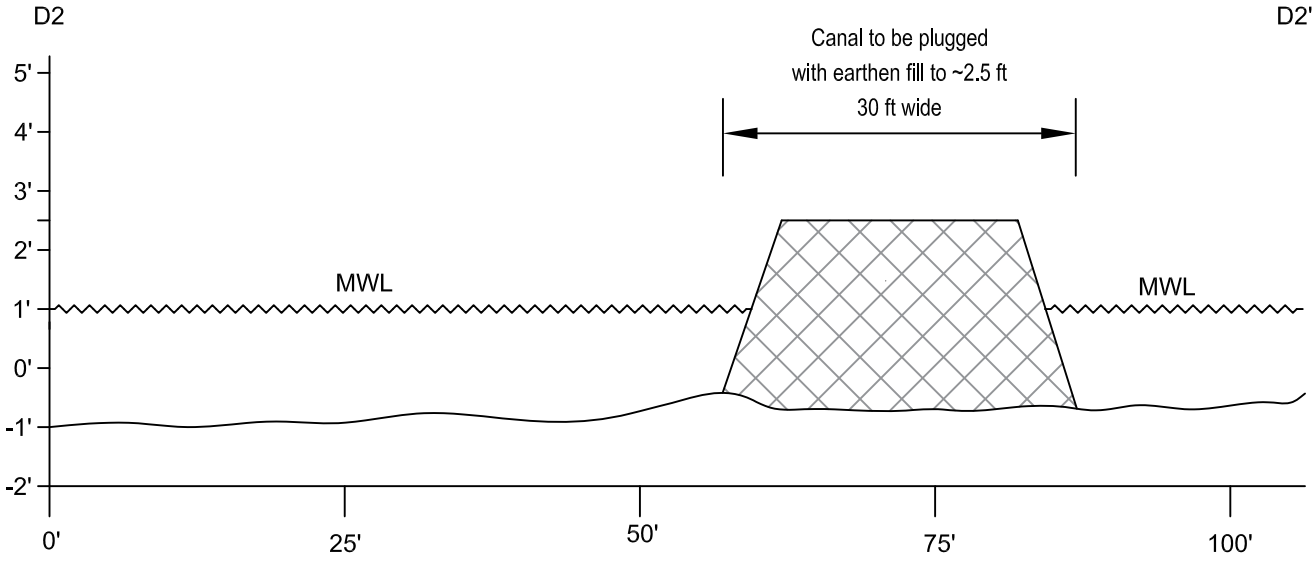
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 32



Section D1 - D1': Typical earthen plug
2:1 Vertical Exaggeration



Section D2 - D2': Typical earthen plug
5:1 Vertical Exaggeration

Fill

Excavation

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

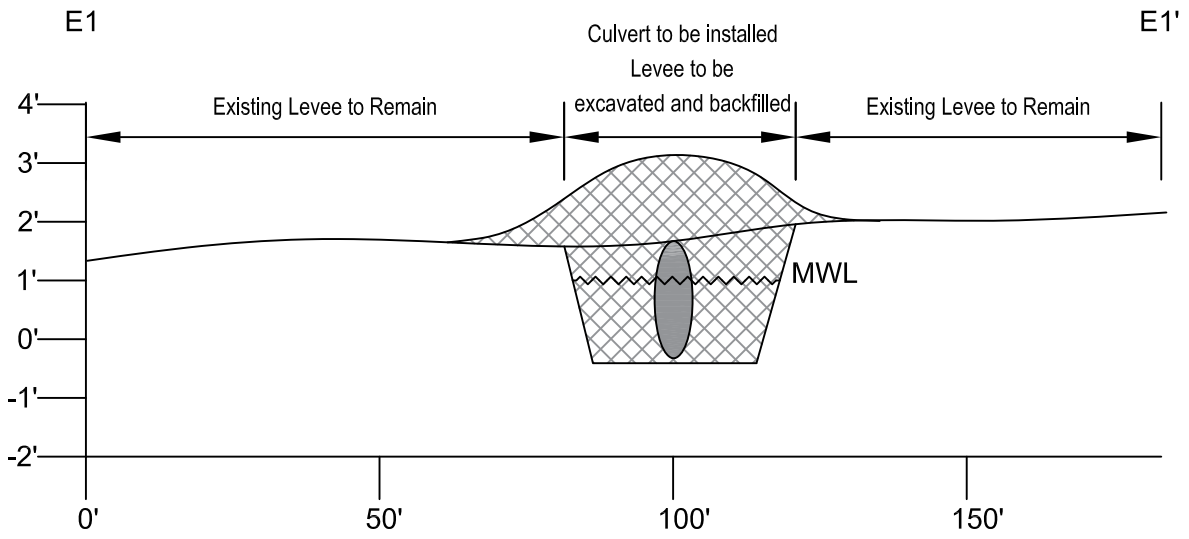
Raceland, LA

CROSS SECTION D1 & D2

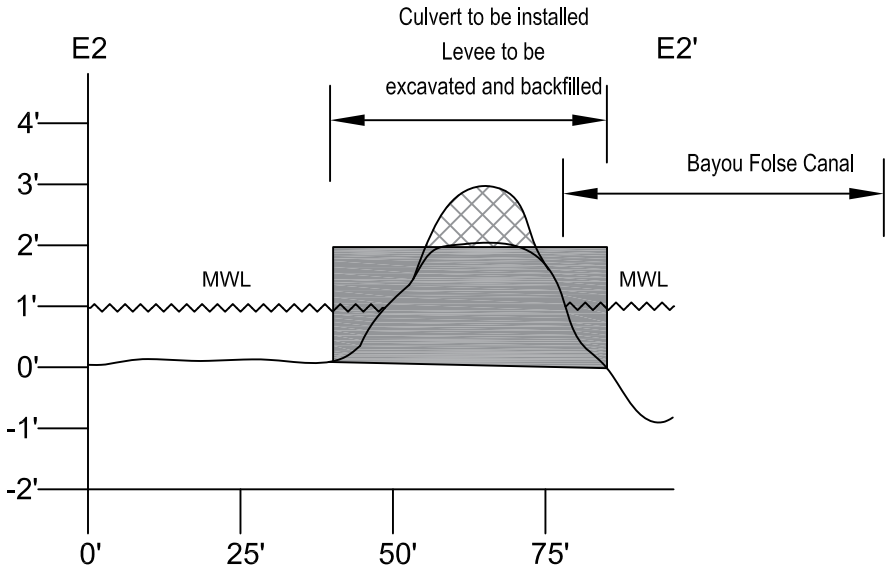
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 33



Section E1 - E1': Typical culvert to be installed
2:1 Vertical Exaggeration



Section E2 - E2': Typical culvert to be installed
10:1 Vertical Exaggeration

Fill

Excavation

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

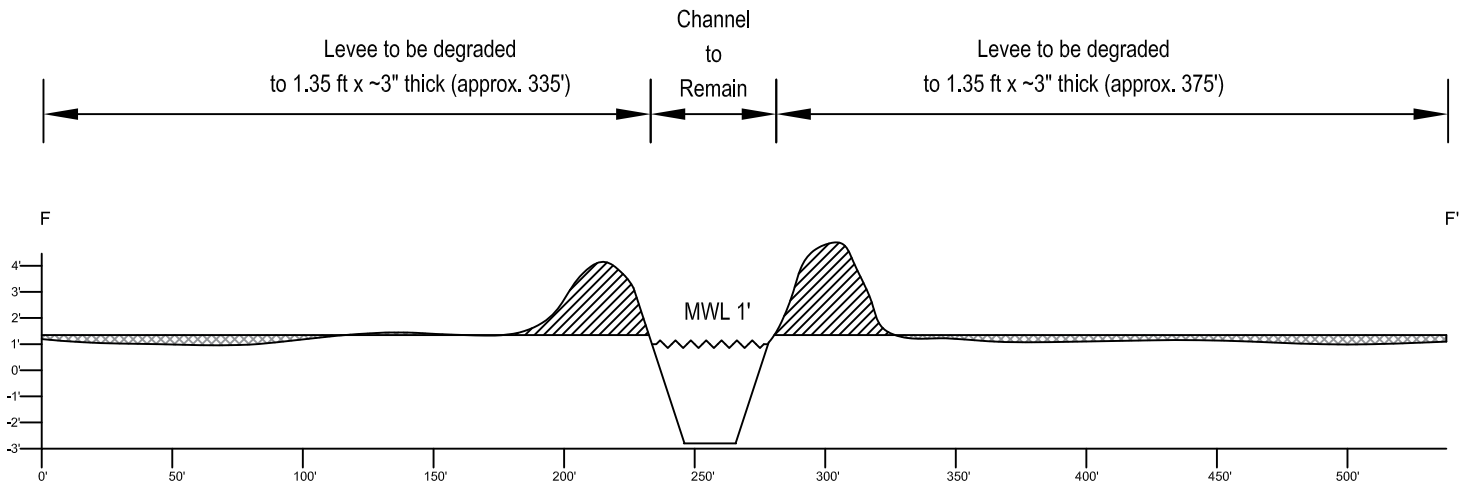
Raceland, LA

CROSS SECTION E1 & E2

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 34



Section F-F': Typical levee to be removed/channel to remain
10:1 Vertical Exaggeration

Fill

Excavation

Map Notes:

1. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
2. Mean water level of Bayou Folse was calculated using water level data obtained from Aug to Dec 2022.

TBU Mitigation Bank

Raceland, LA

CROSS SECTION F

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	11/27/2023
Map No.:	

FIGURE 35

Appendix A – Hydrology Data

Groundwater and Surface Water Wells

Appendix A: Hydrologic Monitoring

A total of 16 monitoring stations equipped with Onset HOBO U20L-04 data loggers were installed in the Bank in the summer of 2022. The 13 surface water gages were installed on June 7-8, 2022 and the 3 ground water wells were installed on July 6, 2022. The HOBO loggers have a useable range between 0 and 13 ft deep and typical water level accuracy of 0.3 ft, with a maximum error of 0.6 ft. The raw absolute pressure data recorded by the HOBO loggers is converted to water depth above the sensor by referencing a dedicated logger (groundwater well #14 deployed above the water level which measures barometric pressure.

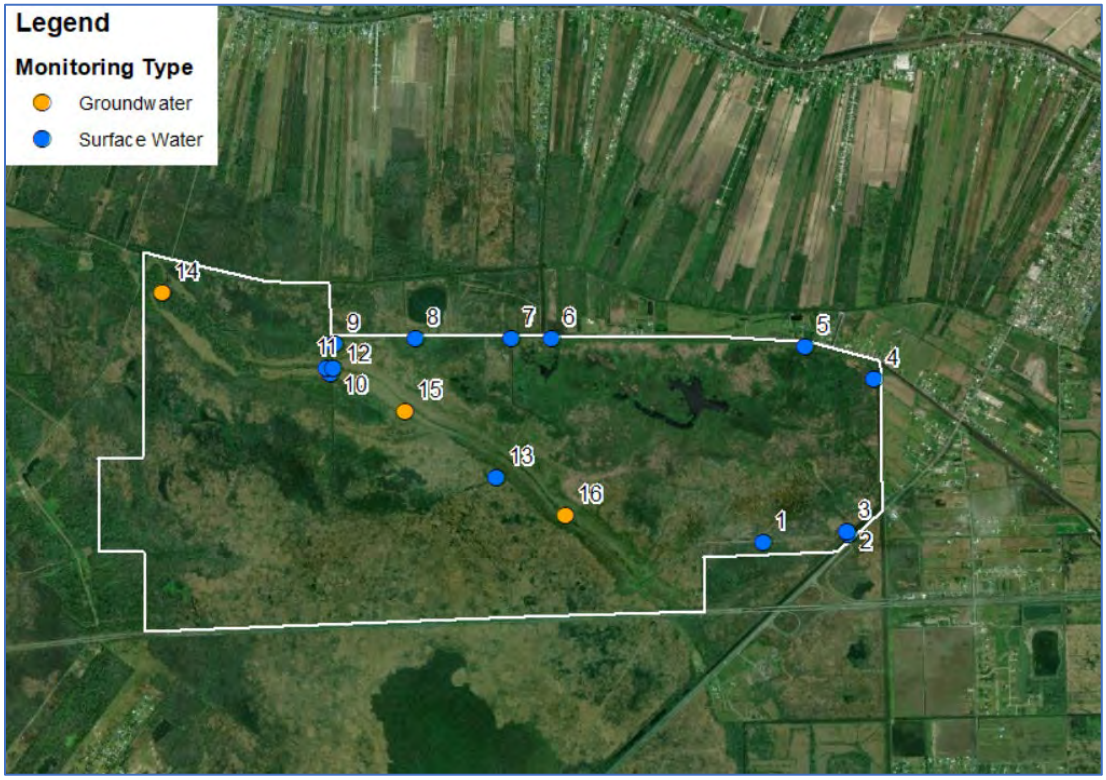


Figure 1: Locations of all hydrology monitoring stations

Figure 2: Location of surface water gages 1-3

Figure 3: Location of surface water gages 4-8

Figure 4: Location of surface water gages 9-12

The groundwater wells were installed and are maintained according to the guidelines provided by the Wetlands Regulatory Assistance Program Installing Monitoring Wells/Piezometers in Wetlands (USACE 2000) handbook. The materials for the wells consisted of 2'' x 2.5' risers and 2'' x 2.5' screen PVC with 010'' slots ("10-slot screen"). Sand that passes a 20-mesh screen and is retained by a 40-mesh screen ("20-40 sand") was used as filter material. Bentonite clay was used to form a tight seal around the riser to prevent water from running down the outside of the pipe into the well screen, ensuring only ground water enters the slotted well screen. Above the bentonite seal, additional bentonite was mixed with natural soil material and shaped to slope away from the riser so that surface water will run away from the pipe rather than pond around it. The 3 groundwater wells are located along the remnant Bayou Folse ridge, the highest elevation on the site, with one located in each major soil type. The three wells are armored with a metal fence supported by t-posts to protect from cattle and other animals and flagged to prevent disturbance from brush hogging.

The surface water gages were housed within PVC risers affixed to t-posts. Of the surface water gages, 7 were installed near culverts. These provide a secure, fixed location for monitoring surface water levels within the project area. These wells provide necessary data regarding the efficiency of the current drainage system and will demonstrate the changes once hydrology improvements have been made. The remaining 6 surface water wells are located in main drainage ditches, ponded areas, swales, and the Bayou Folse Canal. The Bayou Folse Canal station (Gage 6) acts as a reference to the internal water levels and will provide evidence of backwater flooding.

At all monitoring locations, the elevation of the riser cap was surveyed with a Trimble Catalyst DA2 antenna, adjusted through the sub centimeter Trimble RTX Corrections Hub, and logged on a Trimble TDC600 handheld data collector. Water surface elevation relative to NAVD88 was calculated by subtracting the length of the cable which suspends the data logger from the well cap, and subsequently adding the raw water level recorded above the data logger. For the groundwater wells, the ground surface adjacent to the well riser was also surveyed in order to calculate the water level relative to the soil surface and therefore determine the presence or absence of wetland hydrology. Calculated water surface elevations for the wells and gages are available between June 2022 and July 2023. Average water levels measured thus far indicate the effect of impoundment and drainage design on average water levels throughout the Bank (Figure 5), particularly at Gage 8, and on correlation with the Bayou Folse Canal (Figure 6), particularly at Gages 1, 3, 9, and 11-13. The low correlations at these stations indicate a lack of hydraulic connectivity to the Bayou Folse Canal. The high correlation but substantially higher average water level at Gage 8 indicates that hydraulic connectivity is present and likely subject to tailwater effects, possibly due to the invert, sizing, or condition of the adjacent culvert.

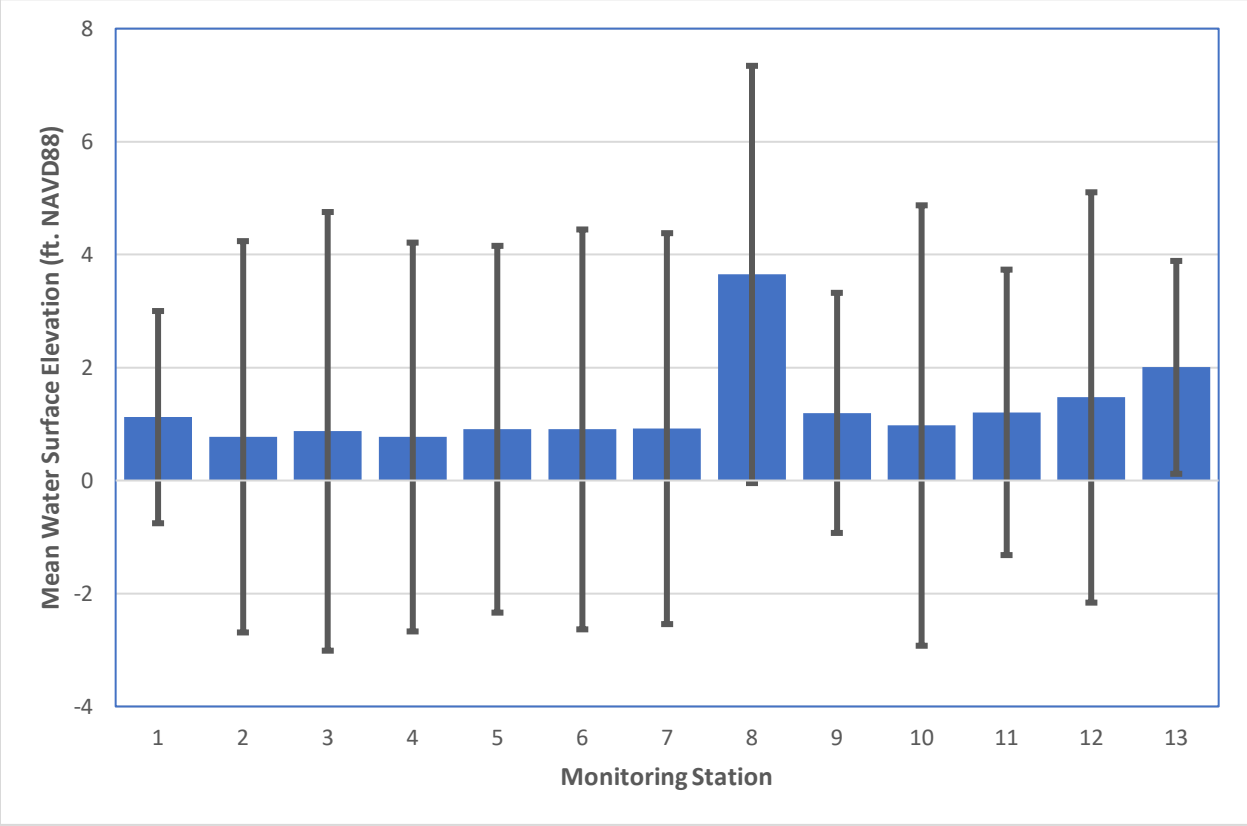


Figure 5: Mean surface water elevations at all gages. Error bars indicate one standard deviation.

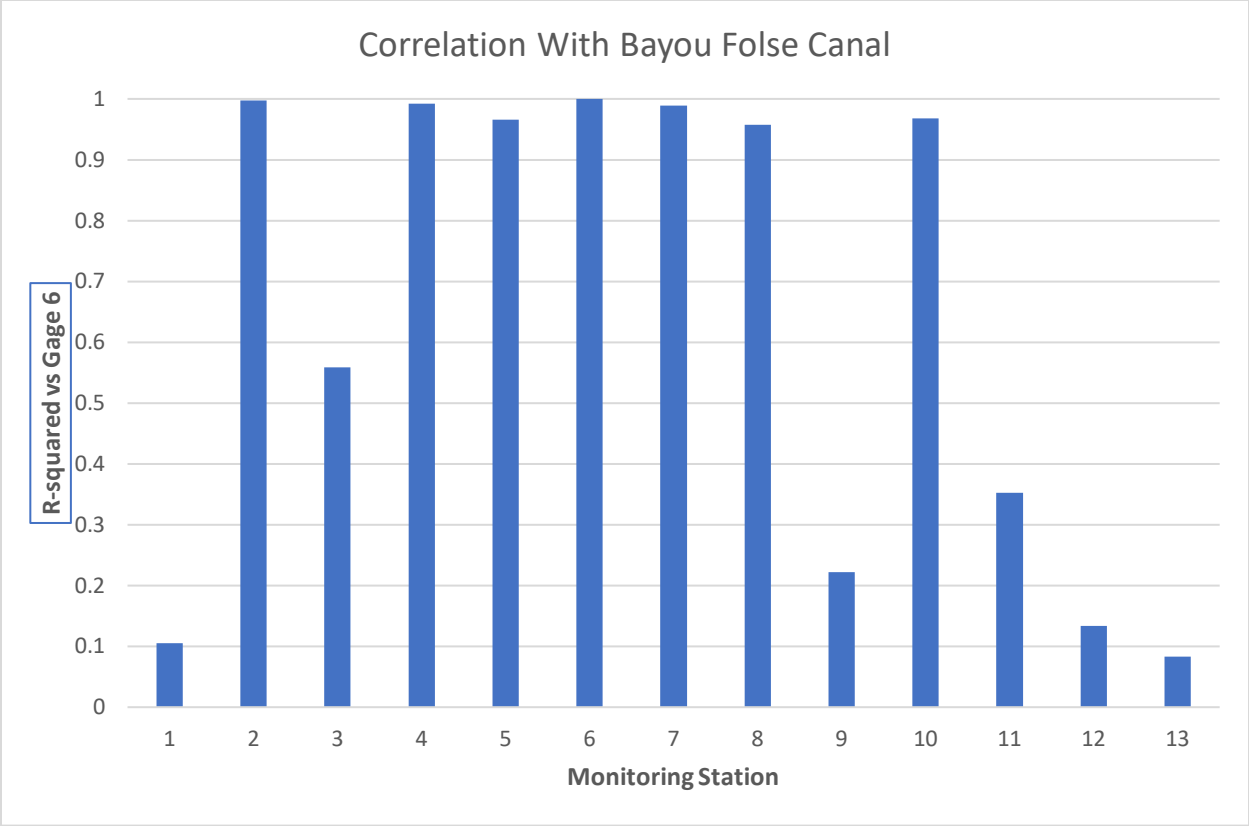
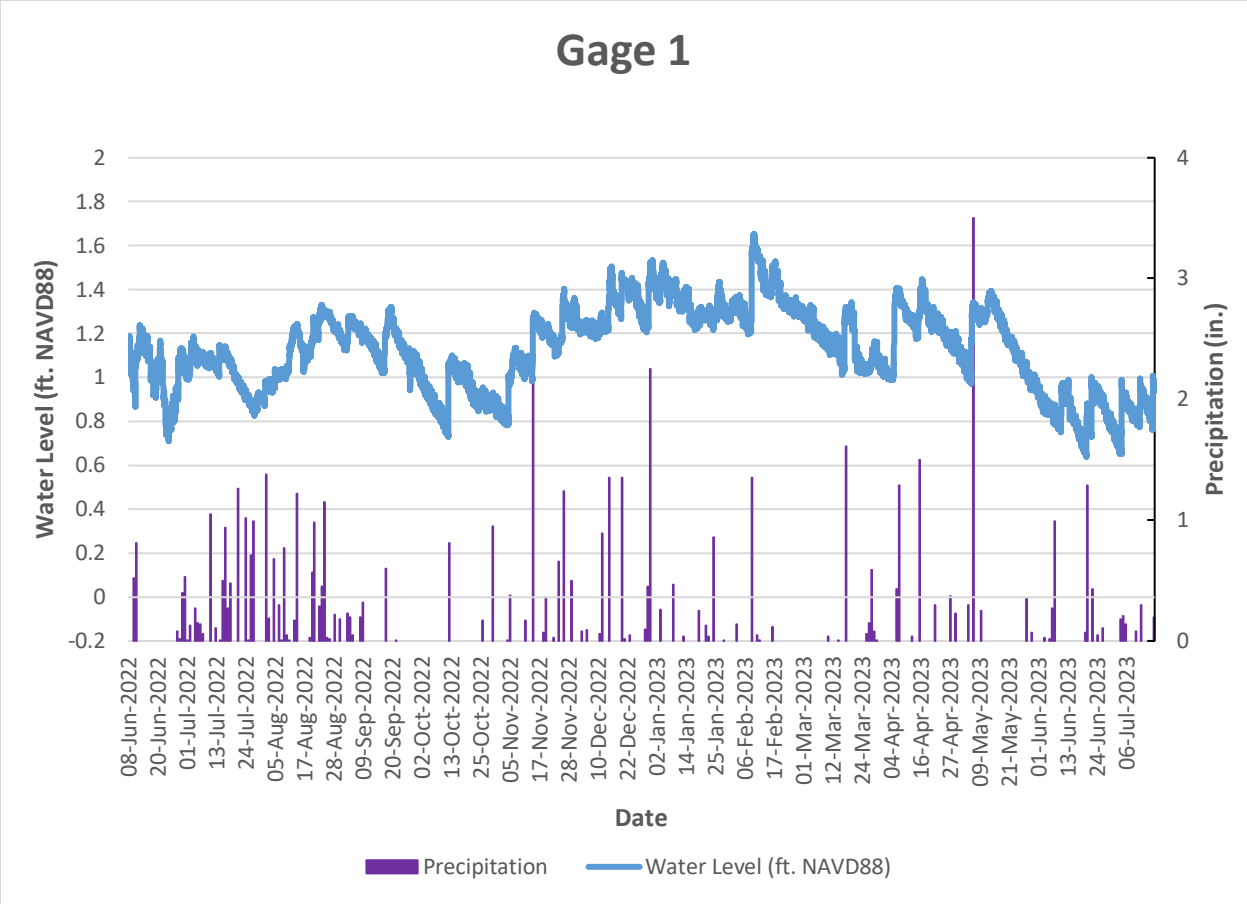
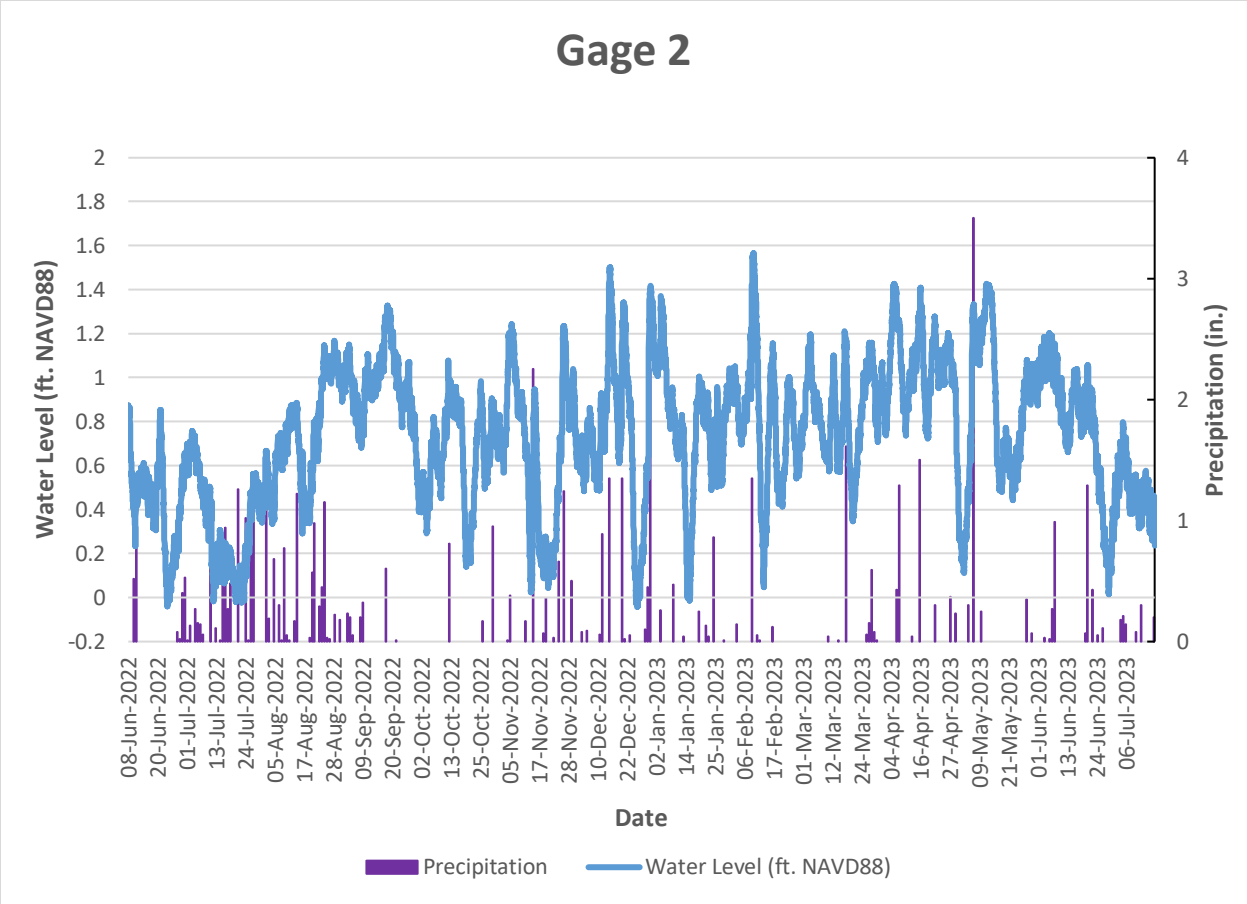
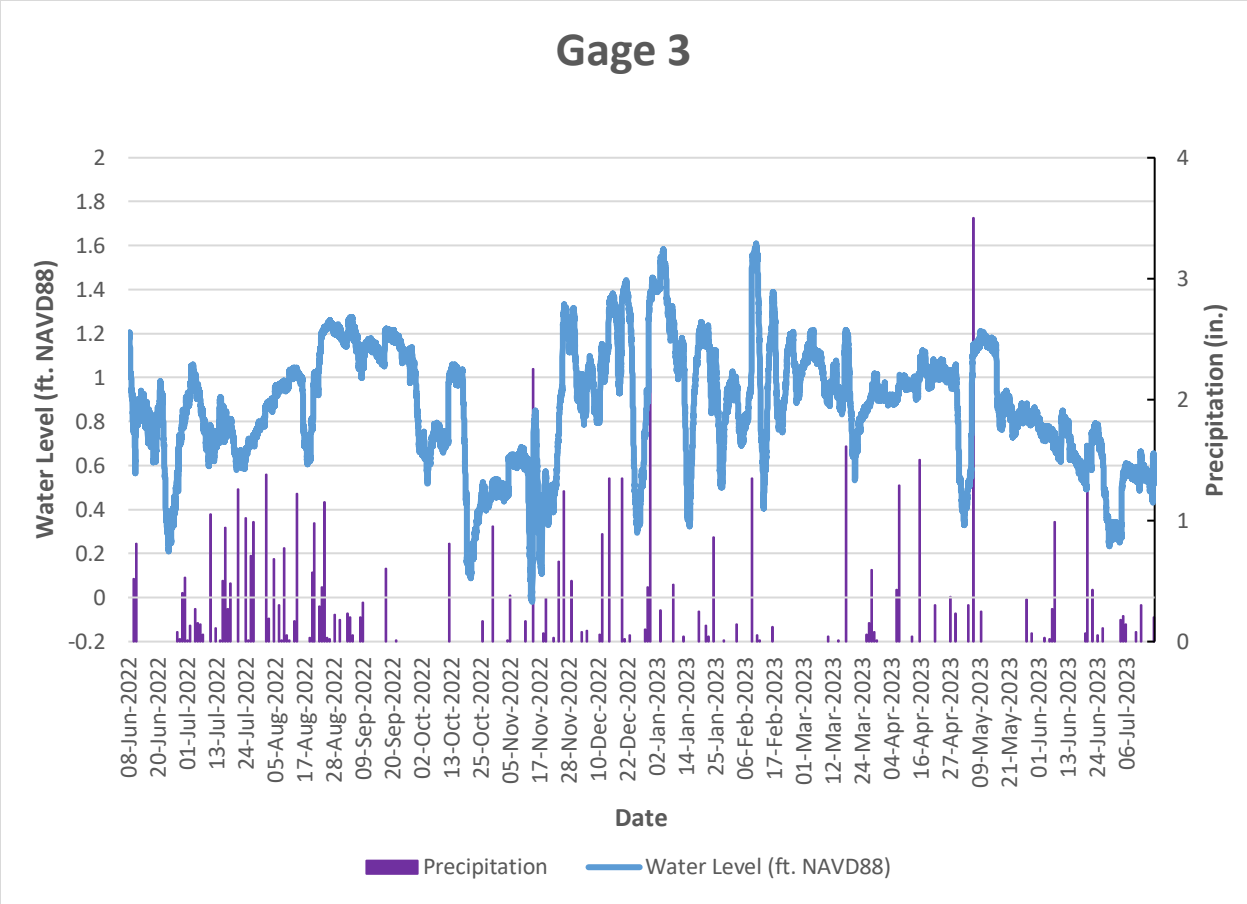


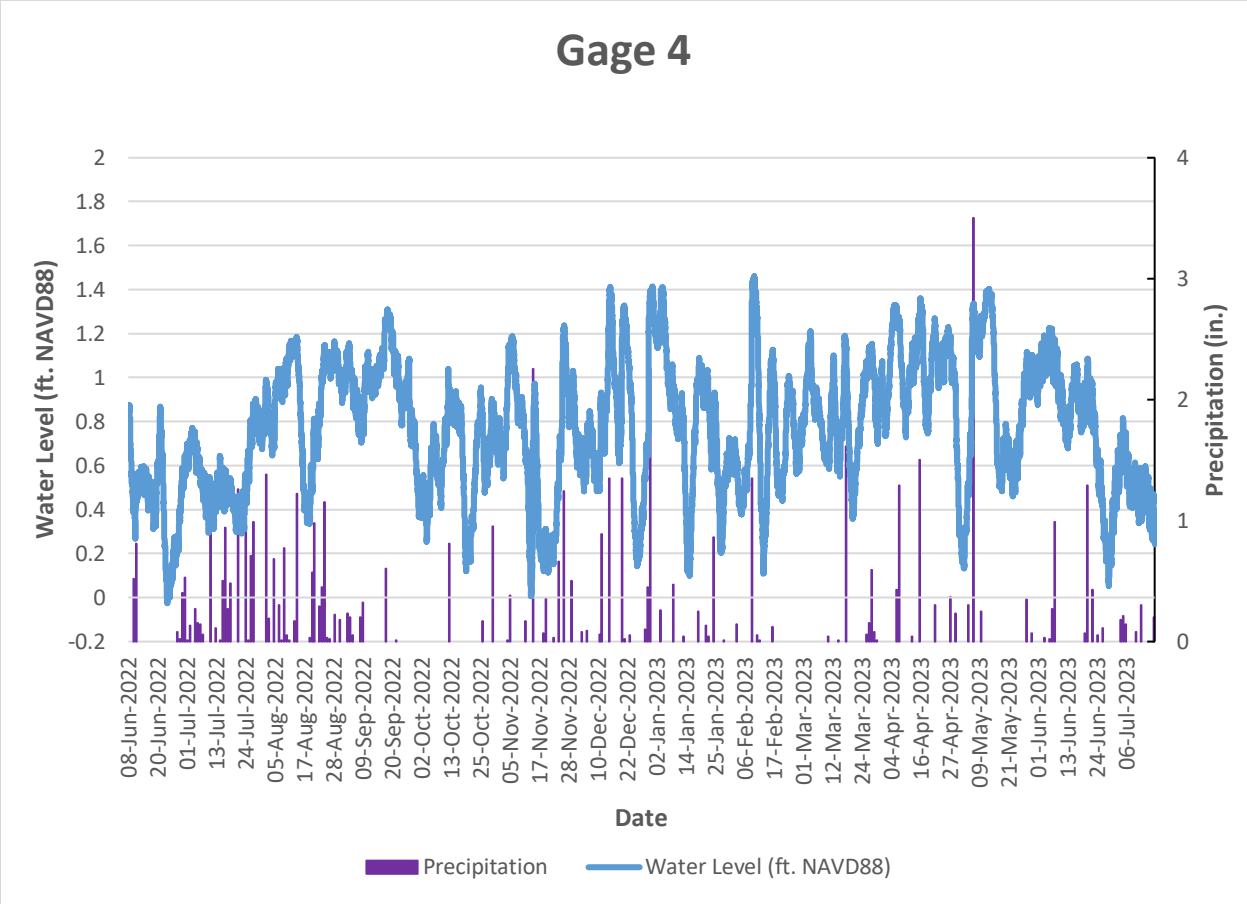
Figure 6: R-squared value of each monitoring station's timeseries as compared to Gage 6 in the Bayou Folse Canal outside the perimeter levees

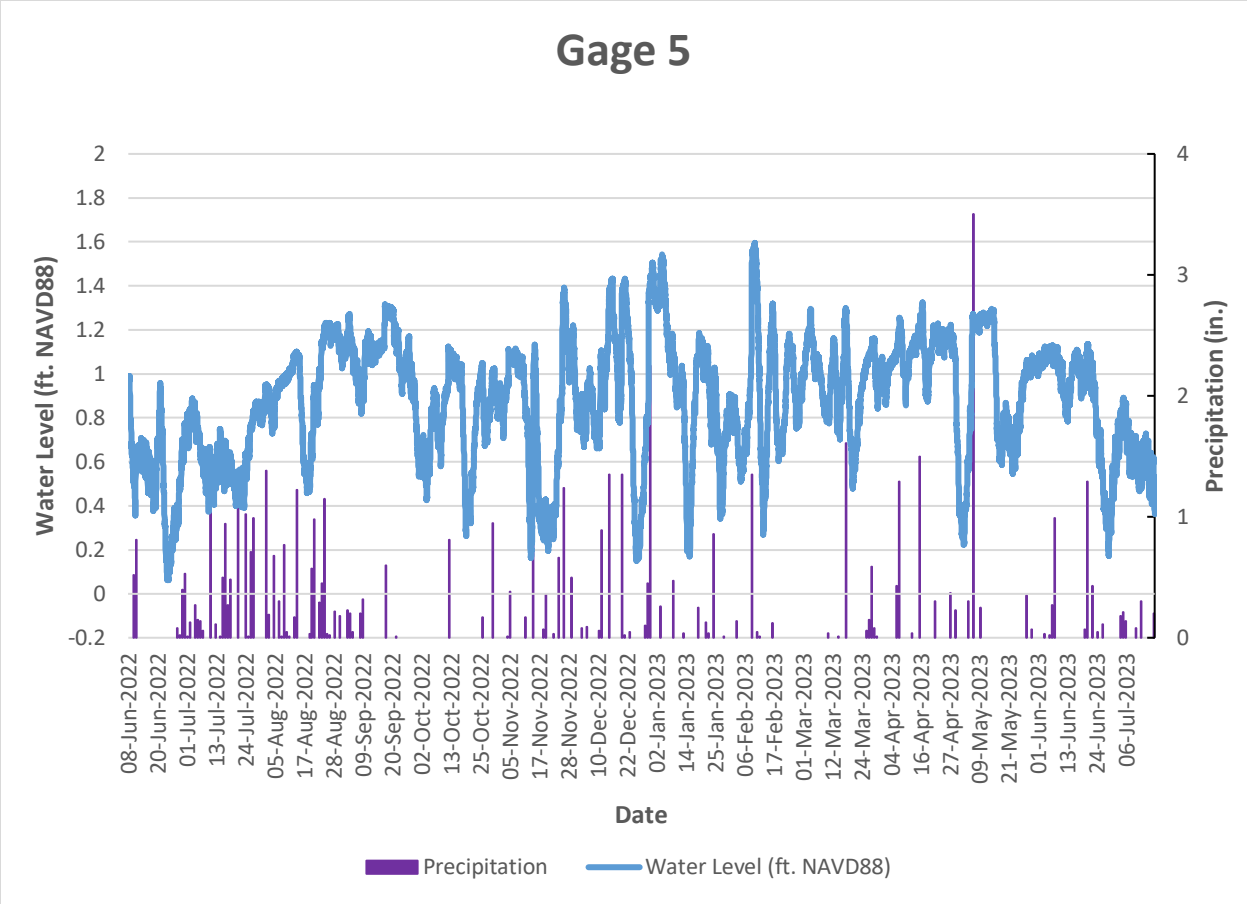
The current hydrographs from all monitoring locations are presented below.

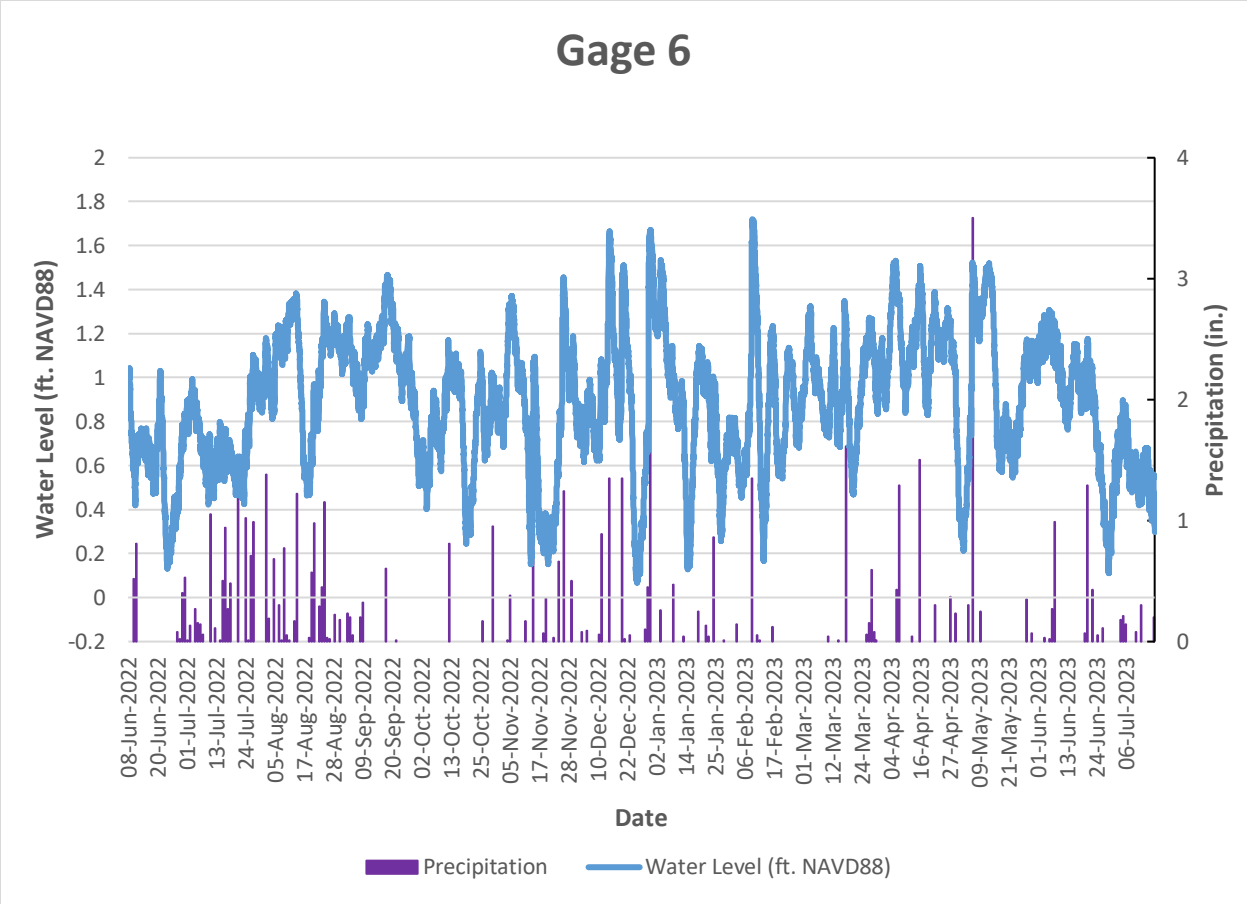

Gage 1
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

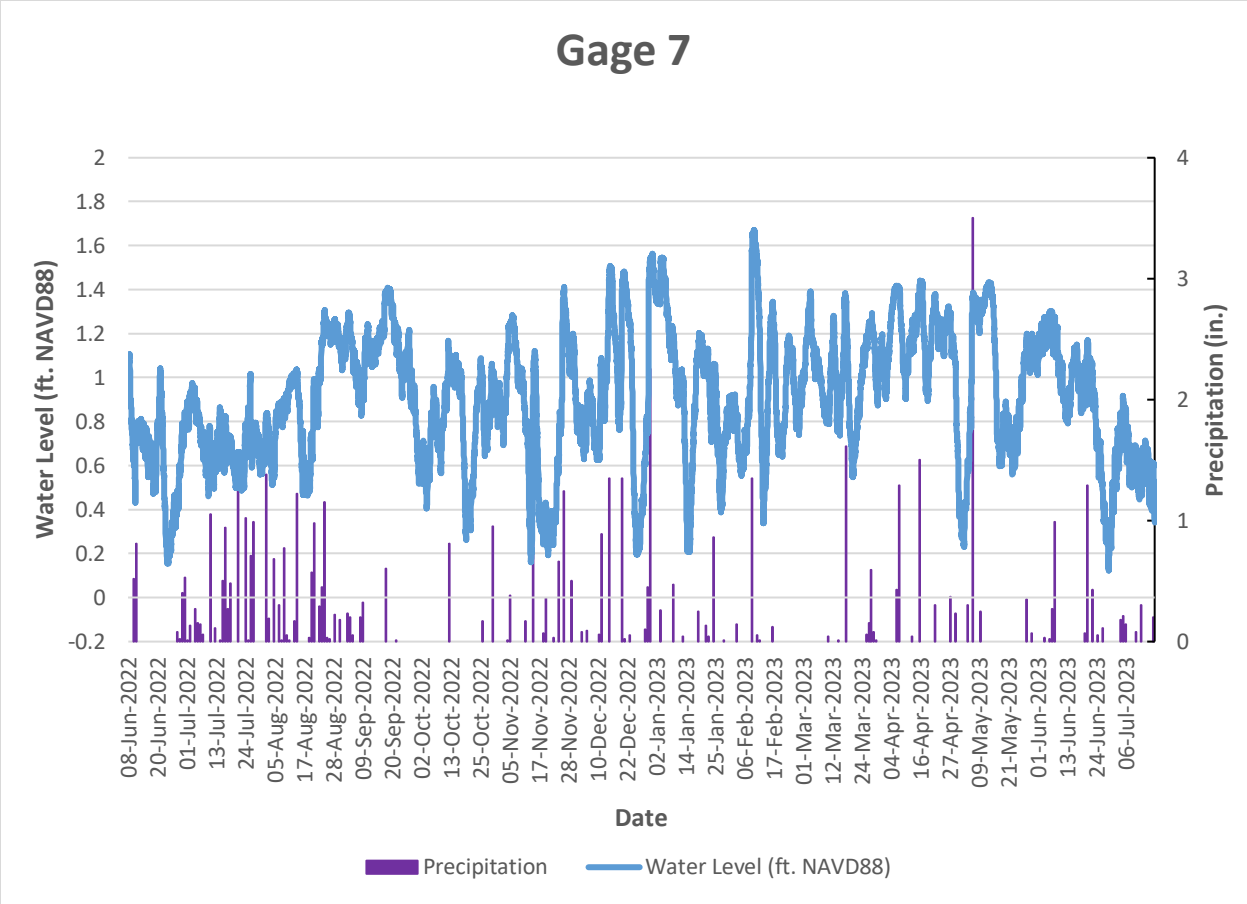

Gage 2
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

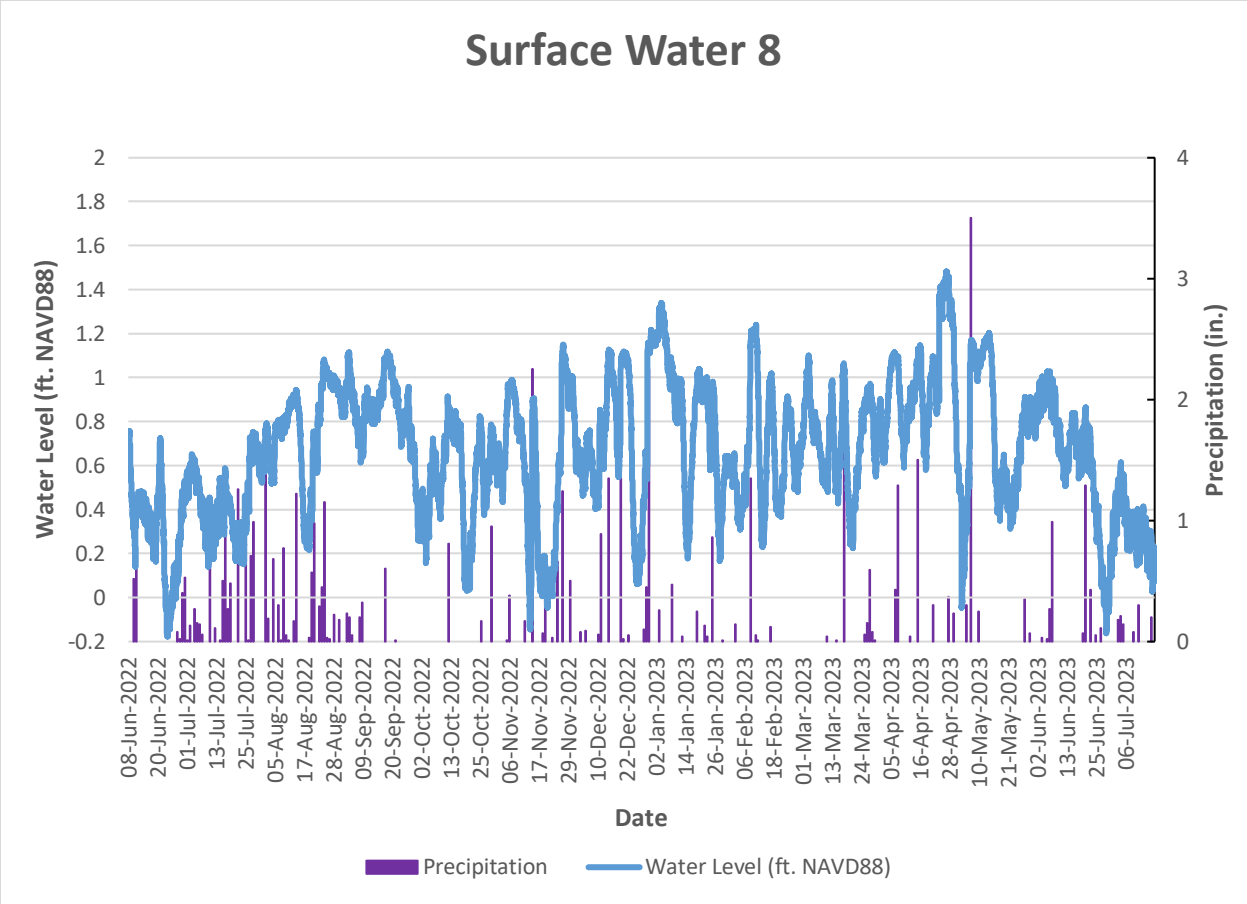

Gage 3
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

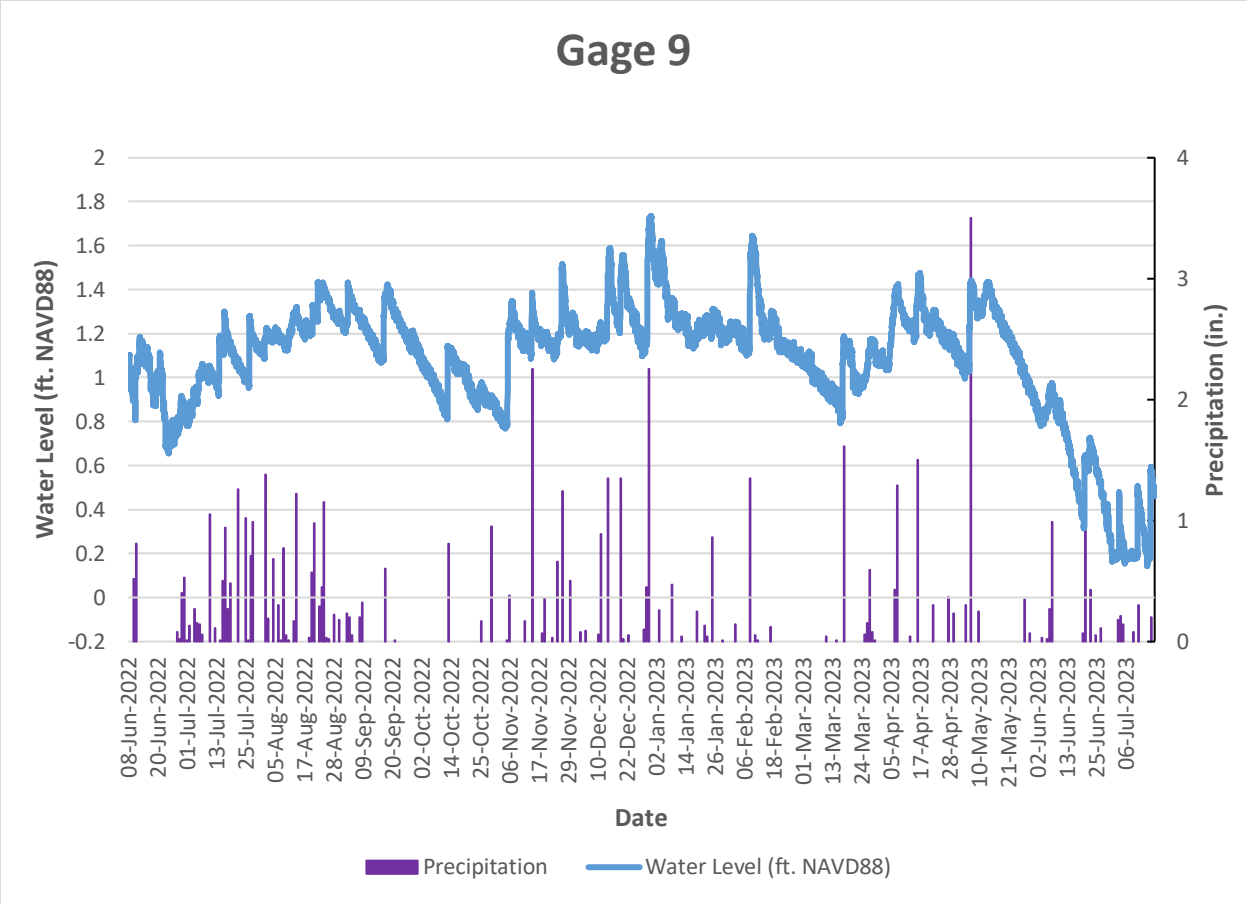

Gage 4
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

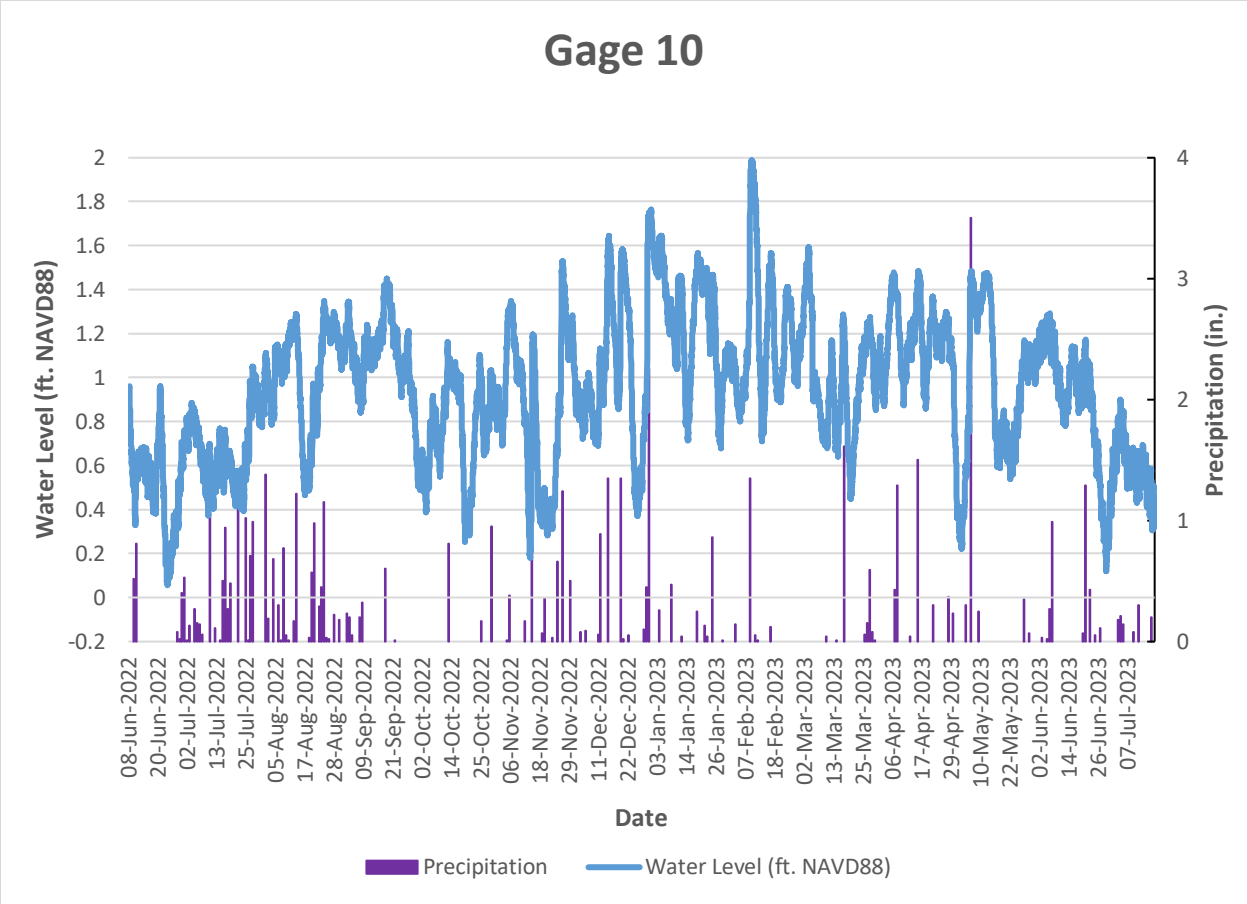

Gage 5
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

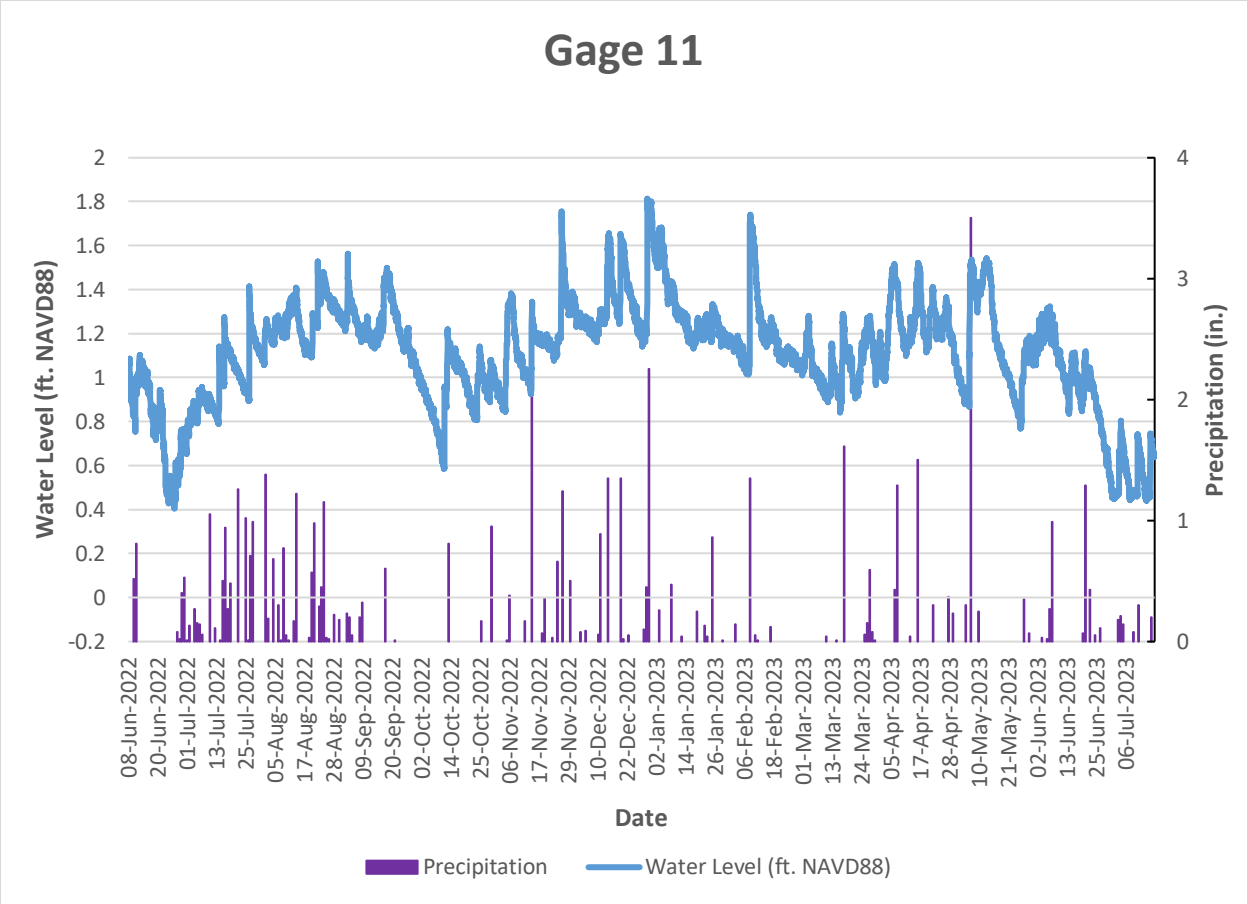

Gage 6
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

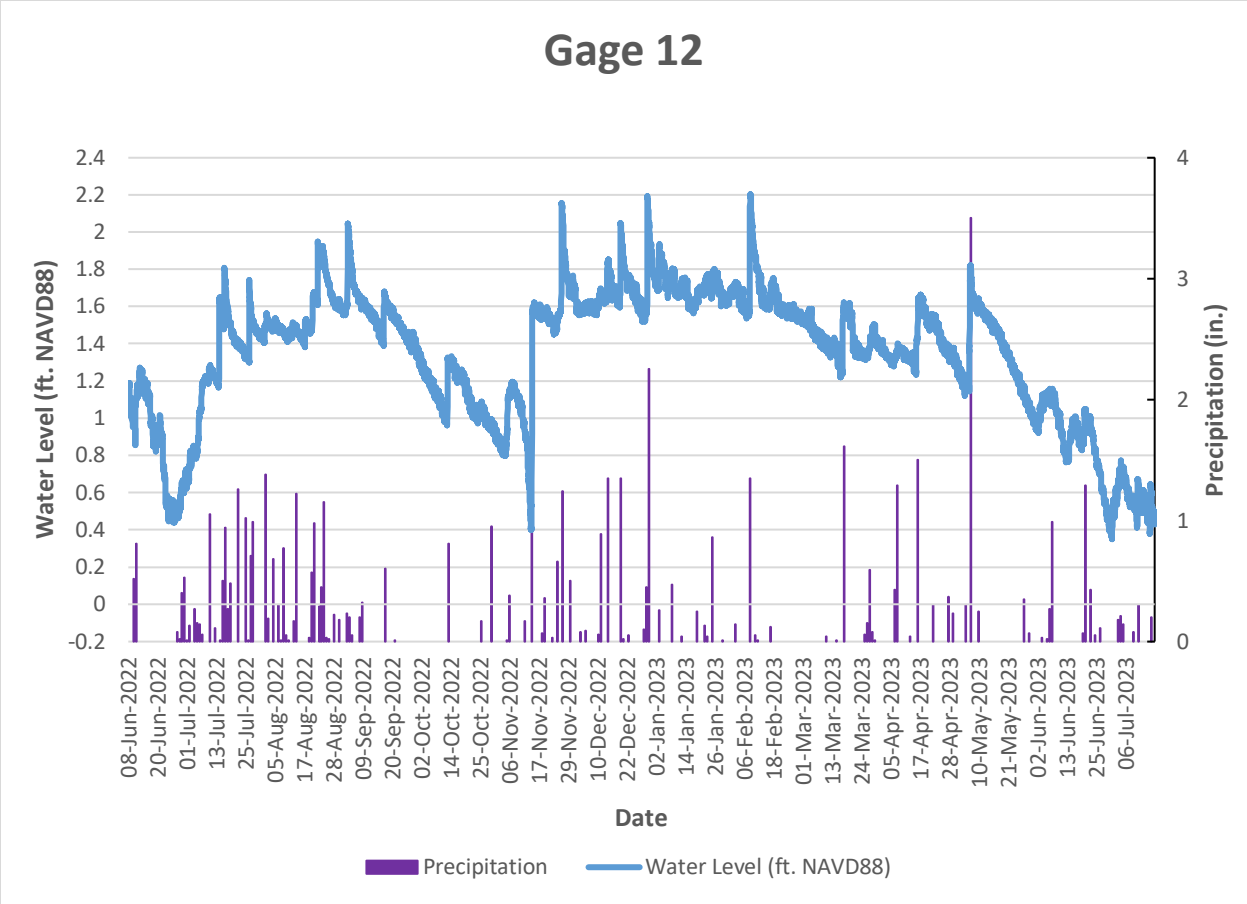

Gage 7
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
24-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
05-Nov-2022
17-Nov-2022
28-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
25-Jan-2023
06-Feb-2023
17-Feb-2023
01-Mar-2023
12-Mar-2023
24-Mar-2023
04-Apr-2023
16-Apr-2023
27-Apr-2023
09-May-2023
21-May-2023
01-Jun-2023
13-Jun-2023
24-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

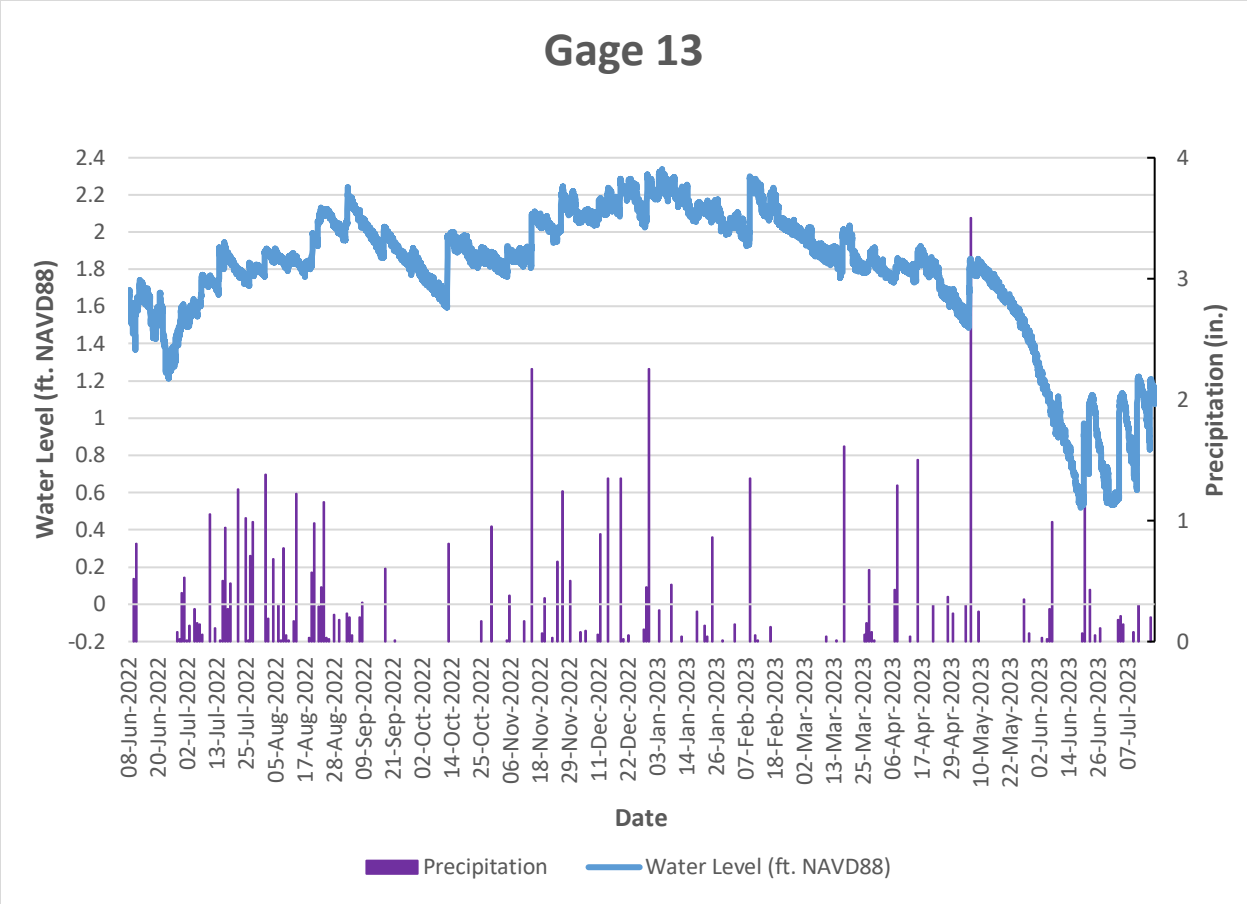

Surface Water 8
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
13-Oct-2022
25-Oct-2022
06-Nov-2022
17-Nov-2022
29-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
26-Jan-2023
06-Feb-2023
18-Feb-2023
01-Mar-2023
13-Mar-2023
24-Mar-2023
05-Apr-2023
16-Apr-2023
28-Apr-2023
10-May-2023
21-May-2023
02-Jun-2023
13-Jun-2023
25-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

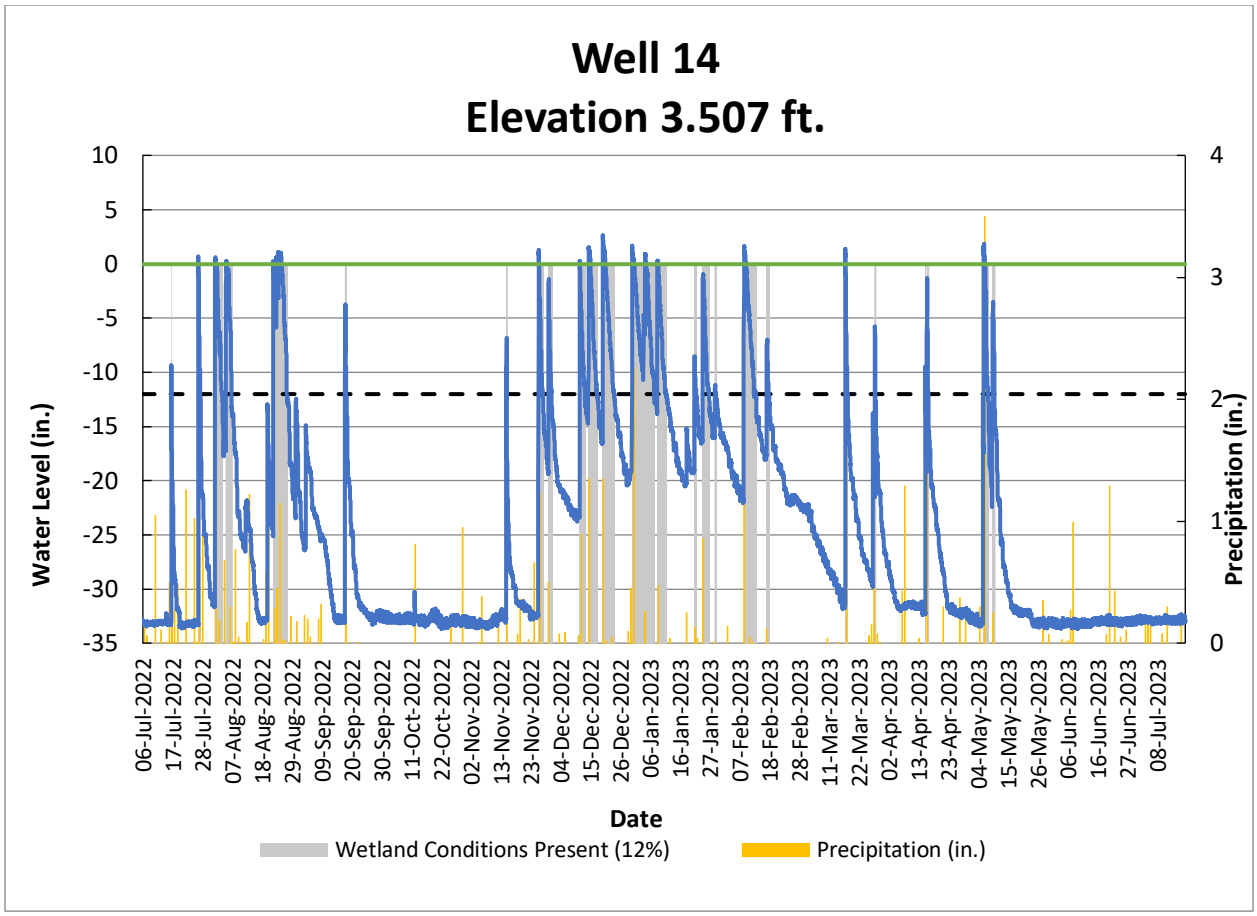

Gage 9
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
14-Oct-2022
25-Oct-2022
06-Nov-2022
17-Nov-2022
29-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
26-Jan-2023
06-Feb-2023
18-Feb-2023
01-Mar-2023
13-Mar-2023
24-Mar-2023
05-Apr-2023
17-Apr-2023
28-Apr-2023
10-May-2023
21-May-2023
02-Jun-2023
13-Jun-2023
25-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)


Gage 10
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
02-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
21-Sep-2022
02-Oct-2022
14-Oct-2022
25-Oct-2022
06-Nov-2022
18-Nov-2022
29-Nov-2022
11-Dec-2022
22-Dec-2022
03-Jan-2023
14-Jan-2023
26-Jan-2023
07-Feb-2023
18-Feb-2023
02-Mar-2023
13-Mar-2023
25-Mar-2023
06-Apr-2023
17-Apr-2023
29-Apr-2023
10-May-2023
22-May-2023
02-Jun-2023
14-Jun-2023
26-Jun-2023
07-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

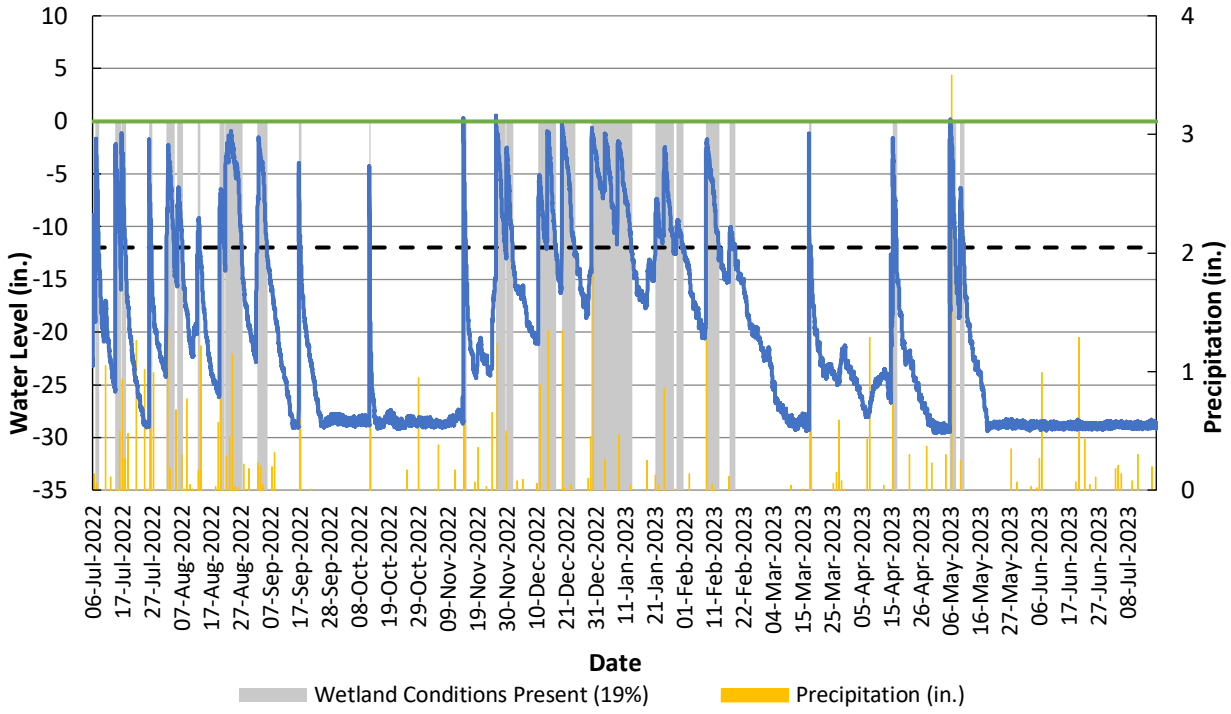

Gage 11
Water Level (ft. NAVD88)
Precipitation (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
14-Oct-2022
25-Oct-2022
06-Nov-2022
17-Nov-2022
29-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
26-Jan-2023
06-Feb-2023
18-Feb-2023
01-Mar-2023
13-Mar-2023
24-Mar-2023
05-Apr-2023
17-Apr-2023
28-Apr-2023
10-May-2023
21-May-2023
02-Jun-2023
13-Jun-2023
25-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)

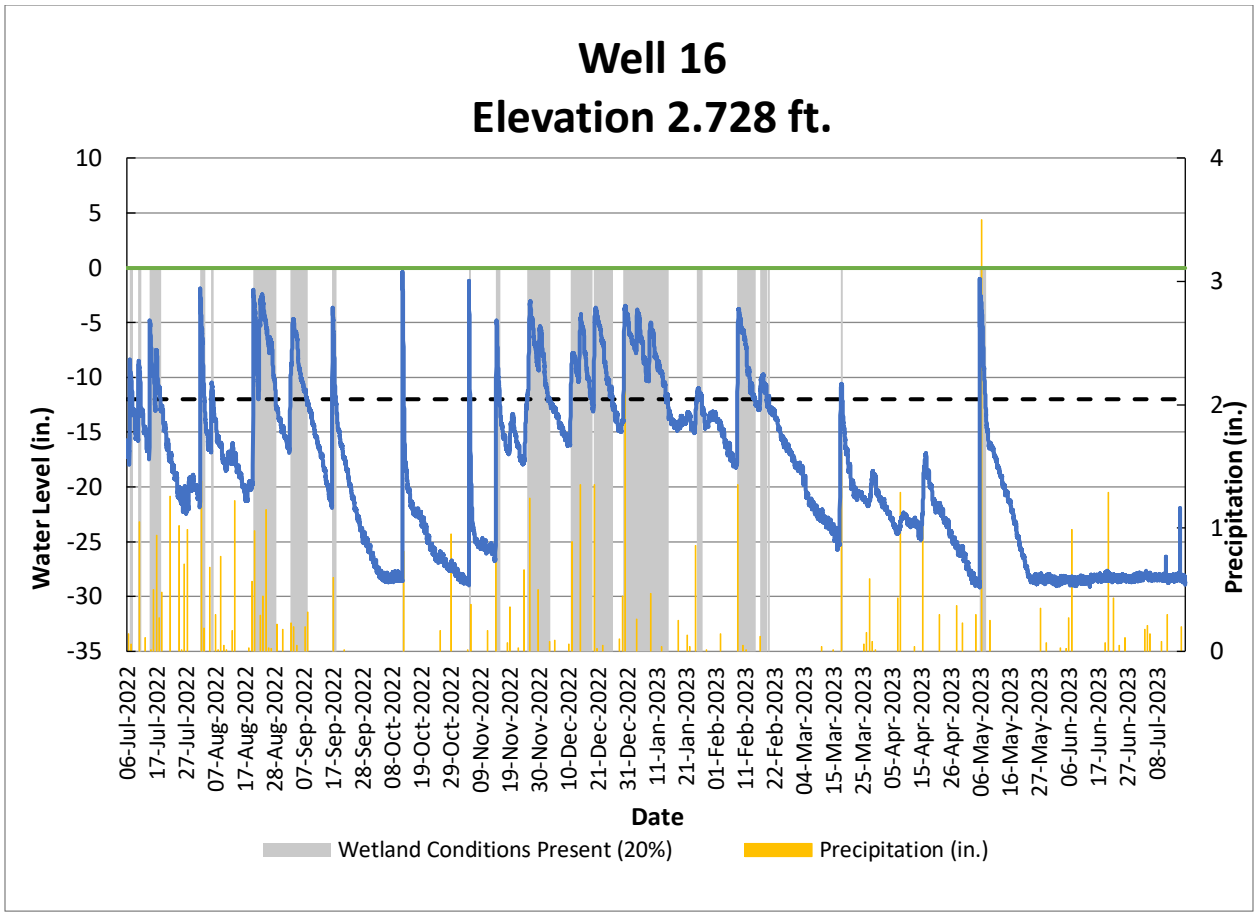

Gage 12
Water Level (ft. NAVD88)
Precipitation (in.)
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
01-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
20-Sep-2022
02-Oct-2022
14-Oct-2022
25-Oct-2022
06-Nov-2022
17-Nov-2022
29-Nov-2022
10-Dec-2022
22-Dec-2022
02-Jan-2023
14-Jan-2023
26-Jan-2023
06-Feb-2023
18-Feb-2023
01-Mar-2023
13-Mar-2023
24-Mar-2023
05-Apr-2023
17-Apr-2023
28-Apr-2023
10-May-2023
21-May-2023
02-Jun-2023
13-Jun-2023
25-Jun-2023
06-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)


Gage 13
Water Level (ft. NAVD88)
Precipitation (in.)
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4
3
2
1
0
08-Jun-2022
20-Jun-2022
02-Jul-2022
13-Jul-2022
25-Jul-2022
05-Aug-2022
17-Aug-2022
28-Aug-2022
09-Sep-2022
21-Sep-2022
02-Oct-2022
14-Oct-2022
25-Oct-2022
06-Nov-2022
18-Nov-2022
29-Nov-2022
11-Dec-2022
22-Dec-2022
03-Jan-2023
14-Jan-2023
26-Jan-2023
07-Feb-2023
18-Feb-2023
02-Mar-2023
13-Mar-2023
25-Mar-2023
06-Apr-2023
17-Apr-2023
29-Apr-2023
10-May-2023
22-May-2023
02-Jun-2023
14-Jun-2023
26-Jun-2023
07-Jul-2023
Date
Precipitation
Water Level (ft. NAVD88)


Well 14
Elevation 3.507 ft.
Water Level (in.)
Precipitation (in.)
10
5
0
-5
-10
-15
-20
-25
-30
-35
4
3
2
1
0
06-Jul-2022
17-Jul-2022
28-Jul-2022
07-Aug-2022
18-Aug-2022
29-Aug-2022
09-Sep-2022
20-Sep-2022
30-Sep-2022
11-Oct-2022
22-Oct-2022
02-Nov-2022
13-Nov-2022
23-Nov-2022
04-Dec-2022
15-Dec-2022
26-Dec-2022
06-Jan-2023
16-Jan-2023
27-Jan-2023
07-Feb-2023
18-Feb-2023
28-Feb-2023
11-Mar-2023
22-Mar-2023
02-Apr-2023
13-Apr-2023
23-Apr-2023
04-May-2023
15-May-2023
26-May-2023
06-Jun-2023
16-Jun-2023
27-Jun-2023
08-Jul-2023
Date
Wetland Conditions Present (12%)
Precipitation (in.)

Well 15
Elevation 2.985 ft.




Well 16
Elevation 2.728 ft.
Water Level (in.)
Precipitation (in.)
10
5
0
-5
-10
-15
-20
-25
-30
-35
4
3
2
1
0
06-Jul-2022
17-Jul-2022
27-Jul-2022
07-Aug-2022
17-Aug-2022
28-Aug-2022
07-Sep-2022
17-Sep-2022
28-Sep-2022
08-Oct-2022
19-Oct-2022
29-Oct-2022
09-Nov-2022
19-Nov-2022
30-Nov-2022
10-Dec-2022
21-Dec-2022
31-Dec-2022
11-Jan-2023
21-Jan-2023
01-Feb-2023
11-Feb-2023
22-Feb-2023
04-Mar-2023
15-Mar-2023
25-Mar-2023
05-Apr-2023
15-Apr-2023
26-Apr-2023
06-May-2023
16-May-2023
27-May-2023
06-Jun-2023
17-Jun-2023
27-Jun-2023
08-Jul-2023
Date
Wetland Conditions Present (20%)
Precipitation (in.)

Appendix B – Jurisdictional Determination

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVE
NEW ORLEANS, LA 70118-3651

December 1, 2023

Regulatory Division
Jurisdiction and Enforcement Branch

Mr. Greg Fell
Natural Resources Professionals, LLC
7330 Highland Road, Suite B-1
Baton Rouge, LA 70808

Dear Mr. Fell:

Reference is made to your request, on behalf of Mr. Kelly Candies, Otto Candies, LLC, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Section 18, Township 16 South, Range 18 East, Lafourche Parish, Louisiana (enclosed map). Specifically, this property is identified as an approximate 4,335 – acre site, Candies Mitigation Bank located in Raceland.

Based on review of recent maps, aerial photography, soils data, the delineation report provided with your request, and a site inspection conducted on July 25, 2023, we have determined that part of the property contains wetlands and non-wetland waters that may be subject to Corps' jurisdiction. The approximate limits of the wetlands and non-wetland waters are designated in red and blue, respectively, on the map. A Department of the Army (DA) permit under Section 404 of the Clean Water Act will be required prior to the deposition or redistribution of dredged or fill material into waters of the U.S, including wetlands. Additionally, a portion of the non-wetland waters may be subject to Section 10 of the Rivers and Harbors Act, a DA Section 10 permit will be required prior to any work in non-wetland waters subject to Section 10.

The delineation included herein has been conducted to identify the location and extent of the aquatic resources for purposes of the Clean Water Act for the particular site identified in this request. This delineation 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 discuss the applicability of an NRCS Certified Wetland Determination with the local USDA service center, prior to starting work.

Please be advised that this property is in the Louisiana Coastal Zone and a Coastal Use Permit may be required prior to initiation of any activities on this site. For additional information, contact Ms. Christine Charrier, Office of Coastal Management, Louisiana Department of Natural Resources at (225) 342 7953.

You and your client and your client are advised that this preliminary jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date. Additionally, this determination is only valid for the identified project or individual(s) only and is not to be used for decision-making by any other individual or entity.

Should there be any questions concerning these matters, please contact Mr. Michael Windham at (504) 862-1235 and reference our Account No. MVN-2022-01283-SK. If you have specific questions regarding the permit process or permit applications, please contact our Central Evaluation Branch at (504) 862-1581.

Sincerely,

for Martin S. Mayer
Chief, Regulatory Division

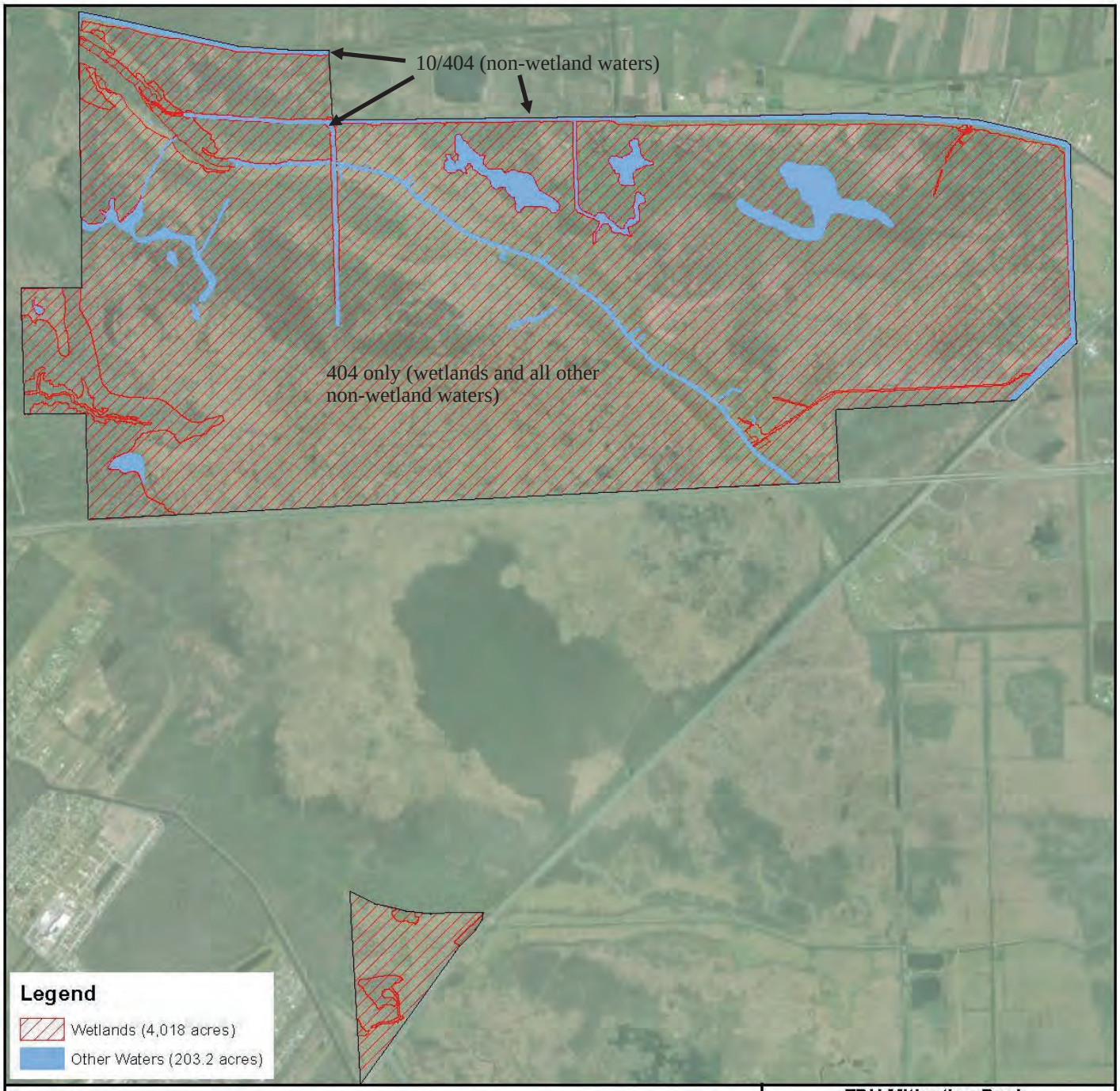
Enclosures

U.S. ARMY CORPS OF ENGINEERS

PRELIMINARY

JURISDICTIONAL DETERMINATION

USACE
FSV 7/25/23
MICHAEL WINDHAM
FOR FELL
ACCOUNT # MVN-2022-01283-SK



Legend
Project Area (4,334.7 acres)

3,000 1,500 0 3,000 Feet

NRP

N

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. TBU Mitigation Bank = Terrebonne Basin Umbrella Mitigation Bank
4. Jurisdictional Determination Request pending (MVN-2022-01283-SK)

TBU Mitigation Bank

Raceland, LA

WETLAND MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	09/08/2023
Map No. :	

FIGURE 1