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

October 16, 2023

Regulatory Division
Special Projects and Policy Team

Project Manager:
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Application #: MVN-2021-01100-MB

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: [ ] 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), and/or [ ] Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 408).

ZERO RANCH MITIGATION BANK IN LAFOURCHE PARISH

NAME OF APPLICANT: Low Land Investors, LLC, c/o Natural Resource Professionals, LLC, 7330 Highland Road, Suite B-1, Baton Rouge, Louisiana 70808, ATTN: Mr. Gregg Fell.

LOCATION OF WORK: Located in Lafourche Parish, Sections 26, 27, 72 and 118-125, T-15-S, R-17-E, approximately 7 miles southeast of Thibodaux and 7 miles west of Raceland, Louisiana, as shown within the enclosed drawings. (Hydrologic Unit Code 08090302, West Central Louisiana Coastal, Terrebonne Basin) (lat. 29.723709, long. -90.725144).

CHARACTER OF WORK: The project site consists of three (3) distinct areas totaling approximately 338.2 acres of pasture and non-forested spoil banks. The applicant/Sponsor proposes the restoration of 165.3 acres of bottomland hardwoods, 103.8 acres of cypress swamp, and 51.2 acres of fresh marsh. Surface hydrology restoration consists of “interior” and “perimeter” activities. “Interior” activities include gapping and/or removing/degrading levees, plugging and/or removing culverts, backfilling and/or ‘swaling’ ditches, and removal of an industrial storage facility. “Perimeter” activities include gapping the southern spoil/bank of the 40 Arpent Canal and decommissioning/removal of the pumping system. “Perimeter” activities would be

deferred two (2) growing seasons following planting of the site(s) with appropriate bottomland hardwood, cypress swamp, and fresh marsh species to decrease the risk of seedling mortality. The scope of work is detailed in the attached mitigation banking prospectus.

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, Brandon Gaspard.** 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 Branch 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 and will not exceed a total of 30 calendar days. 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.

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 is located in waters known to be utilized by the pallid sturgeon (*Scaphirhynchus albus*) and determined that the activity is not likely to adversely affect this species. If the DA permit is approved, the permittee will be required to the follow the IPaC mitigative conditions for the pallid sturgeon (*Scaphirhynchus albus*).

Our initial finding is that the proposed work would have no effect on any species listed as endangered by the U.S. Department of Commerce, 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 Louisiana Department of Environmental Quality before a Department of the Army permit could be issued.*

Any person may request 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, and can be preferably emailed to the USACE project manager listed above or mailed to the address listed above.

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 (Louisiana Coastal Zone Application P20230782). 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.

Martin S. Mayer
Chief, Regulatory Division

Enclosures

Zero Ranch Mitigation Bank
Final Prospectus

September 25, 2023

Sponsor:
Low Land Investors, LLC
206 Industrial Avenue C
Houma, Louisiana 70363

Agent:
Natural Resource Professionals, LLC
7330 Highland Road, Suite B-1
Baton Rouge, Louisiana 70808

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1.0 Introduction

Low Land Investors, 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 Zero Ranch Mitigation Bank (Bank) in accordance with 33 CFR §332.8 (d)(2) and LAC 43:724. The 338.2-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 338.2-acre Bank is located near/along Bayou Folse 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 (re-establish and rehabilitate) 165.3 acres of Bottomland Hardwoods (BLH), 103.8 acres of Bald Cypress Swamp (SWP), and 51.2 acres of coastal Fresh Marsh-Tidal (FM). As described in this Final Prospectus, the Sponsor proposes to execute a perpetual conservation servitude, conduct wetland restoration activities, facilitate the establishment of a self-sustaining wetland ecosystem, and perform 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 Site Location and General Description

The 338.2-acre Bank is located in Sections 26, 27, 72, and 118-125, Township 15 South, Range 17 East within Lafourche Parish, LA (Figure 1). The approximate centroid (decimal degrees) of the Bank is 29.723709°, 90.725144°. The Bank is located approximately 7 miles southeast of Thibodaux and approximately 7 miles west of Raceland (Figure 2).

The Bank consists of maintained cattle pastures and both forested and non-forested spoil banks. Surface elevations range from -2.5 to 8.9 ft NAVD88, with a mean elevation of 2.4 ft NAVD88. The Bank has been modified over time by historic clearing of woody vegetation and the construction of a forced drainage system to facilitate the cattle operation. This drainage system includes constructed ditches/swales, natural swales, and spoil banks/berms that are designed to direct water towards a pump station that discharges water into the 40 Arpent Canal. A levee/spoil bank along the southern bank-line of the 40 Arpent Canal restricts hydrologic connectivity with the surrounding watershed. The forced drainage network and cattle operation has removed wetland area and function within the Bank.

2.0 Project Goals and Objectives

The goal of the project is to re-establish and rehabilitate BLH, SWP, and 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 1 below summarizes the proposed mitigation features of the Bank, which are illustrated in Figure 3a.

Table 1 – Mitigation Bank Mitigation Features

Habitat Type	Mitigation Credit Type	Acreage
Bottomland Hardwood	Re-establishment	96.4
Bottomland Hardwood	Rehabilitation	68.9
Bald Cypress Swamp	Re-establishment	21.6
Bald Cypress Swamp	Rehabilitation	82.2
Fresh Marsh-Tidal	Re-establishment	9.7
Fresh Marsh-Tidal	Rehabilitation	41.5
Total Mitigation Features		**320.3**

Non-mitigation features include 1.4 acres of forested upland spoilbank, 0.4 acres of open water, a 2.5-acre powerline right-of-way, and a 100-foot drainage easement comprising 13.6 acres along the southern bank-line of the 40 Arpent Canal, which is currently held by the North Lafourche Levee District (NLLD).

LDNR-eligible mitigation acreages are shown in Figure 3b. Of the 96.4 acres of BLH Re-establishment, 77.3 acres are below the 5 ft NAVD88 contour and thus LDNR eligible. Of the 68.9 acres of BLH Rehabilitation, 68.5 acres are below 5 ft NAVD88 and thus LDNR eligible. All SWP and FM areas will be below 5 ft NAVD88 and thus LDNR eligible.

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 in LDWF 2009, 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. 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 in LDWF 2009, Fresh Marsh is normally located along the northernmost extent of coastal marshes adjacent to more saline marsh types, or directly beside coastal bays receiving large discharges of freshwater. Salinities generally range from 0.5 to 1 ppt and rarely exceed 2 ppt. Floristic composition is heterogeneous both within and between sites, and species distribution is largely governed by microtopography and the resulting differences in flood frequency and duration. Fresh Marsh has the highest wildlife populations, plant diversity, and soil organic matter of all marsh types. This habitat provides an important nursery for coastal and marine fish species. Due to conversion to more saline marsh types resulting from saltwater intrusion, Fresh Marsh has experienced the largest reduction in acreage of all marsh types.

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, and culverts, along with removing the pump station) in certain areas, overland flow and stormwater retention associated with rainfall events will be improved, along with improved interaction with the 40 Arpent Canal, Lake Fields, surrounding wetland habitats, and the greater Terrebonne Basin. 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 and SWP 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 and aquatic 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 wetland habitat will be protected under a perpetual conservation servitude.

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, SWP, and FM 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 and artificial ridges; filling/installing plugs in artificial channels; de-activating/removing a pumping station; removing culverts,
- 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 Site/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 Chitimacha, Washa, and Chawasha 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). These settlements include the Bayou Folse and Bayou Grand Coteau Ridges, which traverse the Bank.

Lafourche Parish

Lafourche Parish was founded in 1807 as one of the original nineteen parishes in the state. With fertile land and a navigable bayou, there was little difficulty in attracting settlers who arrived in the 1700's from Germany, France, Spanish, and Acadia. 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).

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The 1957 aerial photograph (Figure 4) shows site conditions prior to the purchase of the property by the Sponsor (approximately 1960). By this time, the 40 Arpent Canal had already been

constructed along with the presence of agricultural areas along Bayou Lafourche. Also noted within the immediate area are what appears to be logging canals/roads which connect various portions of the Bank to the 40 Arpent Canal. Within the Bank was a mixed forested ecosystem along with herbaceous wetland habitat. According to the landowner, much of the herbaceous habitat was already harvested for old-growth cypress, and the landowner also recalls discovering old growth cypress stumps throughout the herbaceous habitat, which required specialized equipment to remove.

The 1977 aerial photograph (Figure 5) shows site conditions following the purchase of the property by the landowner, the clearing/harvesting of forested habitat, and the construction of the drainage network and pumping stations. The purpose of this land-use change was to facilitate pastoral activities. Since this time, the Sponsor has operated and maintained a cattle/ranching operation throughout the property.

The 1998 aerial photograph (Figure 6) shows the continued drainage improvements and the maintaining of the cattle pastures throughout the site. A barn structure was also constructed by this time near the 40 Arpent Canal, as well as the expansion/improvements of surrounding pasture/residential areas.

The 2010 aerial photograph (Figure 7) shows the cattle pastures throughout the site. It shows the construction of an oil/gas well pad near the southern boundary of the site, as well as the construction of a radio tower in the northwestern portion of the site, near the 40 Arpent Canal. The 2010 aerial also shows the beginning of the construction of an approved project specific mitigation area and the removal/relocating of levees/spoil banks to accommodate this project.

3.1.2 Existing/Current Land Use

Figure 8 illustrates current conditions of the site and surrounding area. Site conditions are similar to those in 2010, with the addition of the Schlumberger facility in the southern parcel.

Figure 9a illustrates the surrounding land use by type within a one-mile radius of the Bank. The surrounding land use and corresponding percentages are as follows:

- Undeveloped: 54.5%
- Developed/Residential: 10.6%
- Agricultural/Pastoral: 24.5%
- PRM Area: 1.5%
- Upper Bayou Folse MB: 8.9%

Figure 9b illustrates the immediate land use within and around the Bank. Much of the adjacent land is controlled by the Sponsor. To the western/northwestern portion of the bank, there is an existing radio tower that broadcasts the signal for the “Gumbo 94.9” radio station. A powerline servicing the radio tower runs west from the tower along the 40 Arpent Canal for approximately 1,100 ft before turning southwest and subsequently south. The land containing these features as well as their access path is controlled by the Sponsor. There is also an existing barn facility that is under control by the Sponsor. There are light residential areas within the vicinity of the Sponsor,

some of which are controlled by the Sponsor. The Sponsor has also leased a storage facility to Schlumberger in the middle portion of the lower section of the site. This facility is scheduled to be removed as part of the mitigation work plan activities and relocated to an area to the south of the Bank. Also located to the south of the Bank is an existing/active oil/gas well. The Bank is bisected by "Burma Road" from the west and is also accessed by "Grandmaw Lane" from the north, however these roads are private and under the control of the Sponsor.

Figure 9c illustrates mitigation projects within 5 miles of the Bank. In addition to the aforementioned PRM and Upper Bayou Folse areas within one mile, the five-mile radius includes the active Blouin and Upper Grand Coteau Amendment 1 Mitigation Banks, and the sold-out Lafourche Crossing Mitigation Bank.

3.2 Soils

Existing soils mapped by NRCS within the project area (Figure 10) include: Rita muck (Ra: 113.2 acres), Cancienne silt loam (Cm: 97.4 acres), Barbary muck (BB: 36.0 acres); Schriever clays (Sk: 75.6 acres; Sr: 16.0 acres). Soil descriptions follow USDA Web Soil Survey documentation (Soil Survey Staff).

The Rita muck series are very deep, poorly drained freshwater marsh soils found in areas protected by flood control infrastructure. A thin layer of organic muck overlays a layer of consolidated clay from which most organic matter has been oxidized as a result of artificial drainage. These soils are mainly used either for pastures or urban development. This soil is 86% hydric; and hydric characteristics have been confirmed in the field.

The Cancienne silt loam series is a level, somewhat poorly drained, firm, mineral soil found on the highest parts of the natural levees along Bayou Lafourche and associated distributaries. It has high fertility and is well suited for cultivated crops in addition to being moderately well suited for wetland wildlife habitat. Although this soil is listed as 2% hydric, hydric characteristics have been observed in the field.

The Barbary muck series are level, very poorly drained soils with frequent ponding and flooding. They typically support forested swamps and freshwater herbaceous marshes. These soils are well suited for wetland wildlife habitat and provide roosting areas for migratory birds. This soil is 100% hydric, and hydric characteristics have been observed in the field.

The Schriever series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain. The Sk series is 95% hydric, while the Sr series is 100% hydric, and hydric characteristics have been observed in the field.

3.3 Hydrology

3.3.1 Contributing Watershed

The Bank is located in the eastern portion of the West Central Louisiana Coastal watershed (HUC8 08090302), commonly known as the Terrebonne Basin (Figure 11a). This 3,121 mi^2 basin conveys

water between the Mississippi River levee at White Castle, LA and the Gulf of Mexico, bounded by the Atchafalaya Basin guide levee to the west and the natural levee of Bayou Lafourche to the east. Within the greater watershed, the Bank is located in the upper segment of the Bayou Cutoff-Lake Fields sub-basin (HUC10 0809030205), a 205 mi^2 region bounded by Bayou Lafourche to the north, Bayou Blue Road to the west, and the Gulf Intracoastal Waterway to the south and east (Figure 11b). Surface water does not enter the sub-basin from upstream; the primary source of water is precipitation, supplemented by incoming tide from the south. The southern and western portions of the local sub-basin are drained by the Hollywood Canal into Lake Long. The northern portion, including the Bank, is drained toward Lake Fields by the 40 Arpent Canal.

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. The Bank includes two remnant subdelta splays associated with Bayou Folse and Bayou Grand Coteau, 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 12. 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 flooding in Bayou Lafourche, which flowed from the natural levees towards the swamps, and eventually southeastward into the Gulf of Mexico through the coastal marshes. After Bayou Lafourche was plugged at its junction with the Mississippi, water sources to the Bank were entirely derived from local rainfall and runoff.

The 40 Arpent Canal was constructed through the historic Bayou Folse watercourse in the early 1900's to drain properties along the natural levee of Bayou Lafourche (Lafourche Parish Game and Fish Commission). Artificial levees restrict the 40 Arpent Canal to a defined channel and hydrologically isolate the canal from the surrounding land except for lateral inflow from intersecting drains. Gravity drains entering the 40 Arpent Canal from the north are visible within the Bank in 1957 aerial imagery (Figure 4). Clearing and ditching of the Bank is visible in 1977 imagery (Figure 5). Between 1977 and 1985, an interior forced drainage system was constructed throughout a 520-acre area overlapping the Bank, pumping water into the 40 Arpent Canal through 2 outlets. Beginning in 2010, a 100-acre project specific mitigation area was constructed adjacent to the Bank. As part of its management plan, the eastern pump station was deactivated.

3.3.3 Current Bank Elevations

Topographic surveys of the Bank were conducted in 2020 and 2022 by Angelette-Picciola, LLC (Figure 13). Data collected in 2020 included natural ground elevations, centerlines and cross-sections of roads and levees, and elevations of water level monitoring stations, while the 2022 data consisted of inverts and geometries of culverts and internal drainage channels. Differences were calculated between natural ground elevations from the 2020 survey and the spatially

overlapping elevations from the USGS 1-meter LIDAR. Once the differences were determined, a correction surface was generated using the Inverse Distance Weighted spatial interpolation method in QGIS. This surface was added to the original LIDAR to produce a corrected DEM in NAVD 88, which shows that site elevations within the property range from -2.5 to 8.9 ft NAVD88. The mean elevation is 2.4 ft NAVD88. 80% of the Bank area (10^{th} to 90^{th} percentiles) is between 1.1 and 4.7 ft NAVD88. Figure 14a shows the corrected DEM. Figures 14b and 15 depict the 5 ft NAVD88 contour. The Sponsor notes that in approximately 2020-2021, approximately 3 acres of a non-forested spoil bank along the southern bank-line of the 40 Arpent Canal in the easternmost portion of the Bank was removed. This material was excavated in an end-on-end fashion, starting with the easternmost section and working back to the west towards Burma Road. During this process, an excavator was used to excavate the material and place it directly into a dump truck. Fill material was then hauled to the existing barn facility and/or used to repair the existing Burma Road where needed.

3.3.4 Current Bank Hydrology

Climate data is derived from NOAA's AgACIS and NCEI Climate Normals for 1991-2020 at the Thibodaux 4 SE station, located approximately 4 miles from the Bank (Figure 16). Monthly average temperatures range from 54.2 F in January to 83.6 F in July. Average annual precipitation is 71.1 in, with the driest 30% of years receiving less than 65.8 in and the wettest 30% receiving over 77.8 in. Figures 17a-c shows annual climate hydrographs of monthly precipitation and estimated evapotranspiration for average, 30^{th} percentile dry, and 30^{th} percentile wet years (Pierce 2015; Thornwaithe and Mather 1955; Dunne and Leopold 1978). During average and wet years, precipitation exceeds evapotranspiration in all months, while in drier years, precipitation exceeds evapotranspiration in winter and early spring months only. Groundwater and surface water data was collected with HOBO water level monitors deployed throughout the Bank since April 2020 (Figure 16). As of March 2023, 2.9 years of continuous hydrology data have been collected at three groundwater sites (Wells 1, 2, and 5), and one surface water site (Gage 4).

The Bank can be divided into 3 hydrologic units and 14 sub-units (pastures) for analysis, design, and monitoring purposes (Figure 18). In total, 374.2 acres in and around the Bank are under pump (Figure 19). Surface runoff collected from the West and South units is pumped into the 40 Arpent Canal through a 24" pipe at 40 cubic feet/second. Figure 20 shows monthly rainfall as well as the equivalent rainfall pumped from August 1, 2020-September 2021, as calculated from operational records taken during that time period. The difference between recorded rainfall and equivalent removed is defined as "net rainfall." On average, the pumped area received 2.8 inches of net rainfall per month, as compared to 7.0 inches per month recorded at the Thibodaux 4 SE weather station. The pumping system, therefore, removes the equivalent of 4.2 inches of rainfall per month from the Bank. The pump was operated on 82 days during the 14-month reporting period, for an average of 5.9 days per month or approximately once every five days.

The East unit (Figure 21a), consisting of three pastures, is outside the pumped area although it includes the channel for the deactivated pump and is therefore hydrologically connected to the project-specific mitigation area to the south. This channel connects to the 40 Arpent Canal through a culvert. The central and western pastures (E1-E2) are otherwise hydrologically isolated from the 40 Arpent Canal due to Burma Road, which acts as a levee with elevations ranging from

4 to over 9 ft NAVD88. The levee along the canal in the eastern pasture (E3) was removed in March 2021, establishing an overbank hydrologic connection with the 40 Arpent Canal. This pasture also includes a natural swale which is an approximately 550-ft reach of the remnant Bayou Folse channel. The channel has silted in over time, with an invert of approximately 2.5 ft NAVD88 as compared to approximately 0.5 ft on neighboring properties. Groundwater Well 1 is located in pasture E3 at 4.0 ft NAVD 88 and has recorded saturation within 12 inches of the soil surface for 36% of the period of record (Figure 22a).

The West unit (Figure 21b) is under pump and includes 7 pastures. This unit is hydrologically isolated from the 40 Arpent Canal by a levee along the northern boundary which is generally 3 ft above grade with crest elevations between 6-7 ft NAVD88. The W1 pasture includes an approximately 910-ft segment of the remnant Bayou Folse ridge and swale. This portion of the remnant channel has also silted in to an invert depth of 1.5 to 2.5 ft NAVD88. Pastures W1-W4 are separated from W5-W7 by a road running southeast to northwest, approximately 1 ft above grade. North-south levees are present on both the eastern and western edges of pasture W6. Two main drainage ditches convey water towards the east along the northern and southern boundaries of W5-W7. They are fed by a network of internal swales throughout the unit which flow through culverts below roads and levees. The main ditches connect to the pump channel which runs along the southeastern border of the West Unit toward the 40 Arpent Canal. Well 2 is located in the W2 pasture at 4.0 ft NAVD88 and has recorded saturation within 12 inches of the soil surface for 48% of the period of record (Figure 22b).

The South unit (Figure 21c) is also under pump and includes 4 pastures. Interior north-south running swales collect runoff which flows into a ditch running west to east and eventually into a larger ditch running south to north along the eastern edge of the South unit. The S1 pasture also includes 7 parallel swales conveying water to the east into the north-south drainage ditch. Water flows from this ditch through a culvert under Burma Road and ultimately into the main pumping channel. The eastern boundary of the South unit is hydrologically isolated from the adjacent project-specific mitigation by a levee approximately 5 ft above grade. The southernmost pasture (S4) is adjacent to the ridge formed by Bayou Grand Coteau, although the remnant channel is excluded from the Bank. Well 5 is located in pasture S2 at 2.0 ft NAVD88 and has recorded saturation within 12 inches of the soil surface for 12% of the period of record, indicating the efficiency of pumping in this area (Figure 22c). An oilfield services facility operated by Schlumberger is currently located between fields S1 and S2.

The mean observed stage of Gage 4 (Figure 22d) in the 40 Arpent Canal is 1.0 ft NAVD88. During the period of record, stages at or above 1.3 ft were observed 25% of the time, and stages at or below 0.4 ft were observed 75% of the time. Following rainfall events exceeding approximately 1 inch in 24 hours, water levels in the 40 Arpent Canal rapidly rise from baseline values to peaks between 1.7-2.8 ft. Spectral analysis was applied to the Gage 4 hydrograph to detect regularly recurring (periodic) fluctuations in the timeseries. The results of the analysis indicate the presence of fluctuation periods of approximately 24 and 26 hours which contribute substantially more to variation on the hydrograph as compared to nearby frequencies. These results are visualized as a periodogram, with peaks representing the dominant fluctuation periods (Figure 23). The 24- and 26-hour fluctuations correspond respectively with the K1 and O1 lunar diurnal constituents listed

by NOAA as the dominant tidal components at Grand Isle. This implies that the 40 Arpent Canal is tidally influenced in the vicinity of the Bank.

3.3.5 Jurisdictional Wetlands

A request for a preliminary Jurisdictional Determination (JD) for the Bank and other land areas owned by the Sponsor was submitted to the US Army Corps of Engineers on September 29, 2021. On April 15, 2022, the Sponsor received a preliminary JD from the Corps (MVN-2021-01100-SG). Within the area of study, 256.1 acres were identified as Jurisdictional Wetlands and 29.4 acres as Other Waters of the US, with 183.0 of non-wetland. The Bank itself contains 200.0 acres of Jurisdictional Wetlands and 5.6 acres of Other Waters of the US, with 132.6 acres of non-wetland. Figure 24 illustrates the Jurisdictional Wetlands and Other Waters of the US identified within the Bank.

3.4 Vegetation

3.4.1 Historical Plant Community

Based on a review of *The Natural Communities of Louisiana* (LDWF 2009) and historic aerial photography, the Bank would have primarily consisted of the "Overcup Oak – Water Hickory" BLH association and/or the "Sugarberry – American Elm – Green Ash" BLH association in the higher elevations, and both Bald Cypress Swamp and Fresh Marsh – Tidal within the lower elevations.

The Overcup Oak – Water Hickory BLH 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*), planertree (*Planera aquatica*), buttonbush (*Cephalanthus occidentalis*) and vines. This community type has a long successional stage.

The Sugarberry – American Elm – Green Ash BLH 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, American elm (*Ulmus americana*), and green ash, other species include water hickory, 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 *s*wamp dogwood, hawthorn (*Crataegus* spp.), and red mulberry (*Morus rubra*). Many vines and herbaceous plants are present.

Bald Cypress 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 bald cypress, tupelo gum (*Nyssa aquatica*), swamp blackgum

(*Nyssa biflora*), green ash, red maple, water locust, buttonbush, pumpkin ash (*Fraxinus profunda*), black willow (*Salix nigra*), planertree, 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*), alligator weed (*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*), pennywort (*Hydrocotyle* spp.), common duckweed (*Lemna minor*), milfoil (*Myriophyllum* spp.), white waterlily (*Nympheaea odorata*), cattail (*Typha* spp.), bladderwort (*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 ppt and usually average between 0.5 to 1 ppt.

3.4.2 Existing Plant Community

The existing plant community within the Bank consists of maintained cattle pastures. Within the pastures, the swales/drains that collect and transfer runoff into the pumping system contain a marsh vegetation community. The extent of the existing habitat types are shown in Figure 25.

Within the cattle pastures, there are two distinct vegetation communities depending on elevations. Within the higher elevations (Habitat Type 1), the Sponsor has planted/seeded a variety of Bermuda grass hybrids (*Cynodon* sp.), rye grasses (*Lolium* sp.), and paspalum varieties. Grazing and active pasture maintenance appears to have kept vegetation low and selective towards species with higher protein values. Additionally, haying activities and chemical applications are being implemented to preserve the higher quality grazing vegetation. The fields are dominated primarily by Bahia grass (*Paspalum notatum)*. Un-grazed fields are dominated by needle grasses (*Eleocharis* sp.), vaseygrass (*Paspalum urvillei*), and curly dock (*Rumex crispus*) with the tendency to shift toward sedges towards the lower elevations. The Bank contains 192.1 acres of Habitat Type 1.

The pastures within the lower elevations (Habitat Type 2) are dominated by obligate wetland species including common rush (*Juncus effusus*), maidencane, pickerelweed, giant cutgrass, longtom (*Paspalum denticulatum*), and alligator weed. Minor species include bulltongue, cattail, flatsedge (*Cyperus* spp), water primrose (*Ludwigia leptocarpa*), and spikerush. The Bank contains 140.5 acres of Habitat Type 2.

3.5 General Need for the Project in this Area

The Bank is located in the Deltaic Plain, within HUC #08090302 (Figure 11a), which is in the larger Central Louisiana Accounting Unit and Lower Mississippi Subregion. 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 2010). The primary driver of this land loss is a lack of sedimentation due to the construction of the Atchafalaya and Mississippi River Levees. Other contributing factors include 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 habitat due to the ecosystem functions and values they provide. Inherently diverse in tree, shrub, and vine species, bottomland hardwoods provide habitat for rich fauna and function to abate floodwater and improve water quality (Gardiner and Oliver 2005). Overbank flooding and concomitant deposition of nutrient-rich sediments make these ecosystems some of the most productive on earth (Brinson et al 1993, 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).

Bald cypress 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 (Matoon1915). Early estimates of the area of bald cypress forests range from 0.67-3.64 million hectares, but following intensive timber harvesting activities from 1890-1925, this number was reduced drastically to only 0.14 million hectares. 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 Shaffer 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 flood regime. 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 bald 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 Bank – are conducted. Essentially, these projects involve a “jump-start” to natural succession which in the

case of natural bald cypress swamp systems took many years to develop. By conducting SWP plantings within the Bank, along with active management and long-term protection, the need for SWP habitat within the Terrebonne Basin will be partially addressed as ultimately a sustainable SWP 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 2010). Marsh plantings within the Bank will contribute to the much-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 Bank - 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 include: 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 Bank 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 Bank will address the needs of the watershed by contributing 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

As described below, the Sponsor will first restore/improve wetland hydrology within internal portions of the Bank, where planting of BLH, SWP, and FM species will then occur. External hydrology improvements will be made following two growing seasons. In this way, the existing pumping station can be operated if a high-water event threatens the establishment of any newly planted vegetation. The pumping system will remain in place, but will not be operated except in case of any 24-hour rainfall events in excess of 1.75 inches. It is anticipated that this type of event will recur approximately every 40 days, in contrast with the approximately five days between pumping events during the operational recording period. Upon satisfactory establishment of the planted vegetation, the remainder of the hydrologic work plan will be implemented.

To implement hydrologic work, the Sponsor will utilize bulldozers, excavators, and dump trucks to degrade levees, fill ditches/channels, and level ground surfaces. All hydrologic work will be carried out by the Sponsor with in-house resources. Plantings will be contracted through a consulting forester.

4.1.1 Soils/Hydrologic Work Plan – Overview

The hydrology work plan will consist of “interior” and “perimeter” hydrologic improvements that will ultimately maximize the functional capacity of the Bank. Interior hydrologic improvements will consist of gapping or removing/degrading levees, plugging or removing culverts, infilling or swaling (widening and partially filling) ditches, and relocating an industrial storage facility to an area outside of the Bank. Perimeter hydrologic improvements consist of gapping the existing levee/spoil bank along the south bank of the 40 Arpent Canal as well as removing/decommissioning the pumping station. Excavated material from levees/spoil banks will be used to infill existing ditches, with any excess to be deposited in an upland area outside the Bank boundary, near the existing barn structure. Ultimately, the interior and perimeter improvements will increase wetland area and improve habitat quality throughout the Bank, as natural hydrology will be improved. Hydrologic connectivity will be improved between the 40 Arpent Canal and the North and West units, and between the adjacent PRM area and the South and East units. Overland flow and surface water retention will be facilitated throughout all units of the Bank.

To decrease the risk of seedling mortality due to prolonged flood conditions, planting will be conducted with the existing perimeter levees and pumping system in place. Gapping of perimeter levees and removal of the pumping station will occur after two growing seasons. The gaps will be excavated in an “end on end” fashion using the existing spoil bank as an equipment access path.

Fill material will be excavated and placed directly into a dump truck and hauled to an offsite/non-wetland location.

4.1.2 Soils/Hydrologic Work Plan – Discussion

The overall hydrologic work plan is depicted in Figure 26a, with detail of each hydrologic unit in Figures 26b-d. Figures 27a-c and 28-31 show the cross-section locations and cross-sections of typical construction features, respectively.

The East unit (Figure 26b) currently is hydrologically connected to the 40 Arpent Canal at high stages due to the prior removal of a levee segment as well as the ditch along the southern boundary of the E3 pasture. The remnant Bayou Folse channel will be excavated to an invert elevation of 0.5 ft NAVD88, consistent with the channel dimensions on adjacent properties. Internal hydrologic connectivity will be improved by degrading the levees along the abandoned pump channel between E1 and E2 to a height consistent with surrounding elevations. In order to maintain drainage from the adjacent PRM area to the 40 Arpent Canal, the culvert at the outlet of the pump channel will remain.

Soils and hydrologic work plan activities in the West unit (Figure 26c) will include both external connection to the 40 Arpent Canal as well as internal modification to promote overland flow. At the locations of the north-south swales separating pastures W1, W2, and W3, as well as the eastern extent of the historic Bayou Folse channel, 50-foot gaps will be made in the levee along the 40 Arpent Canal. The inverts of these gaps will be set below the mean high water level of the 40 Arpent Canal (0.9 ft NAVD88) in order to facilitate continuous surface connectivity and introduce tidal influence within the West unit. The remnant Bayou Folse channel, which runs between two of the proposed gaps in pasture W1, will be excavated to an invert elevation of 0.5 ft NAVD88, consistent with the channel dimensions on adjacent properties. The culvert at the pump outlet will be removed and replaced with a 40-foot gap consistent with the width of the existing channel. As with the other West unit gaps, the invert of this gap will be set below the mean high water level of the 40 Arpent Canal to facilitate continuous surface connectivity and tidal influence. The road separating pastures W1, W2, and W4 from W5 and W6 will be degraded and placed into the parallel ditch to the south. The levees along both the western and eastern boundaries of pasture W6 will be degraded and placed into the parallel ditches to the east. The central east-west ditch in pastures W5 and W6 will remain, with the culvert between them removed. The four remaining ditches within W6 as well as the east-west ditch in W4 west of the tower ROW will be “swaled” by moving soil along each bank into the center of the channel, resulting in a wider, shallower cross-section and therefore slower flow velocity. A total of eight culverts will be removed from the interior of the West unit, corresponding with crossings of the roads and ditches to be removed. The culvert below Burma Road on the southern boundary of W5 will remain, as will four culverts facilitating crossings between Burma Road and the West unit.

The primary modification to the South unit (Figure 26d) will be the restoration of hydraulic connectivity and tidal influence through the eastern boundary. The non-forested levee along the eastern boundary of field S1 will be completely degraded and used to backfill the adjacent ditch leading to the pumping system. Two 50-foot gaps will be made in the forested levee along the eastern boundary of fields S2, S3, and S4. The levee bisecting the northern portion of S1 and

continuing northeast toward Burma Road will be completely degraded. The east-west access road between S1 and S2 will be degraded and placed into the parallel ditch to the south. Three north-south ditches in S1 and S2 and an east-west ditch in S3 will be backfilled using material from the levee to be degraded in the northern boundary of S1. At seven locations, existing culverts will be removed and replaced with earthen plugs. Two culverts west of S3 and S4, which are outside the Bank boundary, will remain. Finally, the Schlumberger facility will be relocated outside of the Bank boundary to the southwest.

Interior hydrology work will take place prior to planting; however, the gapping/degradation of perimeter levees as well as removal of the pumping station will not take place until after two growing seasons. This will ensure that seedlings will be allowed to establish in the absence of flooding stress resulting from backwater flooding from the 40 Arpent Canal. The pump will not be operated during routine rain events in order to maintain wetland hydrology. Pumping will occur as-needed to prevent flooding of the SWP and BLH areas, which would be generated by 24-hour rainfall exceeding approximately 1.75 inches. The marsh areas will be allowed to flood with an average of 1 ft of surface water. The pump will run until the water surface elevation at the pump intake is lowered to 2 ft NAVD88, which is the minimum elevation for SWP plantings. This will ensure that excessive flooding will not impact BLH and SWP seedlings during the first two growing seasons.

4.1.3 Post Mitigation Work Plan Hydrology

During high-water conditions in the 40 Arpent Canal, water will enter the East and West units through gapped and/or degraded levees, as well as through the historic Bayou Folse channel which was previously hydrologically isolated. These improvements will produce a continuous surface water connection between the 40 Arpent Canal and the East and West units. Receding high water from above the gap inverts will also drain back into the 40 Arpent Canal. Rainfall and 40 Arpent Canal overflow will move via overland flow toward the depressional areas in the West unit and will ultimately be removed via evapotranspiration. Overland flow in the East unit will travel south towards the existing permittee-responsible mitigation area. The South unit will receive water from rainfall as well as backflow from the PRM area and Upper Bayou Folse Mitigation Bank due to improved connectivity with these areas. Under low-water conditions in the 40 Arpent Canal, runoff will travel via overland flow from west to east into the adjacent mitigation areas where it will be detained before flowing east into the 40 Arpent Canal through the ditch bordering the East unit. Post-work hydrology is illustrated in Figure 32.

4.1.4 Vegetative Work

The Sponsor will plant BLH, SWP, and FM-Tidal species within 331.7 acres of the Bank (Figure 33). Planting will occur during the non-growing season (approximately December 15 to March 15). One-year-old bare-root seedlings will be obtained from a registered, licensed Louisiana nursery grower and properly stored and handled prior to planting. 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, through chemical and/or mechanical means, control of exotic/invasive species, such as Chinese tallow (*Triadica sebifera),* will be conducted. Nuisance wildlife species will also be monitored and controlled as necessary.

Site preparation within the existing pasture/herbaceous habitat will consist of bush-hogging/discing/ripping where necessary, the application of a foliar herbicide (Roundup) where necessary, and leveling surface elevations within the spoil bank degradation/channel filling areas. A pre-emergent herbicide (OustXP) will be applied either before or immediately after planting. The Sponsor anticipates that 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 (LHNP 2009). Specific species assemblages, densities, and percentages will be approved by the CEMVN, LDNR, and IRT.

After a review of the hydrograph of the 40 Arpent Canal during the monitoring period of April 2020 through December 2022, the Sponsor has determined that Bottomland Hardwood Habitat is appropriate for elevations generally above 2 feet NAVD88, which is approximately 165.3 acres. Water surface elevations in the 40 Arpent Canal exceeded this stage for 5% of the period of record, which is near the low range of flood tolerances for BLH species (Pierce 2015). The hydrograph of the 40 Arpent Canal (Gage 4) during the monitoring period also showed six peaks that were approximately 2.7 feet NAVD88 (Figure 22d). Therefore, land areas below this elevation but above the 2 feet NAVD88 elevation will be planted with the Overcup Oak-Water Hickory BLH type (Table 2), and areas generally above 2.7 feet NAVD88 will be planted with the Sugarberry-American Elm-Green Ash BLH type (Table 3). The Sponsor will plant a higher percentage of hard mast species to account for anticipated natural regeneration of soft mast species. Hard mast species will account for at least 60% of all BLH plantings with the remaining 40% consisting of soft mast tree species. Planting densities will be approximately 538 stems per acre (9-foot by 9-foot spacing).

Table 2 – Overcup Oak-Water Hickory BLH Type 1 (113.4 acres)
(9’ x 9’ spacing, 538 stems/acre)

BOTTOMLAND HARDWOOD SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Overcup oak (*Quercus lyrata*)		X	20%
Water hickory (*Carya aquatica*)		X	20%
Nuttall oak (*Quercus texana*)		X	20%
Red maple (*Acer rubrum*)	X		10%
Sugarberry (*Celtis laevigata*)	X		10%
Bald cypress (*Taxodium distichum*)	X		20%

Table 3 – Sugarberry-American Elm-Green Ash BLH Type 2 (51.9 acres)
(9' x 9' spacing, 538 stems/acre)

BOTTOMLAND HARDWOOD SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Nuttall oak (*Quercus texana*)		X	20%
Willow oak (*Quercus phellos*)		X	20%
Swamp chestnut oak (*Quercus michauxii*)		X	10%
Water oak (*Quercus nigra*)		X	10%
American elm (*Ulmus americana*)	X		10%
Sugarberry (*Celtis laevigata*)	X		10%
Green ash (*Fraxinus pennsylvanica*)	X		10%
Sweetgum (*Liquidambar styraciflua*)	X		10%

All areas below 2-foot NAVD88 will be planted with either Bald Cypress Swamp or Fresh Marsh-Tidal Habitat. Exploratory hydrodynamic modeling was used to estimate with-project inundation frequency for approximately one year, and the 90% inundation frequency contour was used to delineate between the two planting types. This contour does not directly correlate with elevation, but is generally between 0.5-1.5 ft NAVD88. Areas which are predicted to experience less than 90% inundation will be planted with Bald Cypress Swamp Habitat for a total of approximately 103.8 acres (Table 4). Within this area, planting densities will be 302 stems per acre at 12-foot by 12-foot spacing, as shown in Table 4 below:

Table 4 – Bald Cypress Swamp Planting – 103.8 acres
(12' x 12' spacing, 302 stems/acre)

BALD CYPRESS SWAMP SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Bald cypress (*Taxodium distichum*)	X		70%
Swamp blackgum (*Nyssa biflora*)	X		10%
Red maple (*Acer rubrum*)	X		10%
Green ash (*Fraxinus pennsylvanica*)	X		10%

Areas predicted to receive 90-100% inundation will be planted with Fresh Marsh-Tidal habitat. These plantings will consist of a mix of 60% seashore paspalum (*Paspalum vaginatum*) and 40% maidencane throughout 51.2 acres, at a density of approximately 871 plugs per acre (5-foot by 10-foot spacing).

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 Tables 2-4 and outlined above will provide genetic material, structure, and ultimately seed producing plants and trees. Natural regeneration will be further 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 removal of perimeter and internal levees will allow for improved hydrologic connectivity to the surrounding watershed, tidal flux, sheet flow, and stormwater retention/detention within the Bank. Existing site conditions indicate favorable conditions for BLH, SWP, and FM plantings due to on-site hydric soils and BLH, SWP, and FM habitats that were historically present.

4.3 Current Site Risks

There are no present risks that would prevent the successful establishment of the self-sustaining BLH and SWP ecosystem. There are no issues in regard to water rights. There is one powerline ROW (approximately 30 feet) and a 100-foot drainage/access agreement (North Lafourche Levee District) within the Bank, which are illustrated in Figure 34. However, these areas will not be included in credit calculations and would not negatively affect the restored, enhanced, and preserved wetland habitat. Additionally, the Schlumberger facility will be moved off-site to a non-wetland location.

The Sponsor has developed the Bank boundary by considering the surrounding infrastructure, land-use, and structures, largely made possible by the fact that much of the land that is contiguous with the Bank is controlled by the Sponsor.

The entirety of the western boundary of the W3 and W4 pastures borders a light residential area that contains lands controlled by the Sponsor. Within this area is a powerline/servitude that ultimately services the radio tower in the north/west portion of W3 by turning the northwest corner towards the east, along the southern bankline of the 40 Arpent Canal. The North Lafourche Levee District maintains a 100-foot statutory servitude along the southern bank line of the 40 Arpent Canal, which encompasses the powerline area as well as the “access servitude” granted to the radio tower company, which operates the structure within lands controlled by the Sponsor. Because no hydrology work is proposed (or necessary) within this portion of the NLLD servitude, along with the fact that the powerline and access route to the radio tower overlaps with the NLLD servitude, the Sponsor is excluding portions of these lands from the mitigation bank, which has resulted in the current proposed boundary.

4.4 Long-Term Sustainability of the Site

Following the implementation of the mitigation work plan, the Bank 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 Bank are either mapped as hydric or exhibit hydric field indicators and are 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 Bank and will therefore have full authority to monitor and maintain the Bank for the long-term.

5.0 Proposed Service Area

The Sponsor proposes to use the Terrebonne River Basin as the Service Area (Figure 35). Impacts to coastal wetlands must be compensated with coastal credits within the Bank. As impacts to BLH, SWP, and FM-Tidal occur within this area, securing credits from the Bank 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 the CEMVN and LDNR on a case-by-case basis.

6.0 Operation of the Mitigation Bank

6.1 Project Representatives

***Sponsor* and Landowner:**
Low Land Investors, LLC
206 Industrial Ave. C
Houma, LA 70363
Attn: David Robichaux

Agent:
Natural Resource Professionals, LLC
7330 Highland Road, Suite B-1
Baton Rouge, LA 70808
Attn: Gregg Fell

6.2 Qualifications of the Sponsor

The Sponsor of the Bank is Low Land Investors, LLC, who has owned the property since approximately 1960. The Sponsor has extensive experience with land management, ranching, land development, land management, construction, and heavy equipment operating. Low Land has the necessary financial resources and expertise to successfully establish the Bank.

6.3 Proposed Long-Term Ownership and Management Representatives

Low Land Investors, LLC will serve as the Sponsor and Owner of the Bank but will reserve the option of appointing a long-term steward which must be approved by the CEMVN, LDNR, and IRT. 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 Bank 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. 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 36 illustrates the land areas (338.2 acres) that will be protected by the Conservation Servitude.

6.5 Construction and Establishment Financial Assurances

Upon approval of the Bank, the Sponsor will establish a Construction and Establishment Financial Assurance (CE Fund), which will be in the form of an escrow account and/or a letter of credit. The CE fund will be held by an entity accredited by the Federal Deposit Insurance Corporation (FDIC), and the beginning balance of the CE Fund will be coordinated with the USACE, LDNR, and IRT to account for construction costs, maintenance costs, monitoring, and bank management during the construction and establishment period. The CE Fund will be reduced as success criteria are achieved and the probability decreases that those funds would be needed.

6.6 Long-Term Strategy

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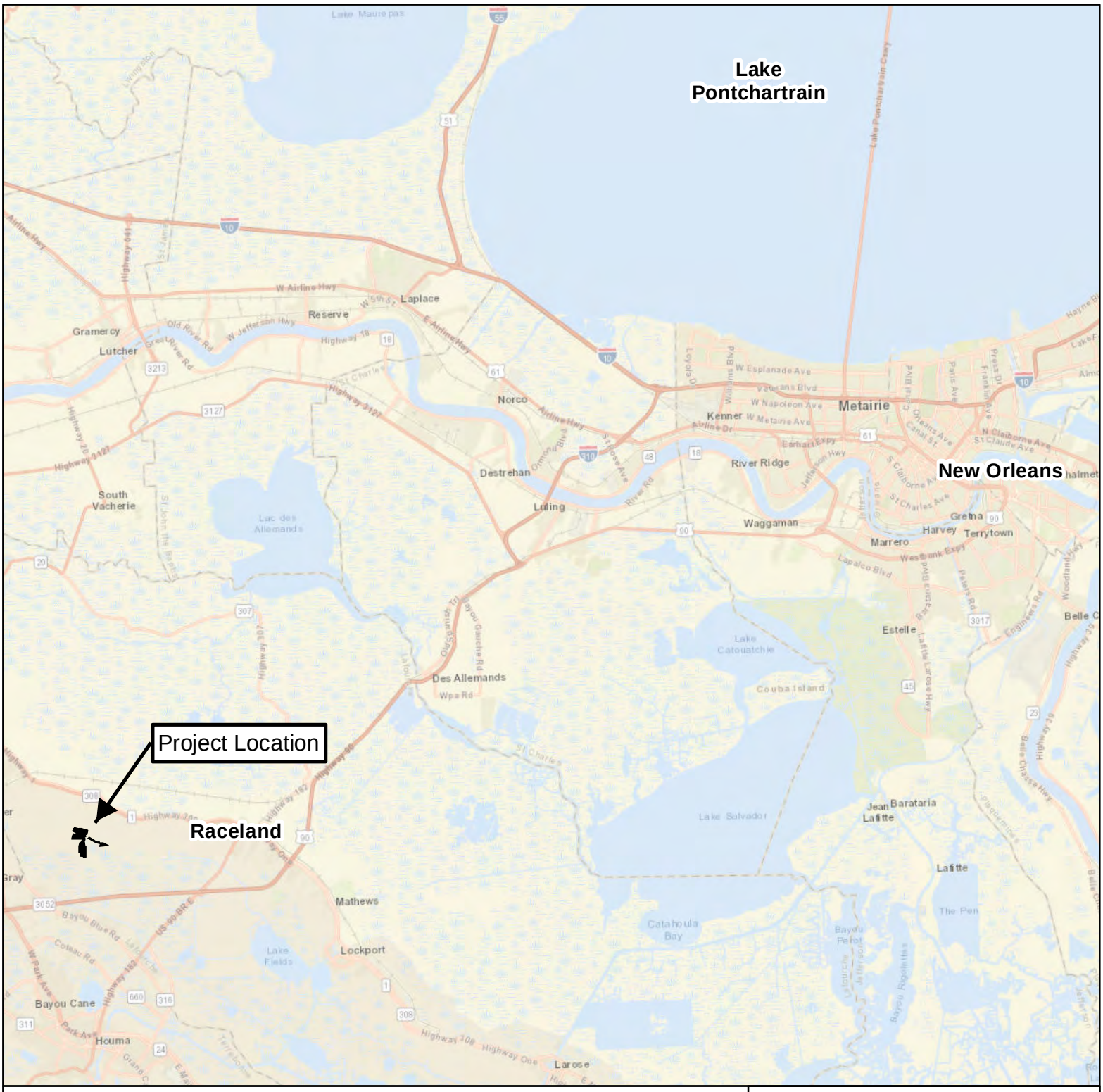
Figures



Legend

Project Boundary (338.2 acres)

6.0 3.0 0 6.0 Miles

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

N

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

VICINITY MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 1

Legend

Project Boundary (338.2 acres)

6.0 3.0 0 6.0 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

VICINITY MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	08/24/2023
Map No. :	

FIGURE 1a

Legend

Project Boundary (338.2 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.

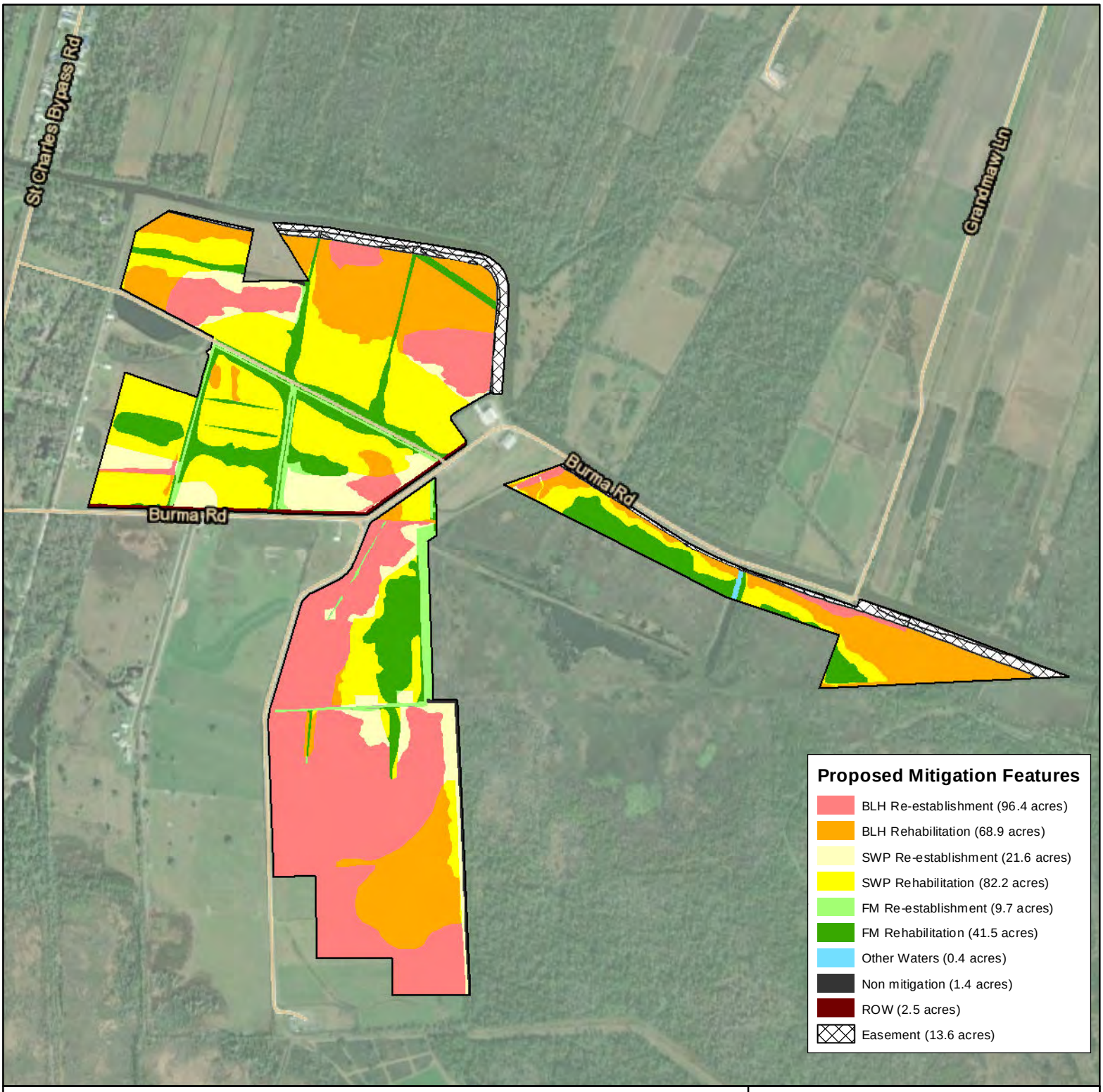
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

AERIAL LOCATION MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 2



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

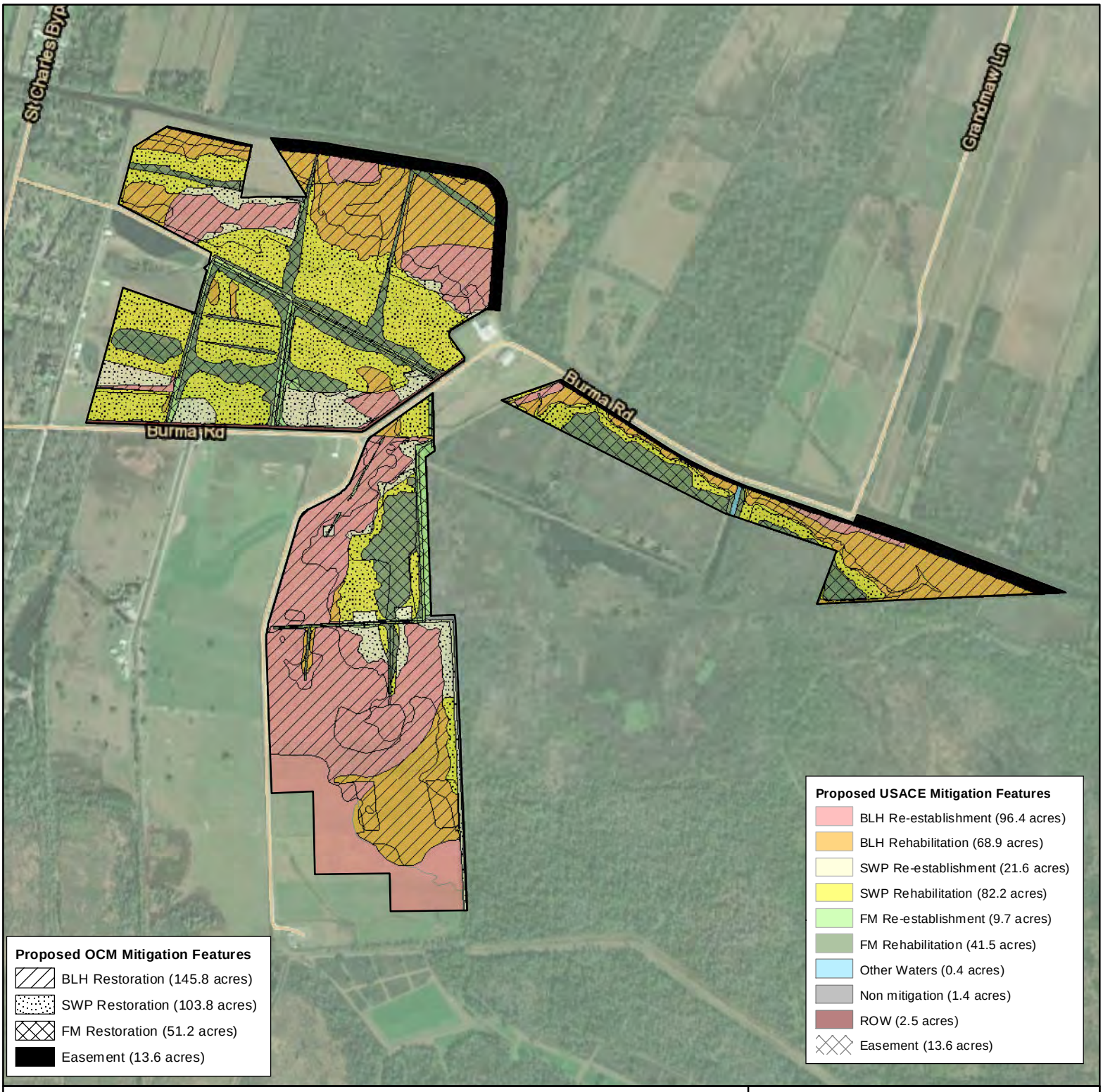
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

MITIGATION FEATURES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 3a



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

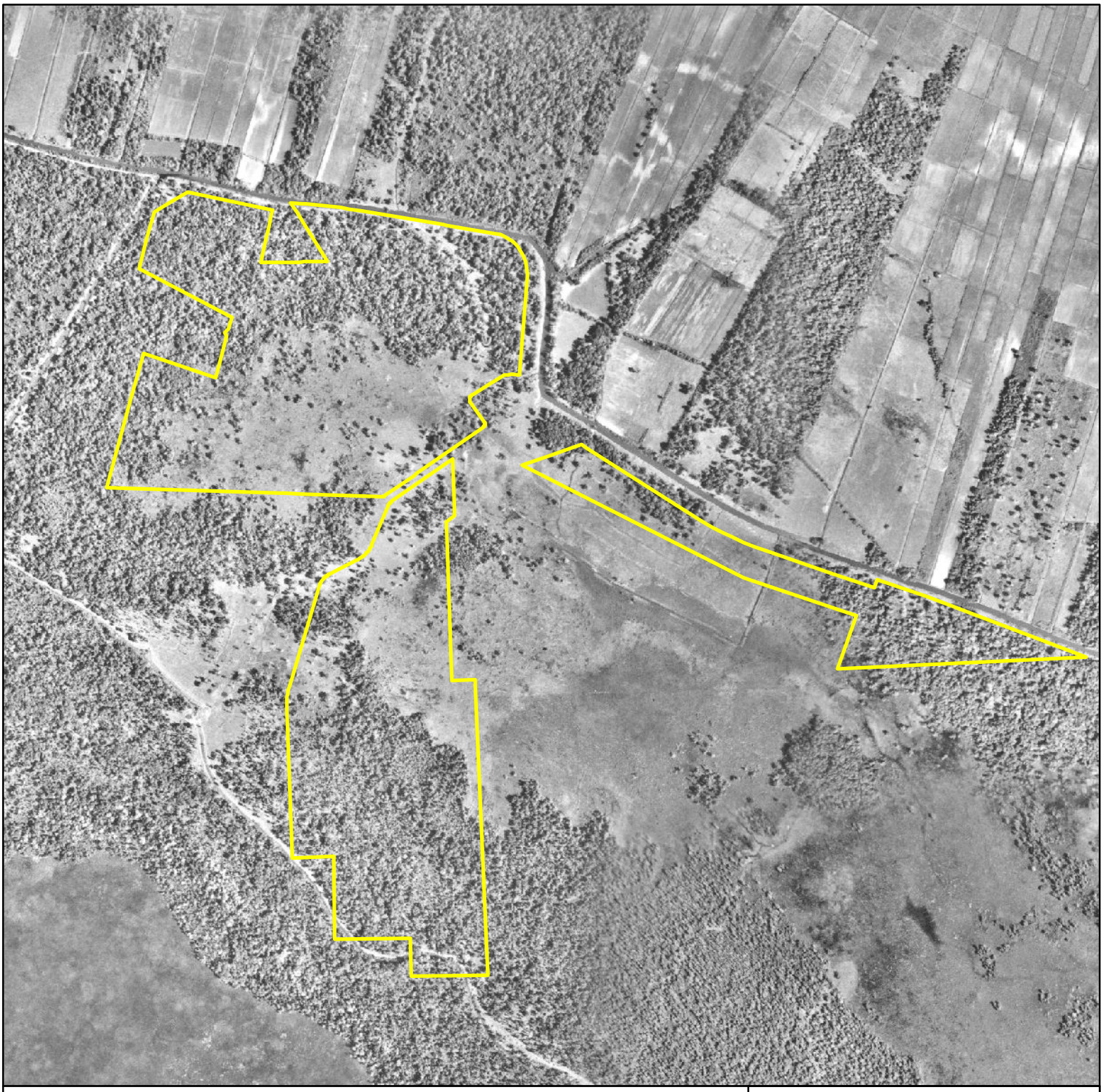
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

MITIGATION FEATURES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 3b



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

1957 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 4

Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

1977 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 5

Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

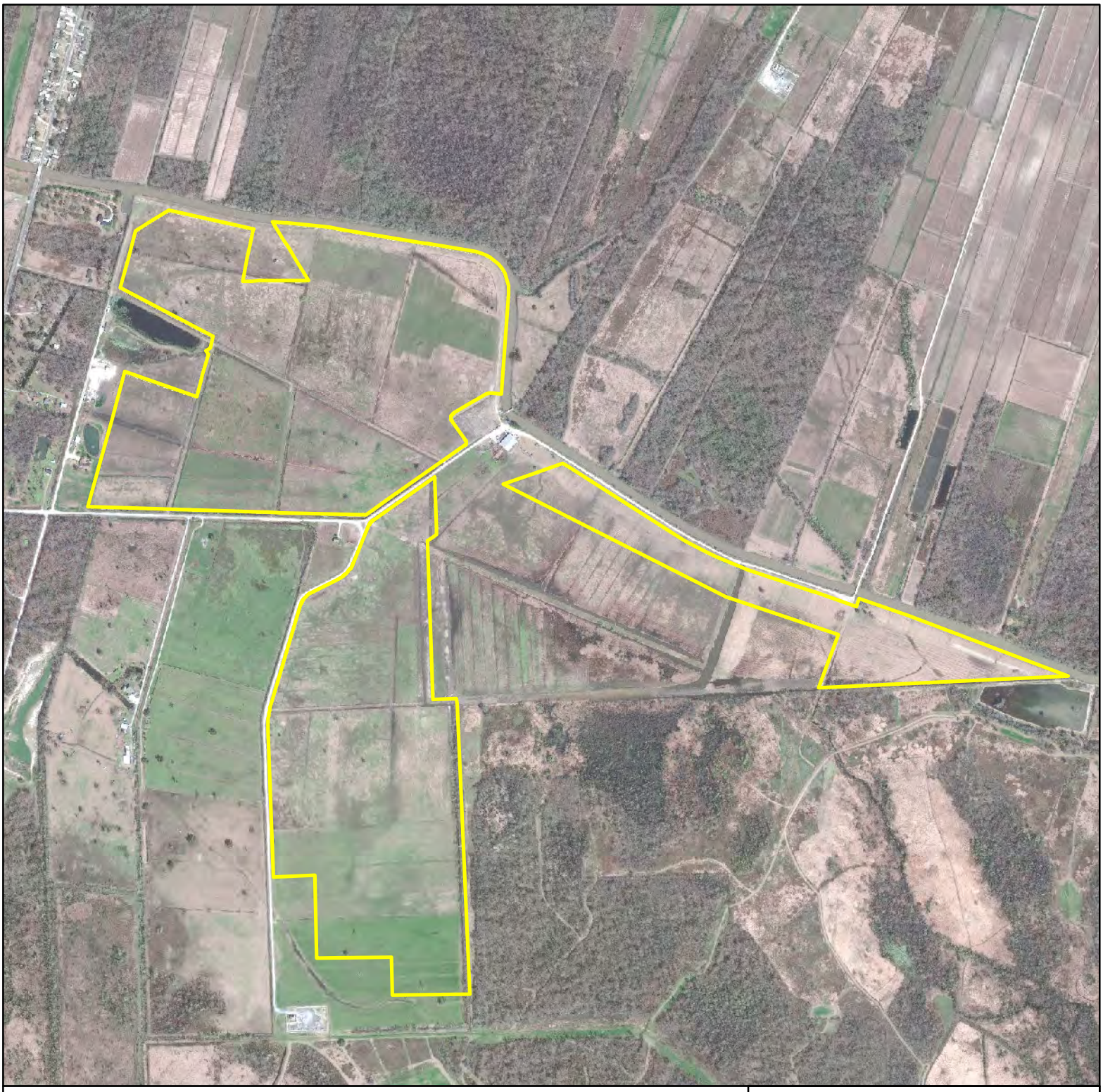
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

1998 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 6



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

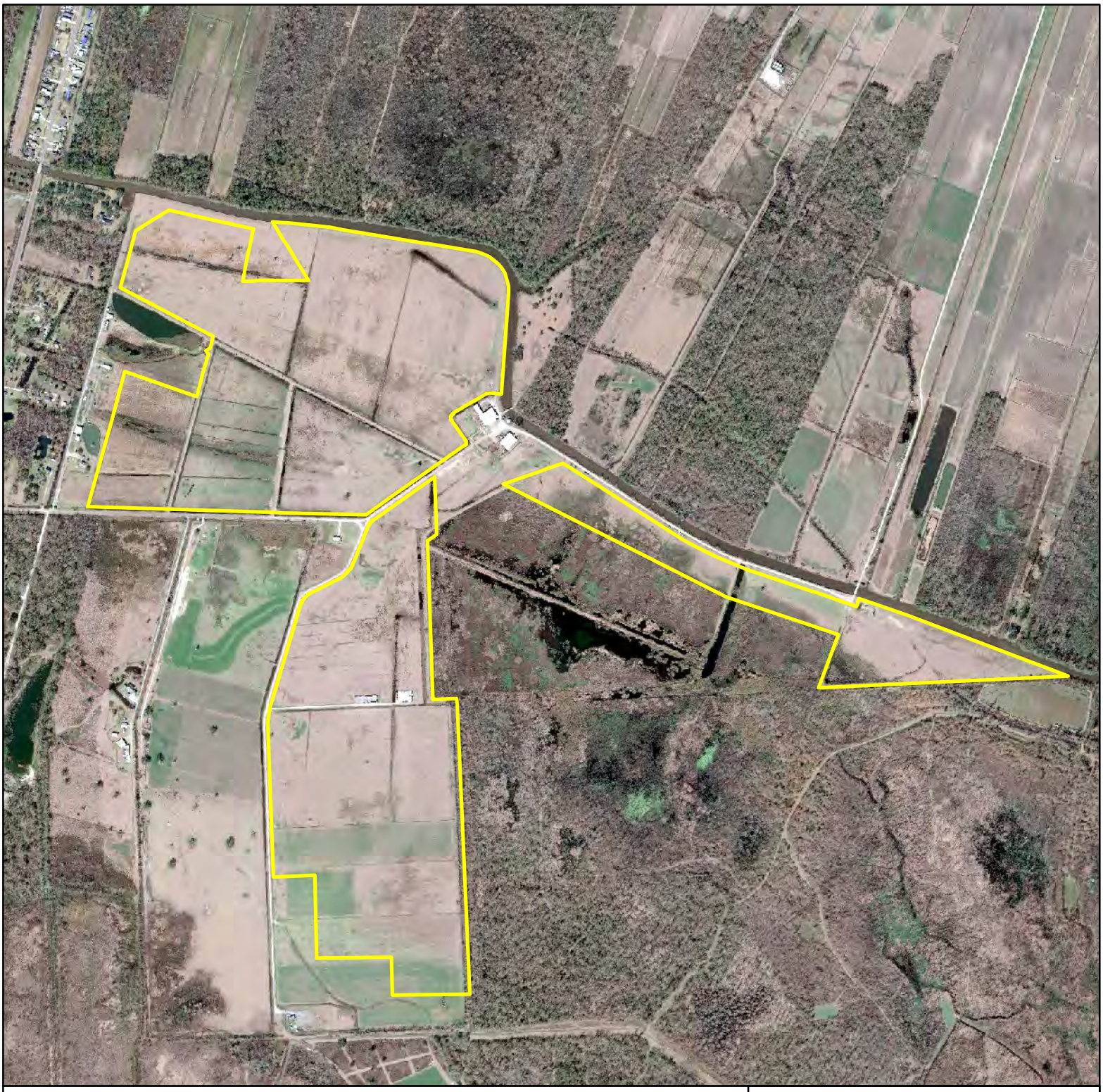
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

2010 HISTORIC AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 7



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

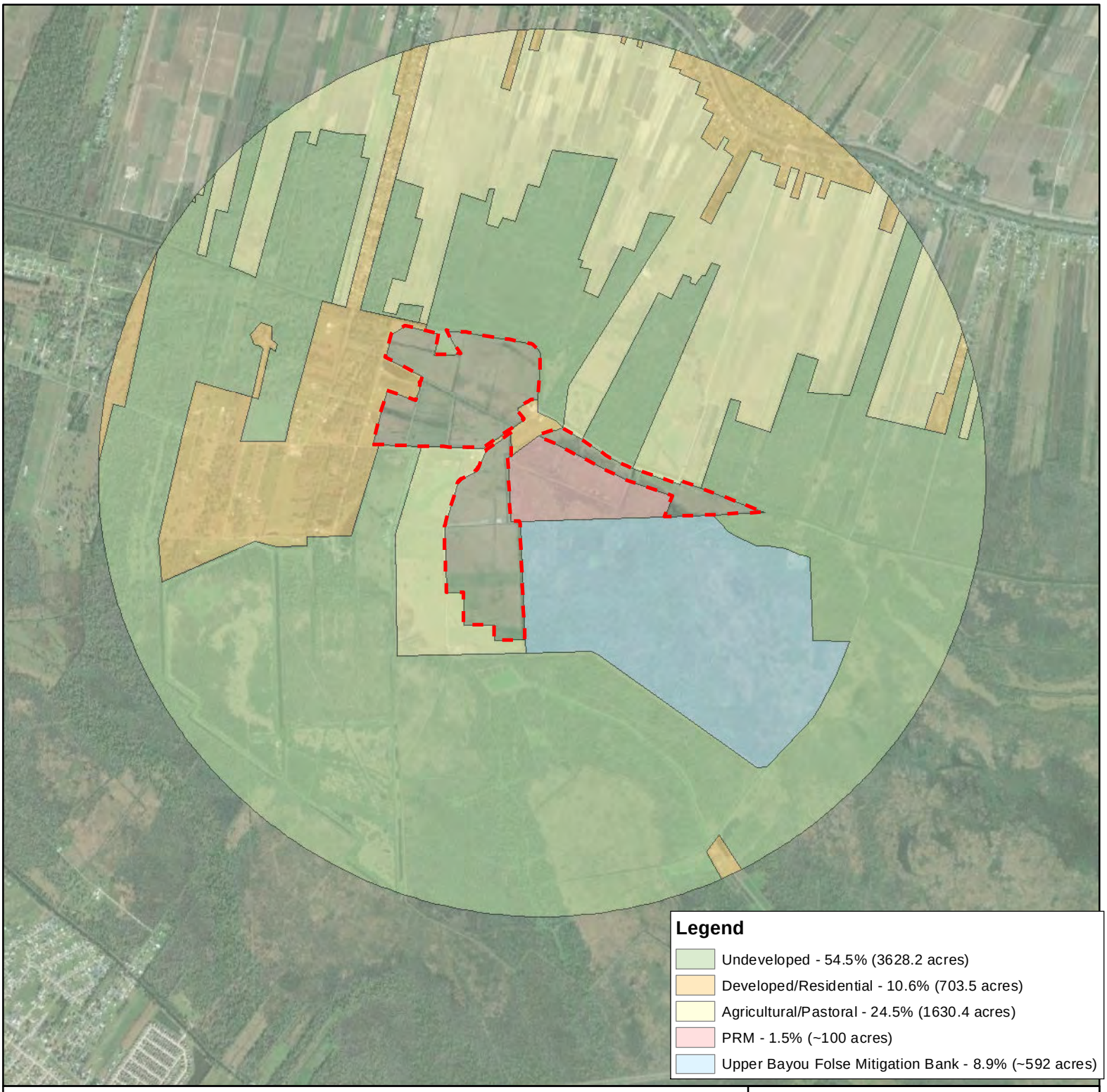
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

2023 CURRENT AERIAL

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 8



Legend

Project Boundary (338.2 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.

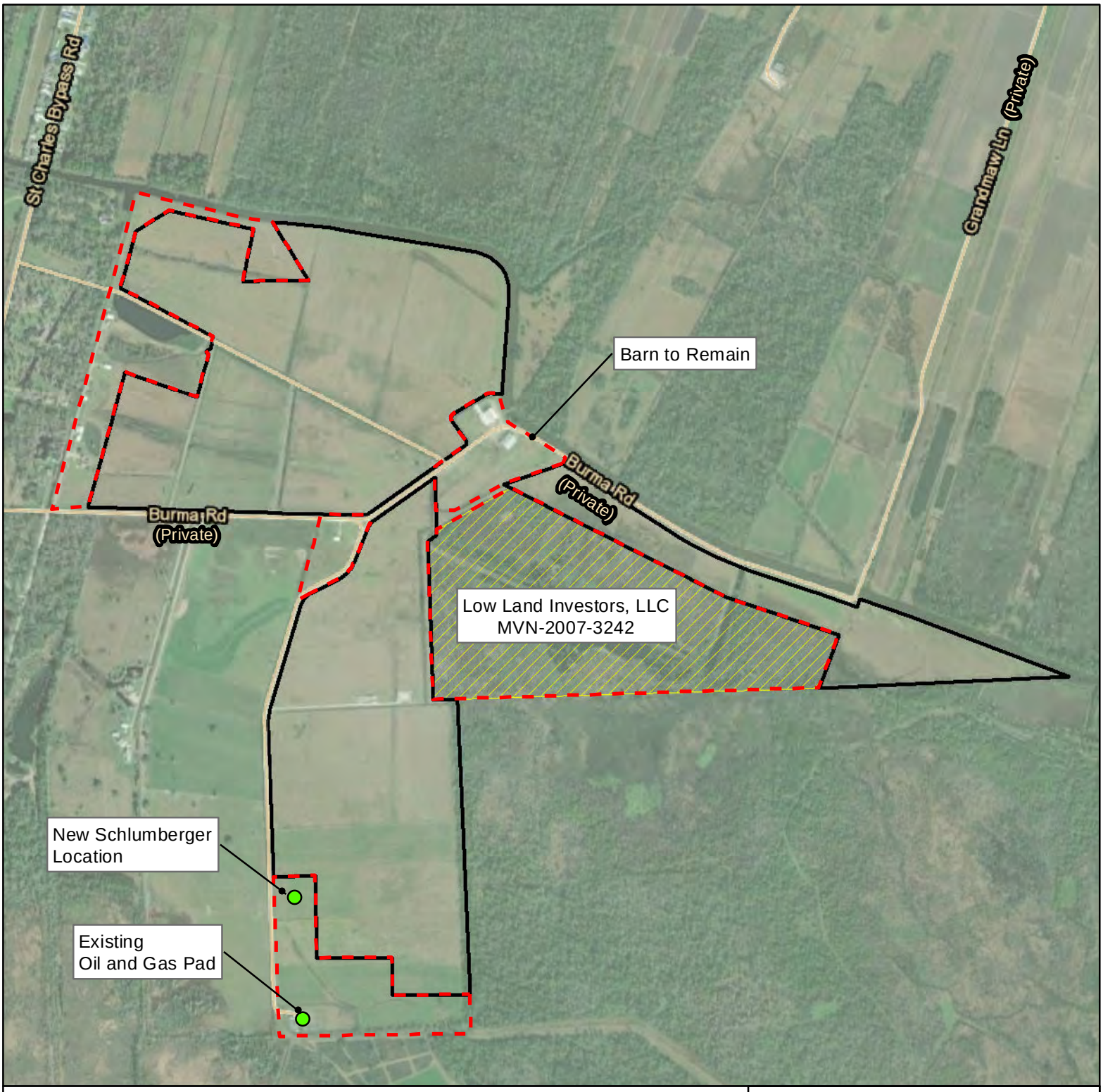
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

SURROUNDING LAND USE

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 9a



Legend

- Project Boundary (338.2 acres)
- Adjacent Properties Controlled by Low Land
- PRM

1,200 600 0 1,200 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

ADJACENT PROPERTIES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 9b

Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 Feet

N

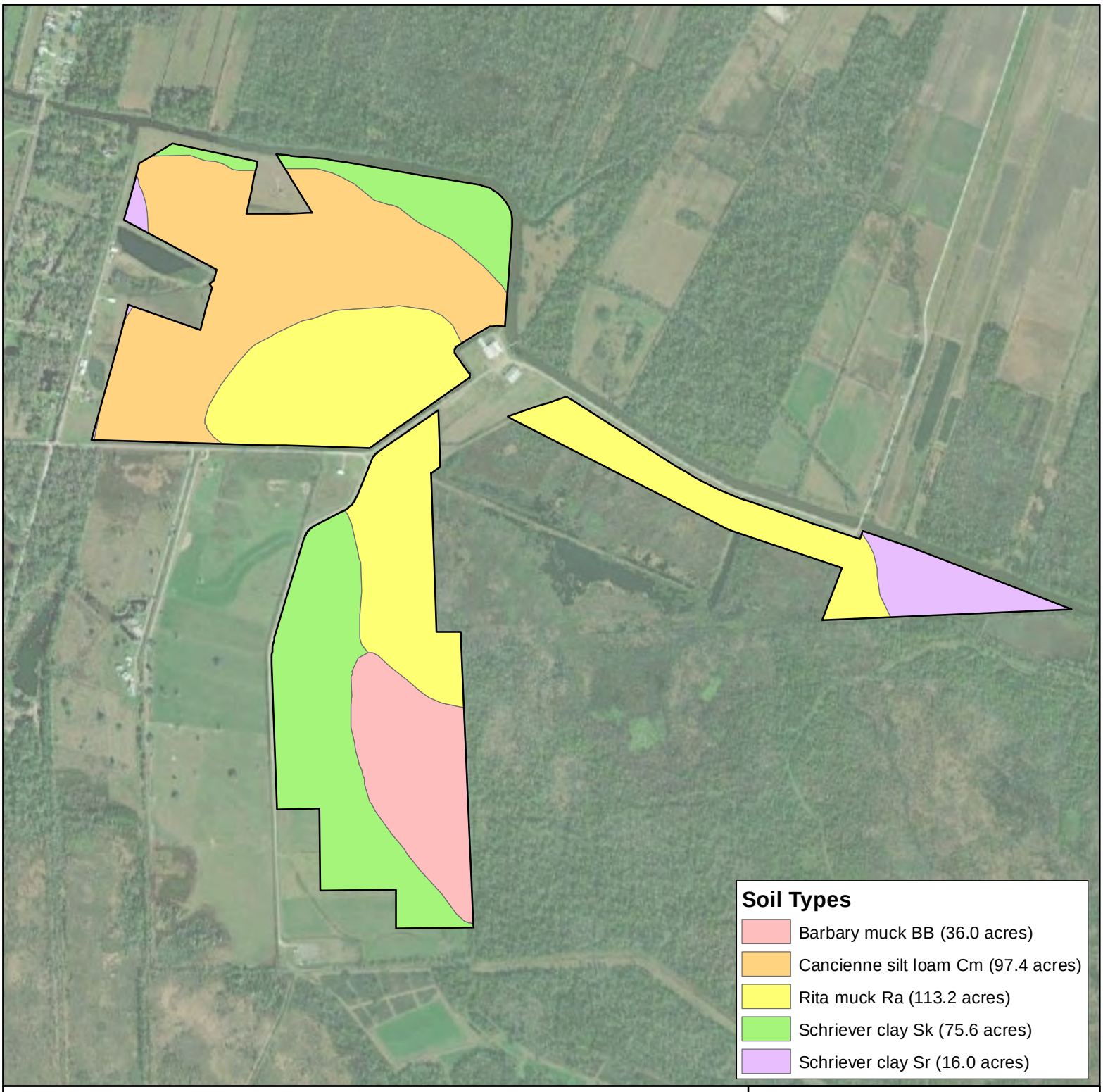
Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

MITIGATION BANKS WITHIN 5 MILES LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 9c



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

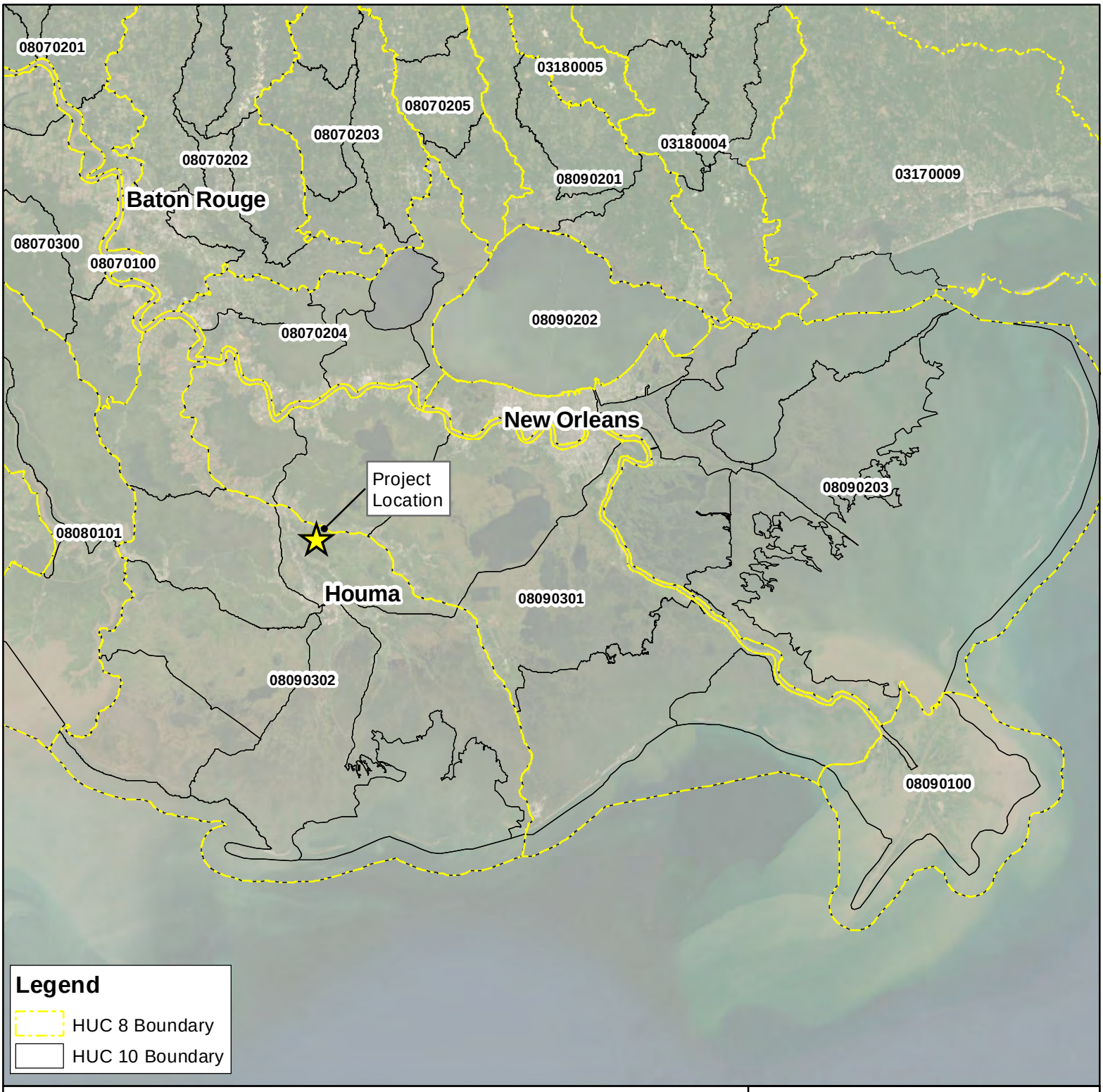
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

SOIL TYPES

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 10



Legend

Project Boundary (338.2 acres)

20.0 10.0 0 20.0 Miles

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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

WATERSHED BOUNDARY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 11a

Legend

Project Boundary (338.2 acres)

4.0 2.0 0 4.0 Miles

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

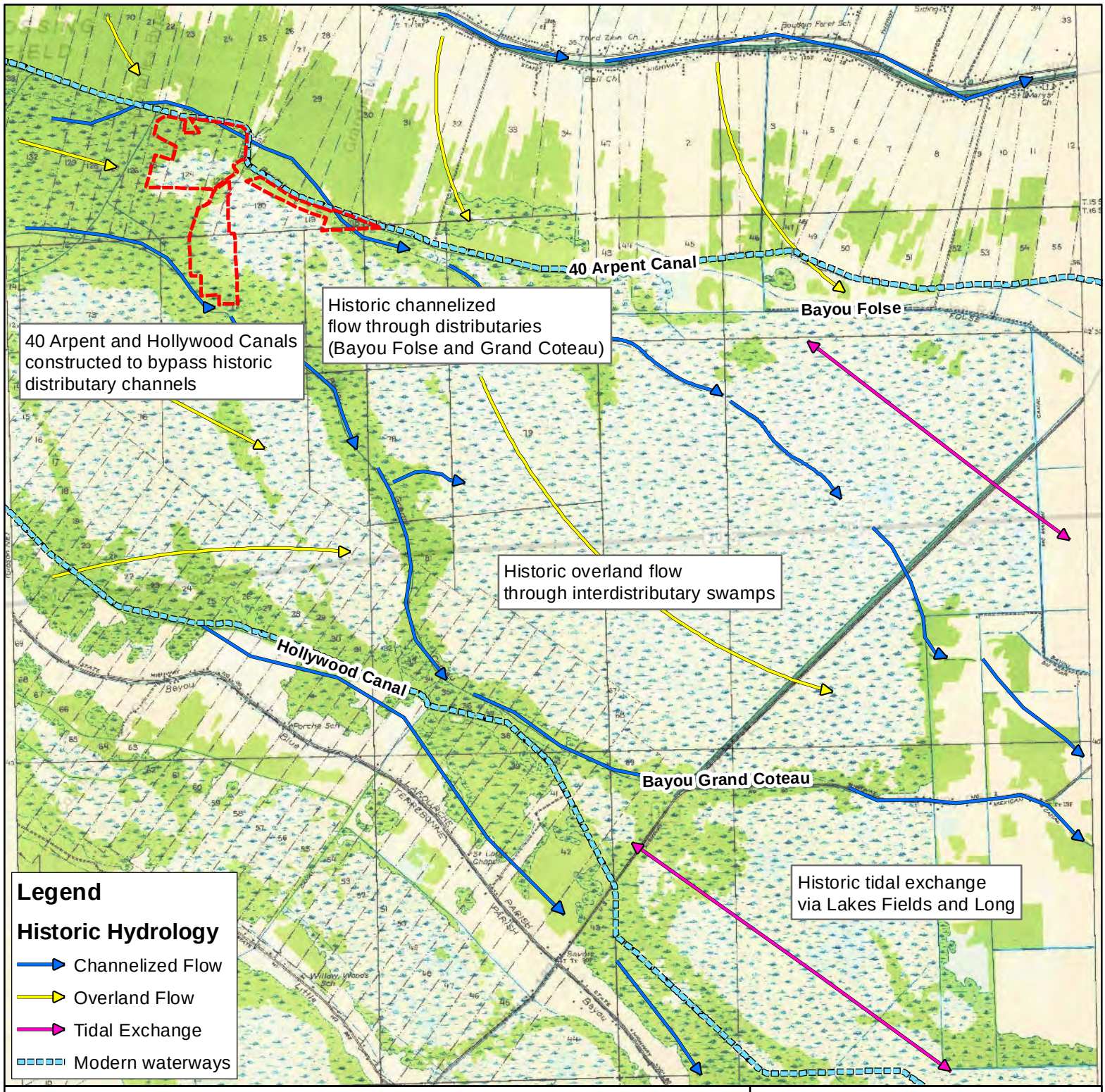
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

WATERSHED BOUNDARY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 11b



Legend

Project Boundary (338.2 acres)

5,000 2,500 0 5,000 Feet

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

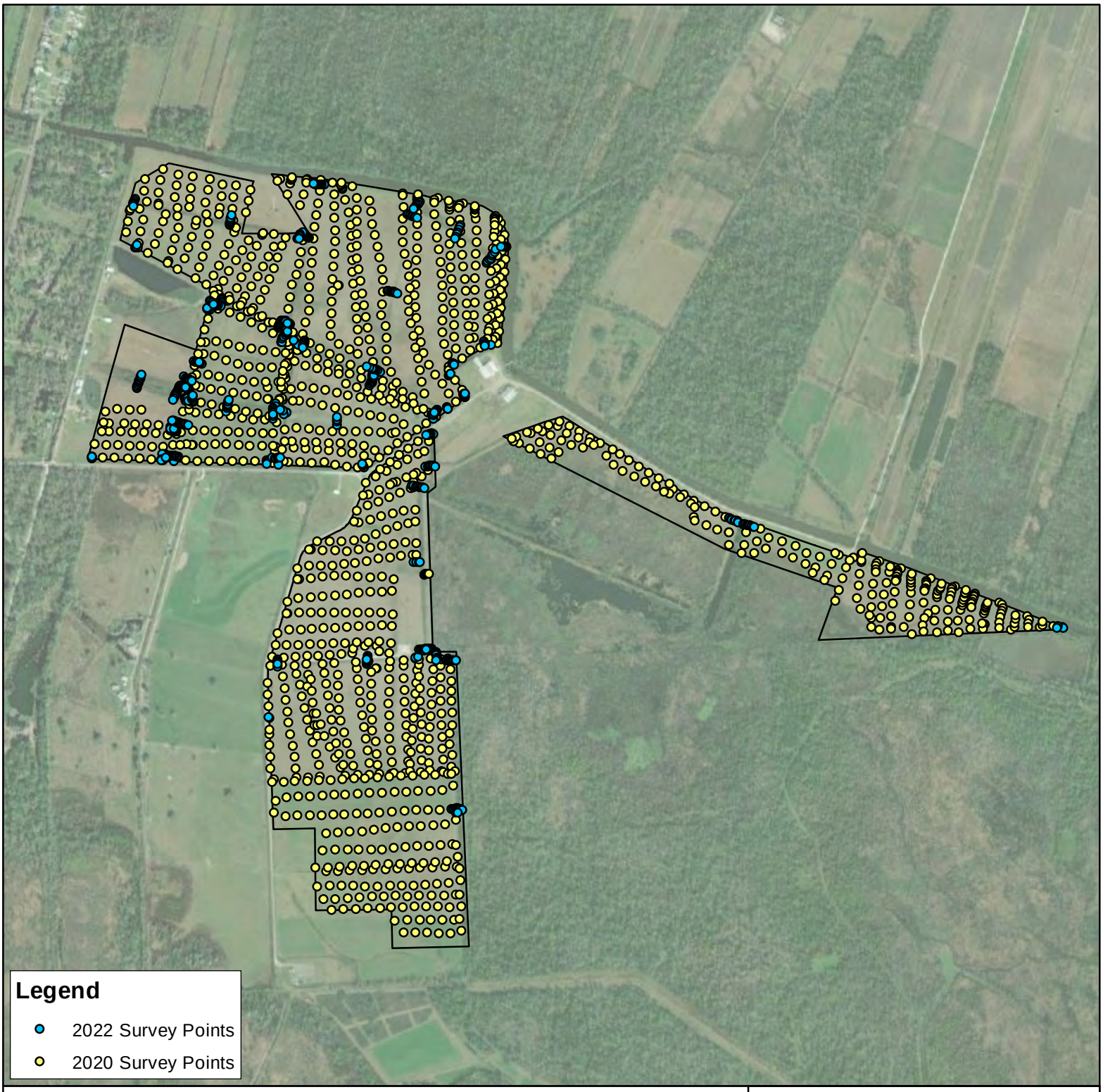
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HISTORIC HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 12



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

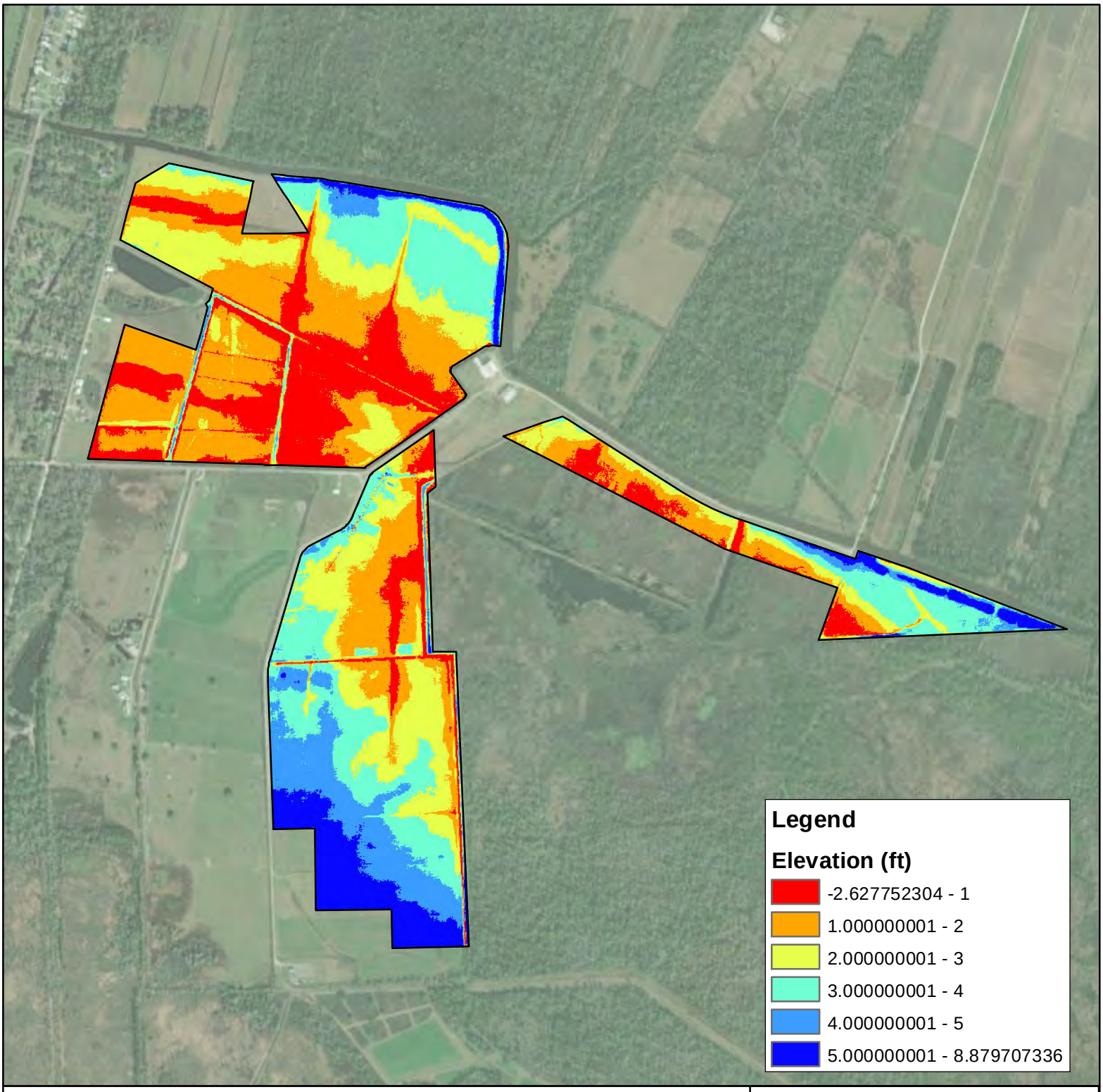
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

SURVEY POINTS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 13



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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. 2018 LIDAR adjusted with 2020 survey data.

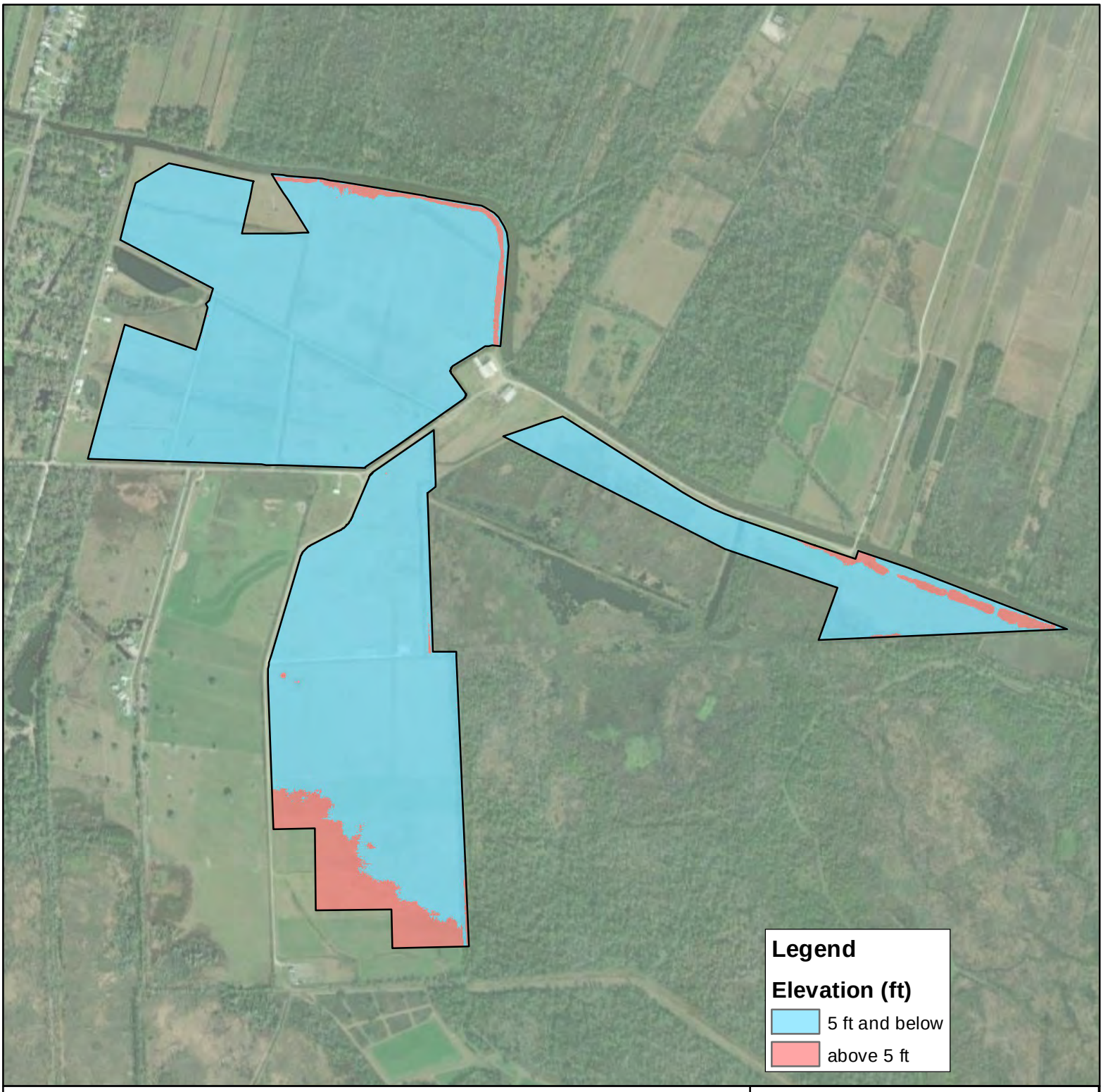
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

LIDAR

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 14a



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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. 2018 LIDAR adjusted with 2020 survey data.

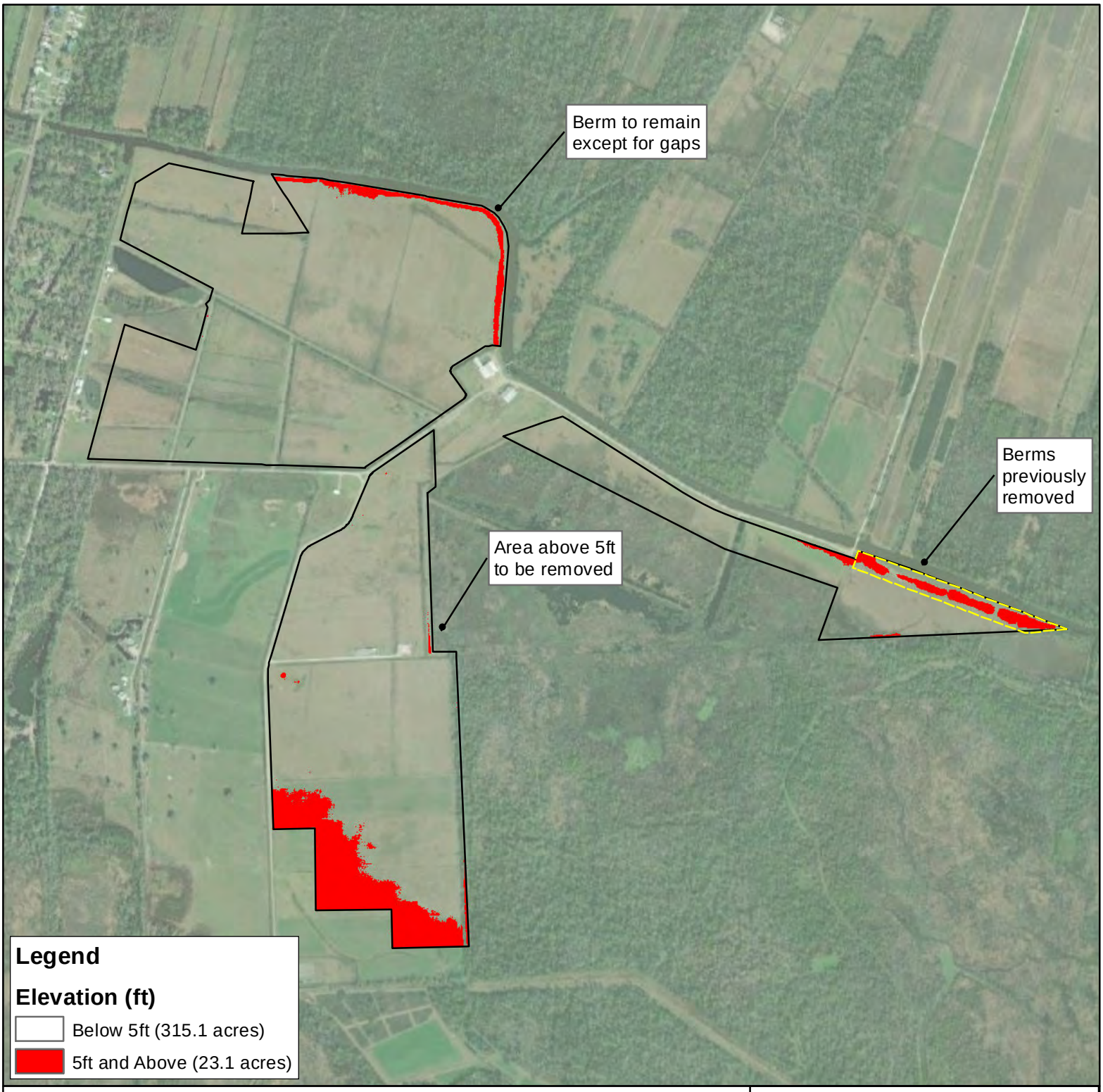
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

LIDAR

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 14b



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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. 2018 LIDAR adjusted with 2020 survey data.

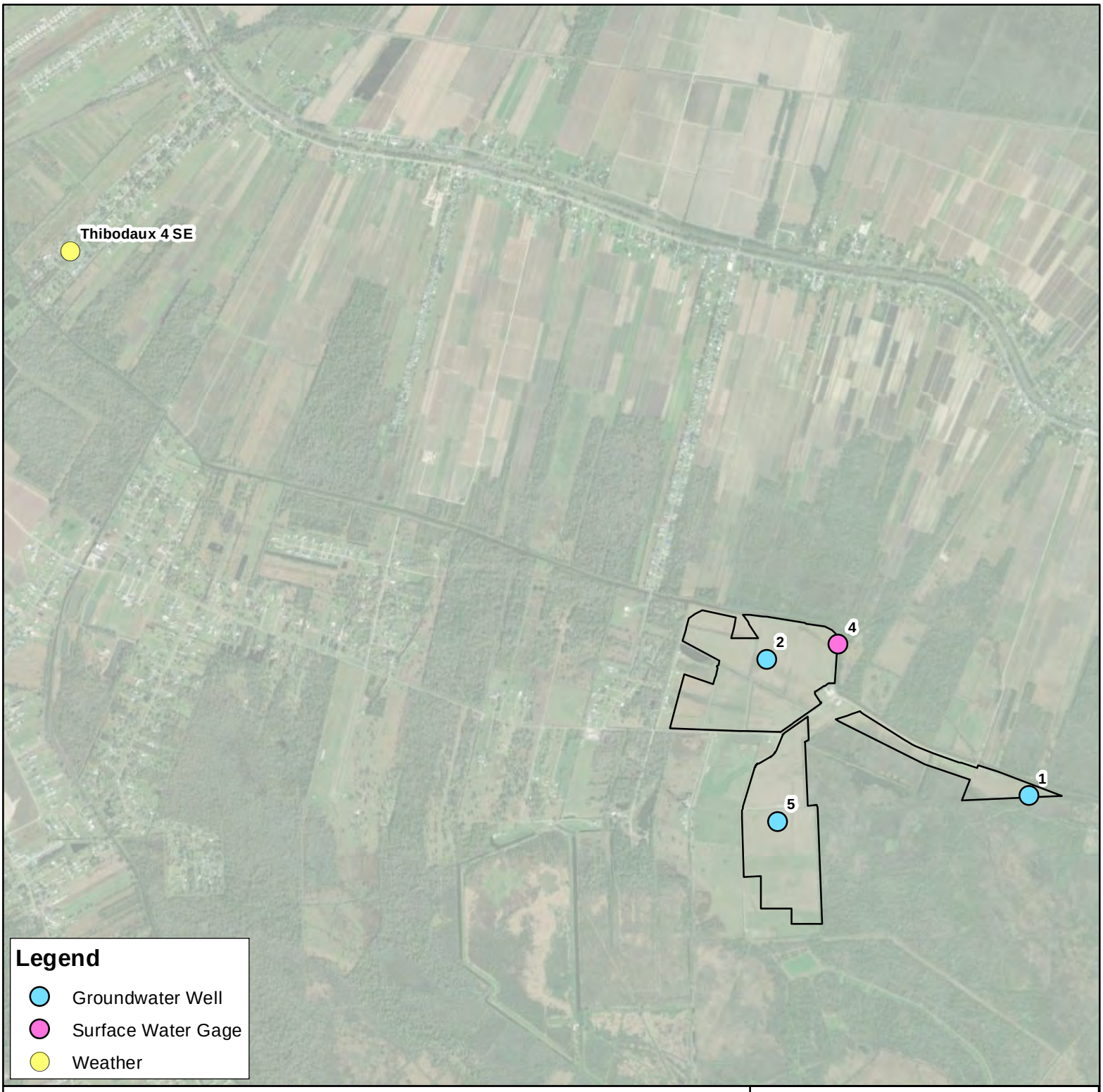
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

FIVE FOOT CONTOUR

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 15



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 Feet

N

Map Notes:

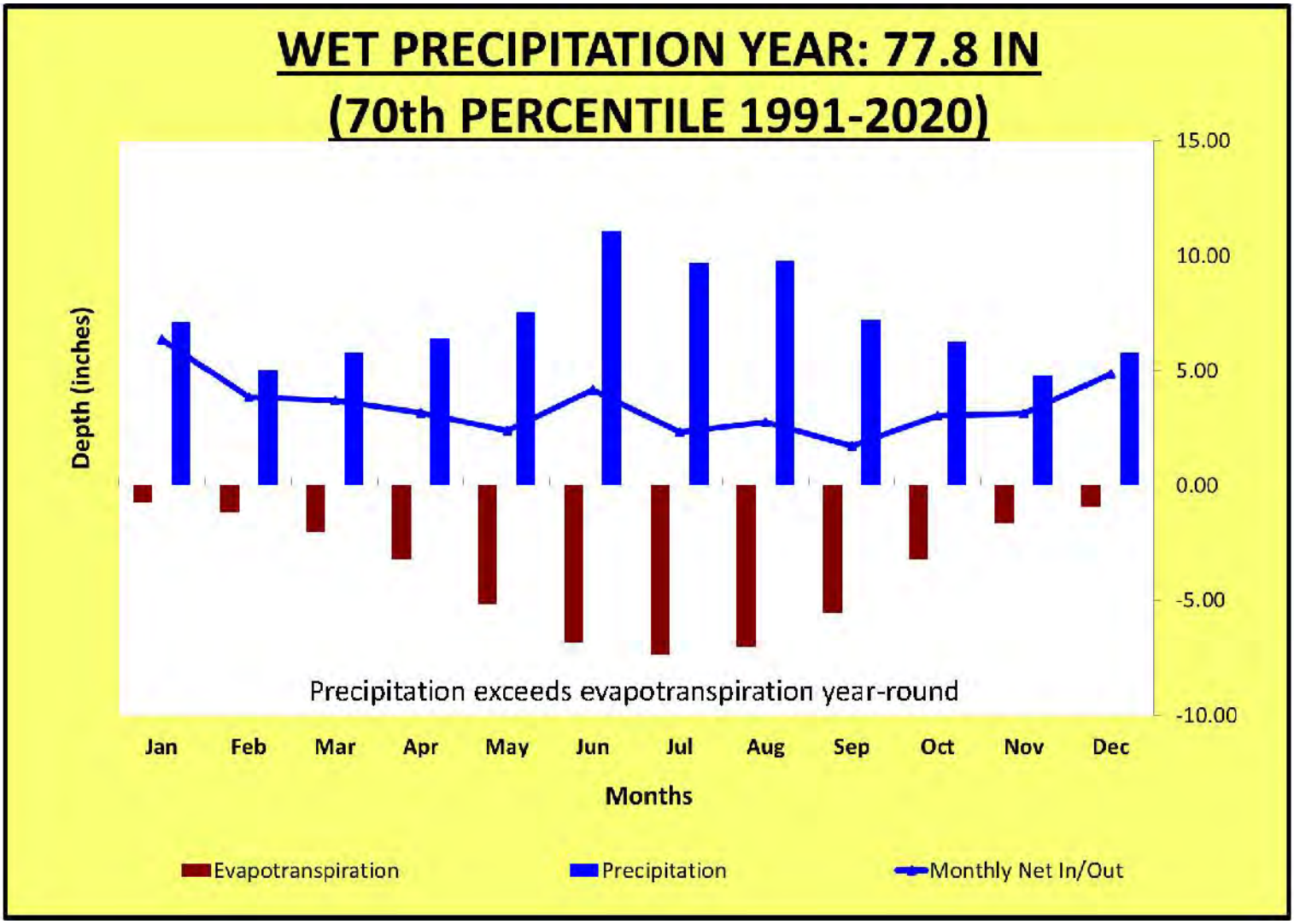
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

WELL & WEATHER STATION LOCATIONS
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 16

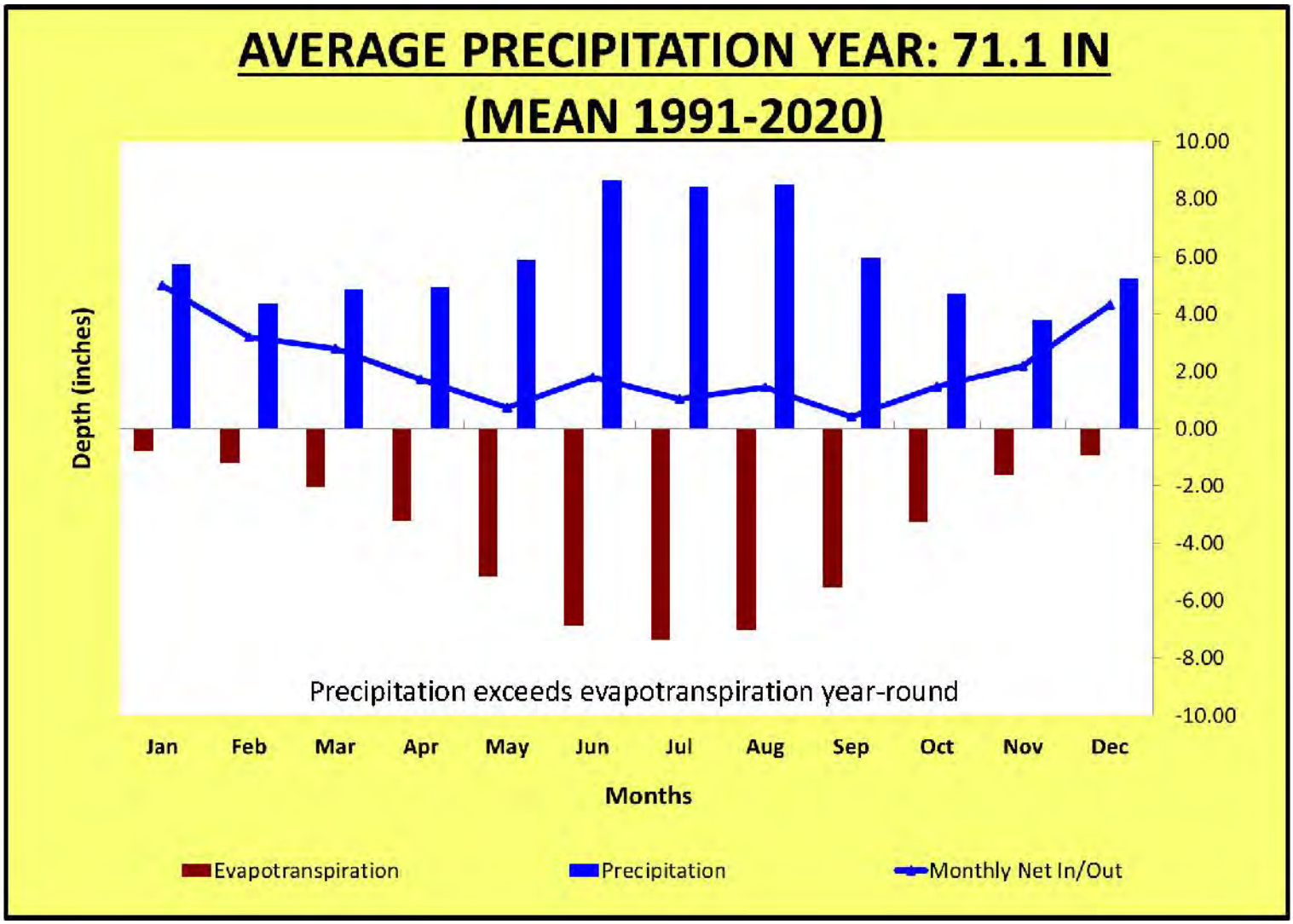


Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

Zero Ranch Mitigation Bank	
Low Land Investors, LLC	
Houma, LA	
CLIMATE HYDROGRAPH	
LAFOURCHE PARISH, LA	
Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	
FIGURE 17a	

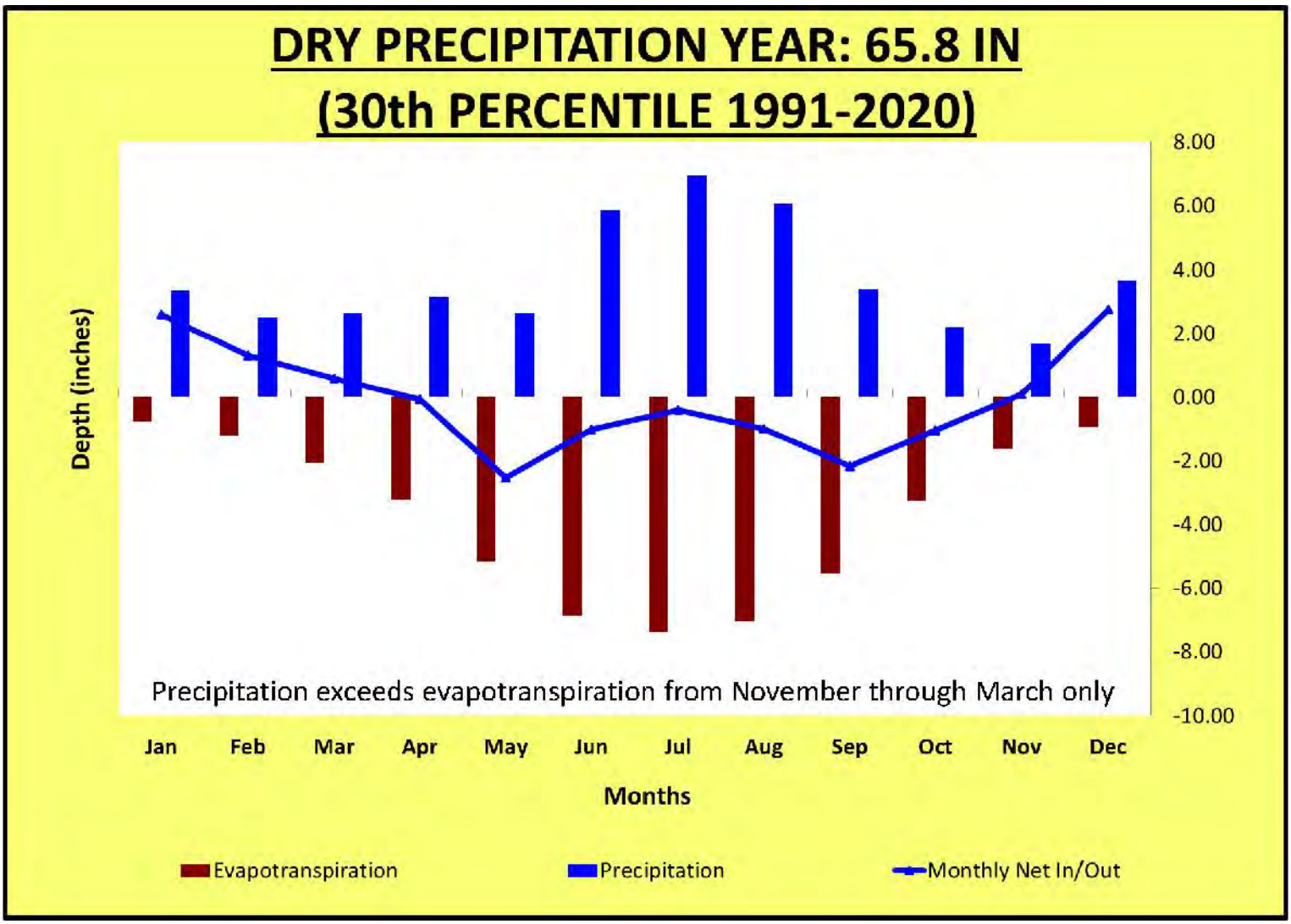


Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

Zero Ranch Mitigation Bank **Low Land Investors, LLC** **Houma, LA**	
CLIMATE HYDROGRAPH **LAFOURCHE PARISH, LA**	
Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
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.

NRP

N

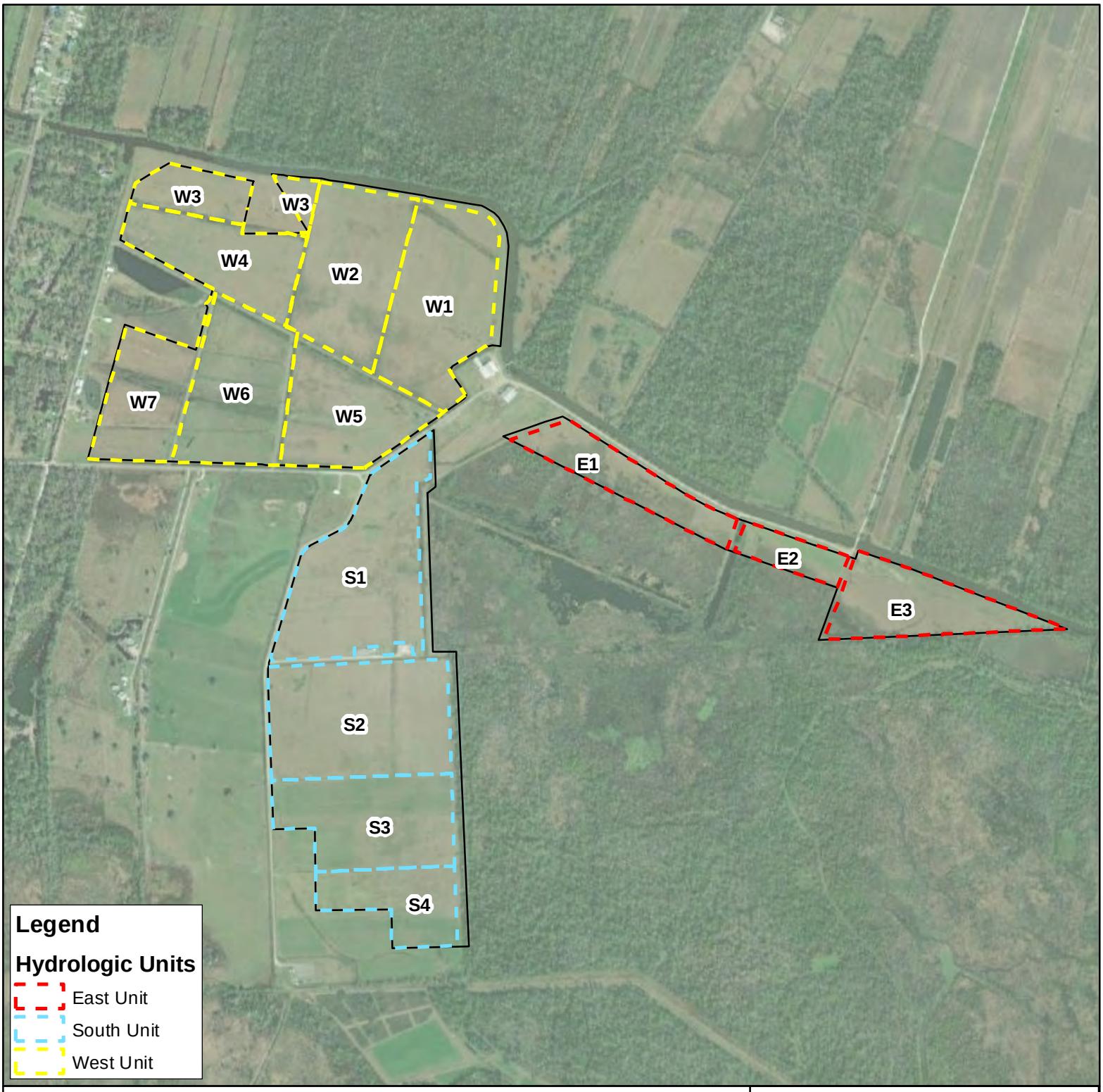
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CLIMATE HYDROGRAPH

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 17c



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 Feet

N

NRP

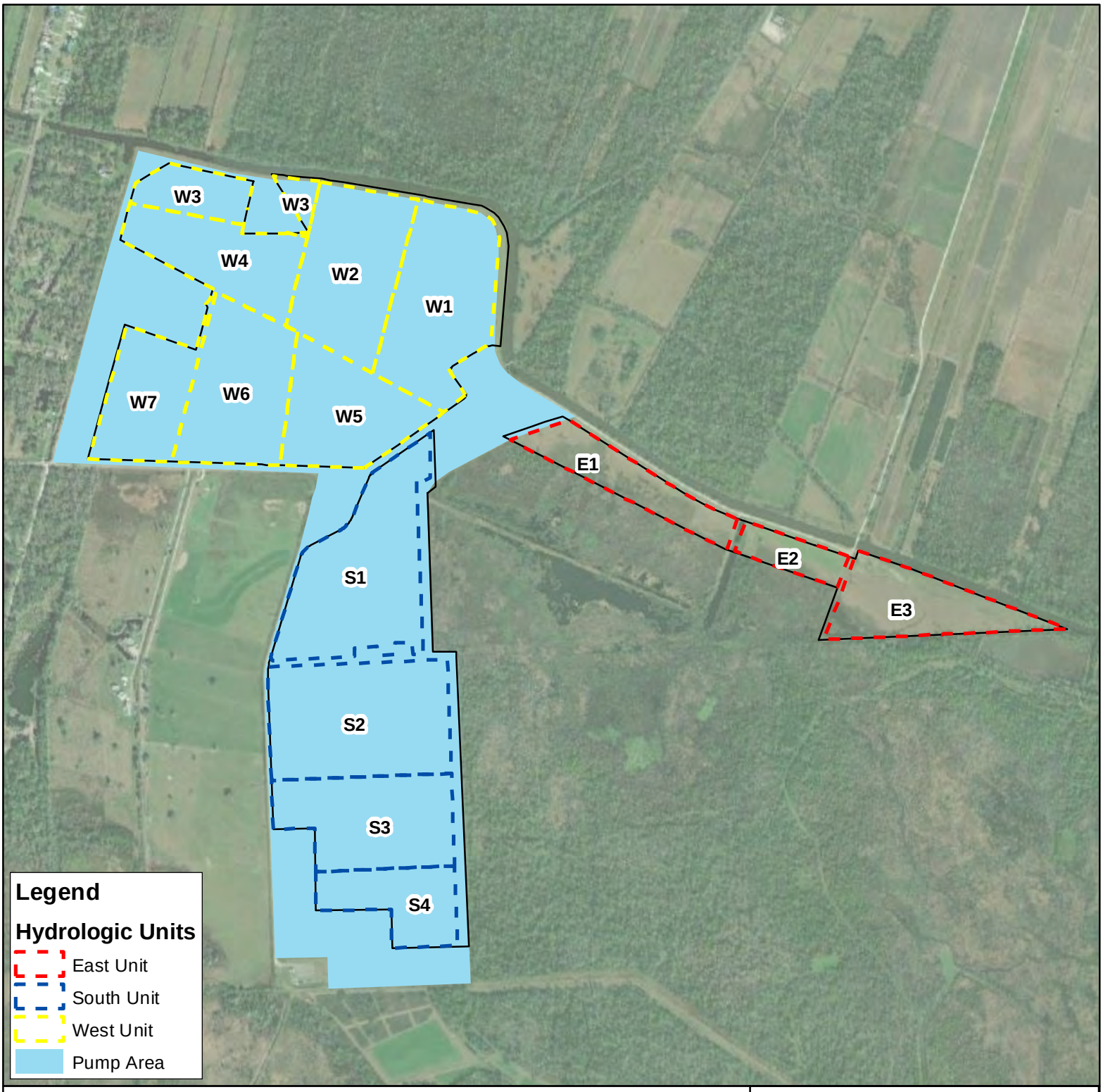
Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HYDROLOGIC UNITS & PASTURE NAMES
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 18



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

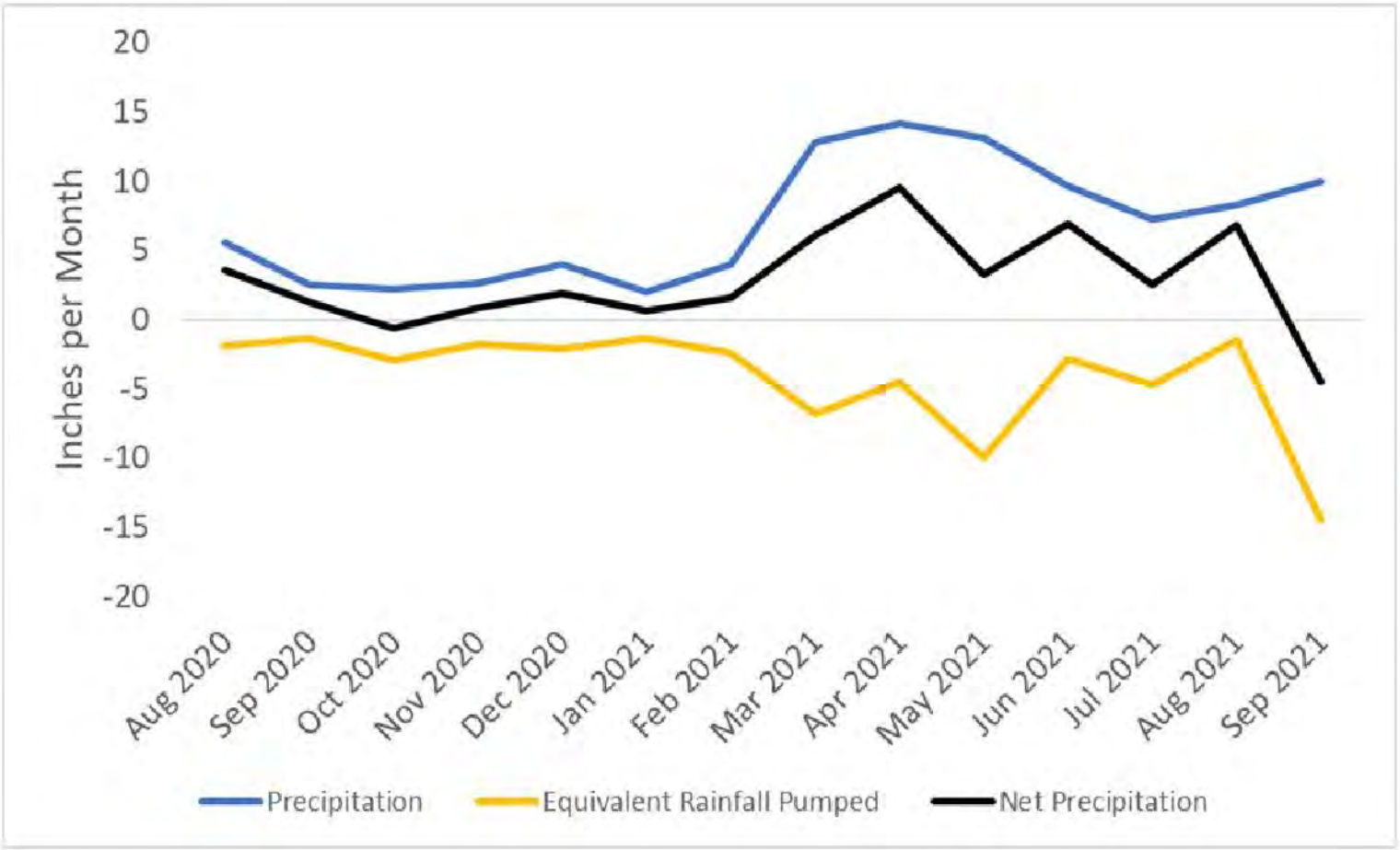
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

PUMP AREA

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 19



Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

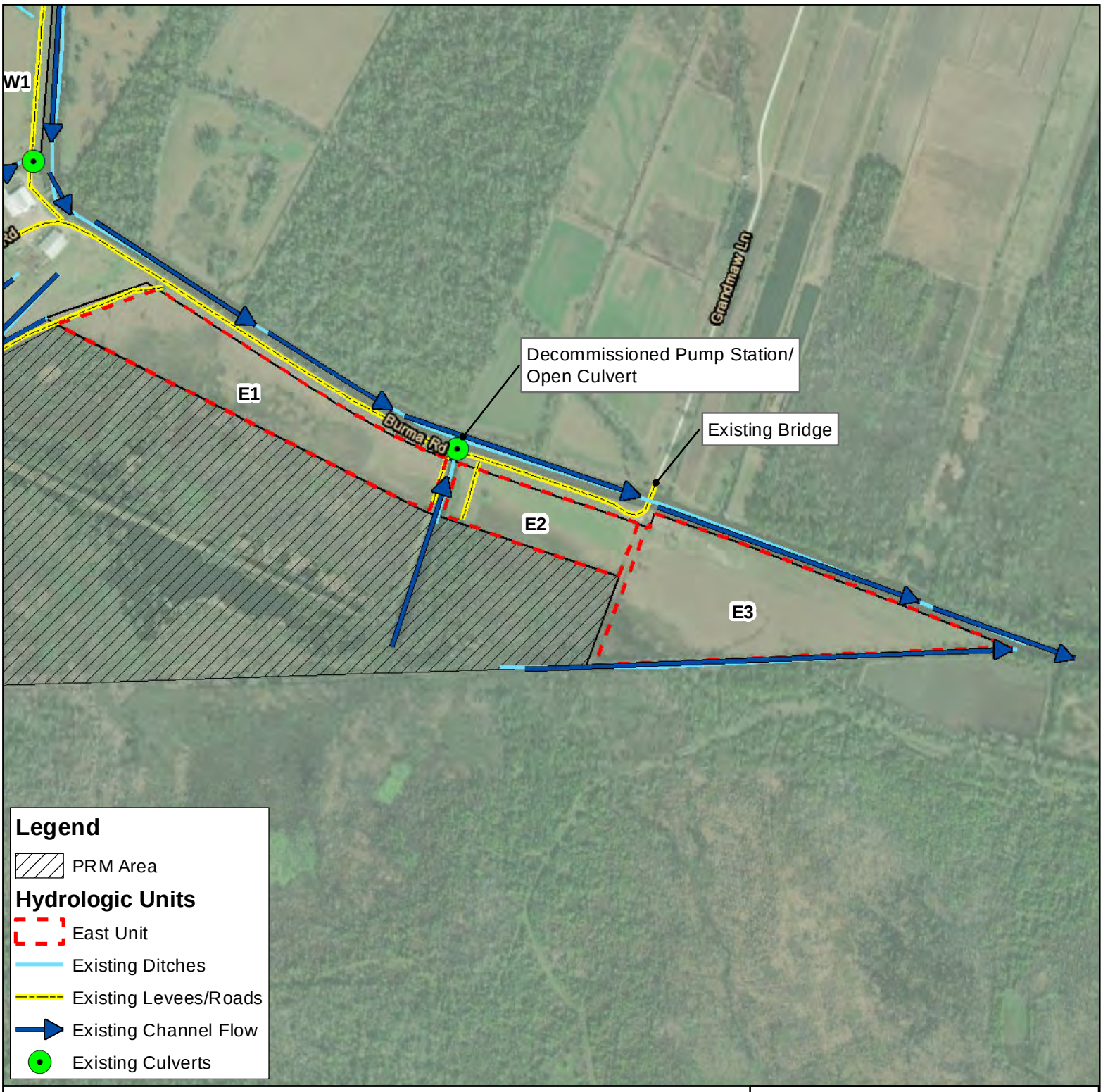
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

PUMPING HYDROGRAPH

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 20



Legend

Project Boundary (338.2 acres)

700 350 0 700 Feet

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

N

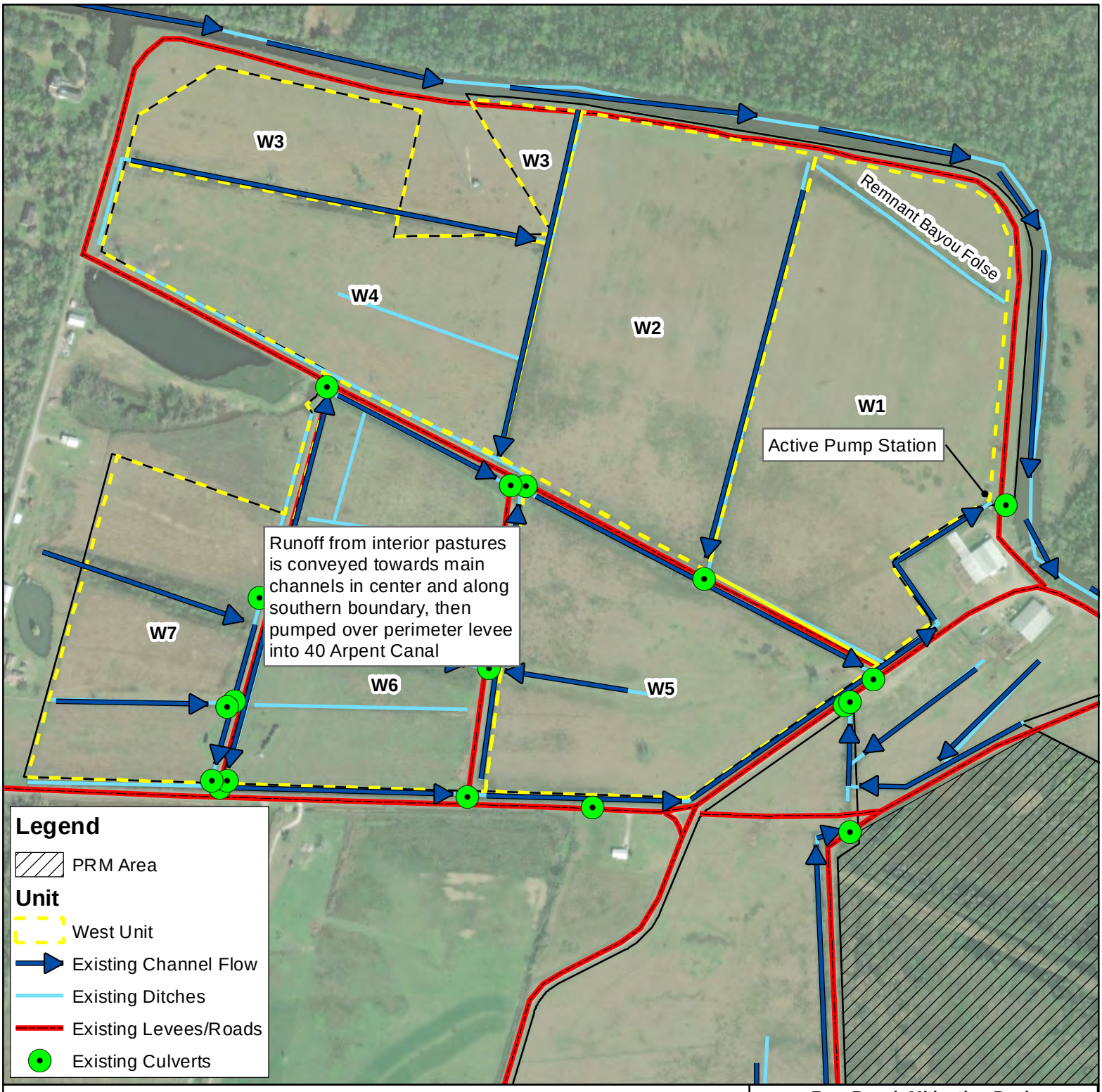
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

EAST UNIT CURRENT HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 21a



Legend

Project Boundary (338.2 acres)

500 250 0 500 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.

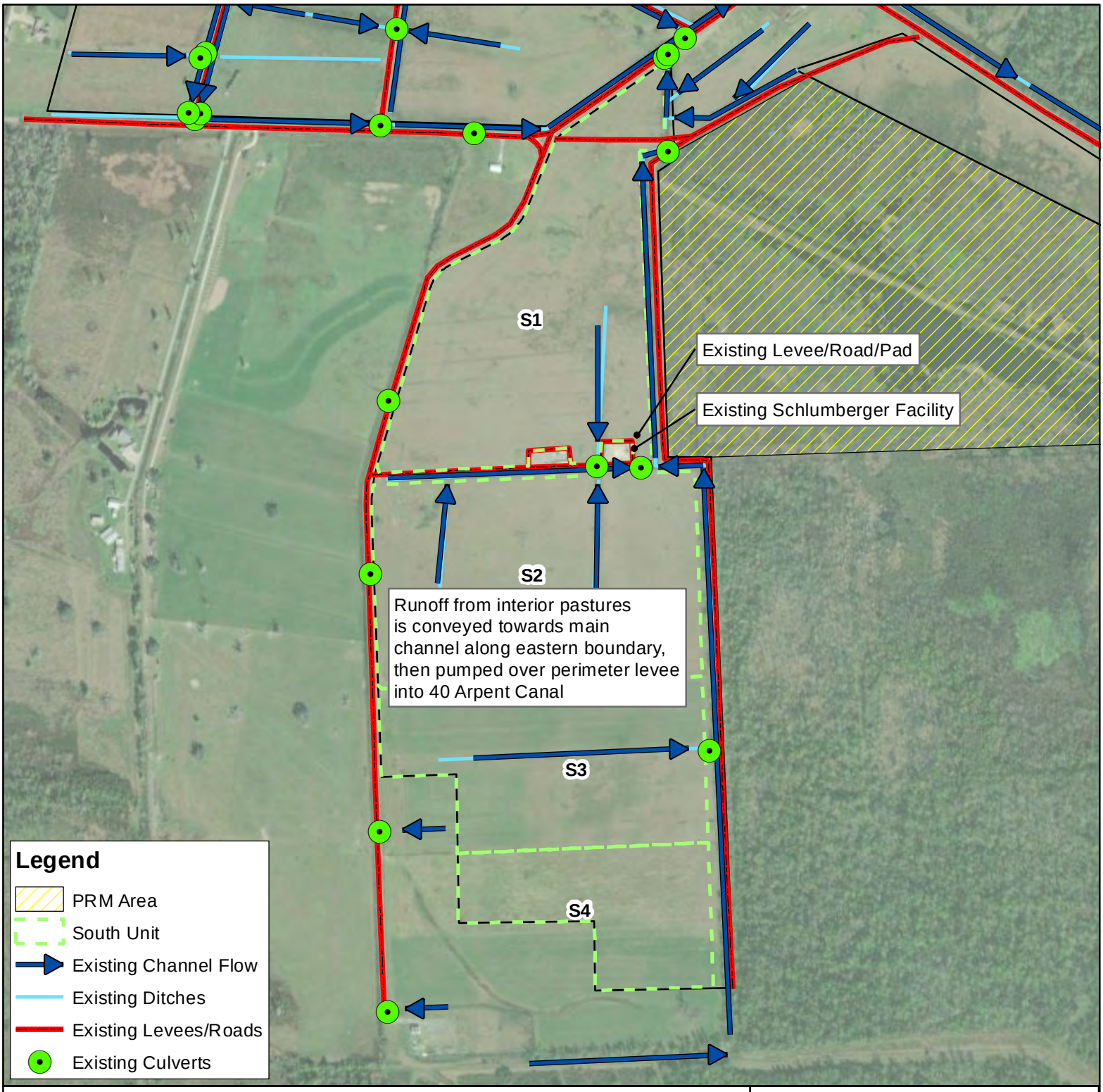
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

WEST UNIT CURRENT HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 21b



Legend

Project Boundary (338.2 acres)

500 250 0 500 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.

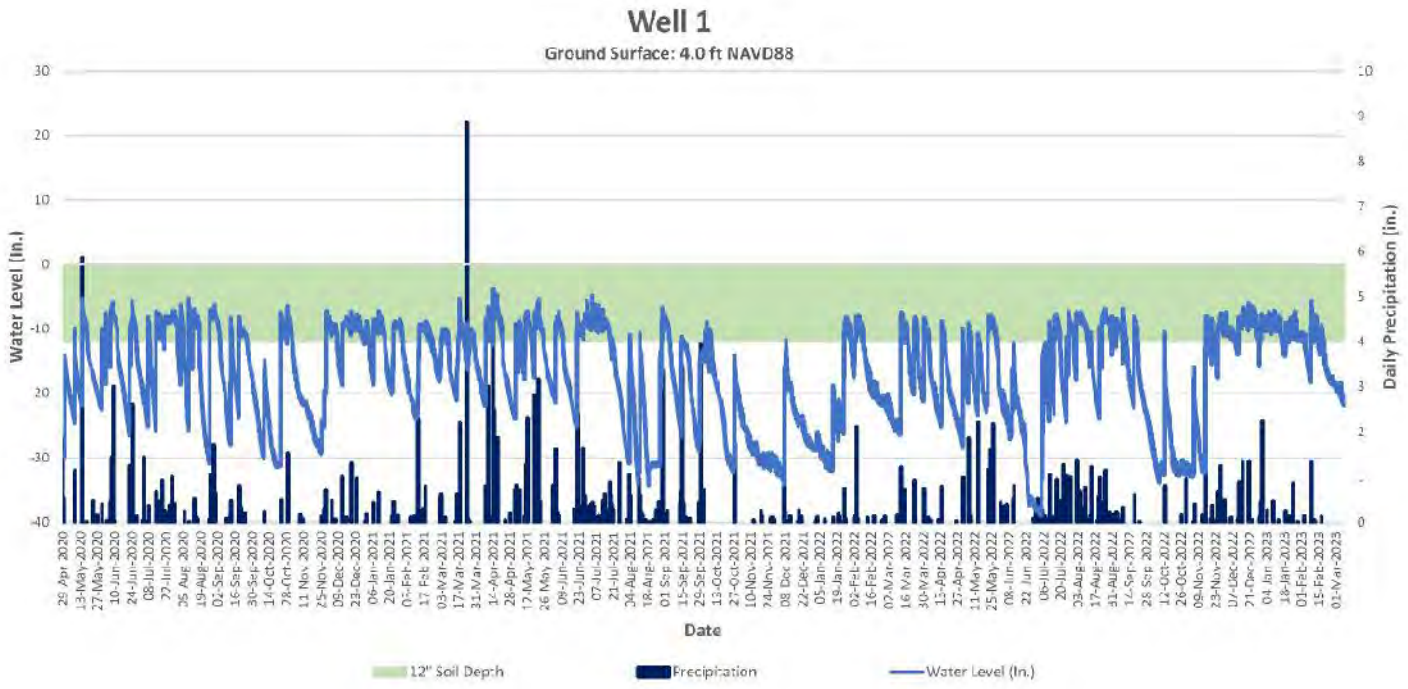
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

SOUTH UNIT CURRENT HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 21c



Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

GROUNDWATER WELL 1

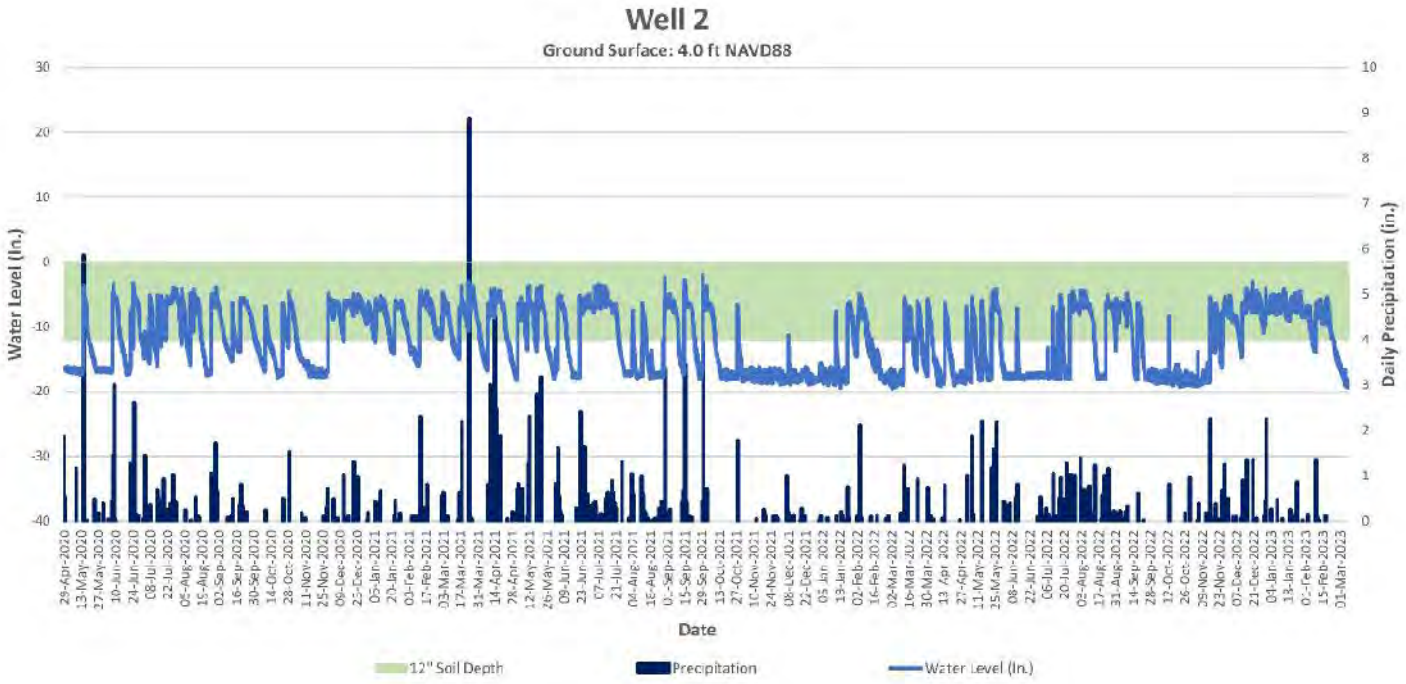
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 22a

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.

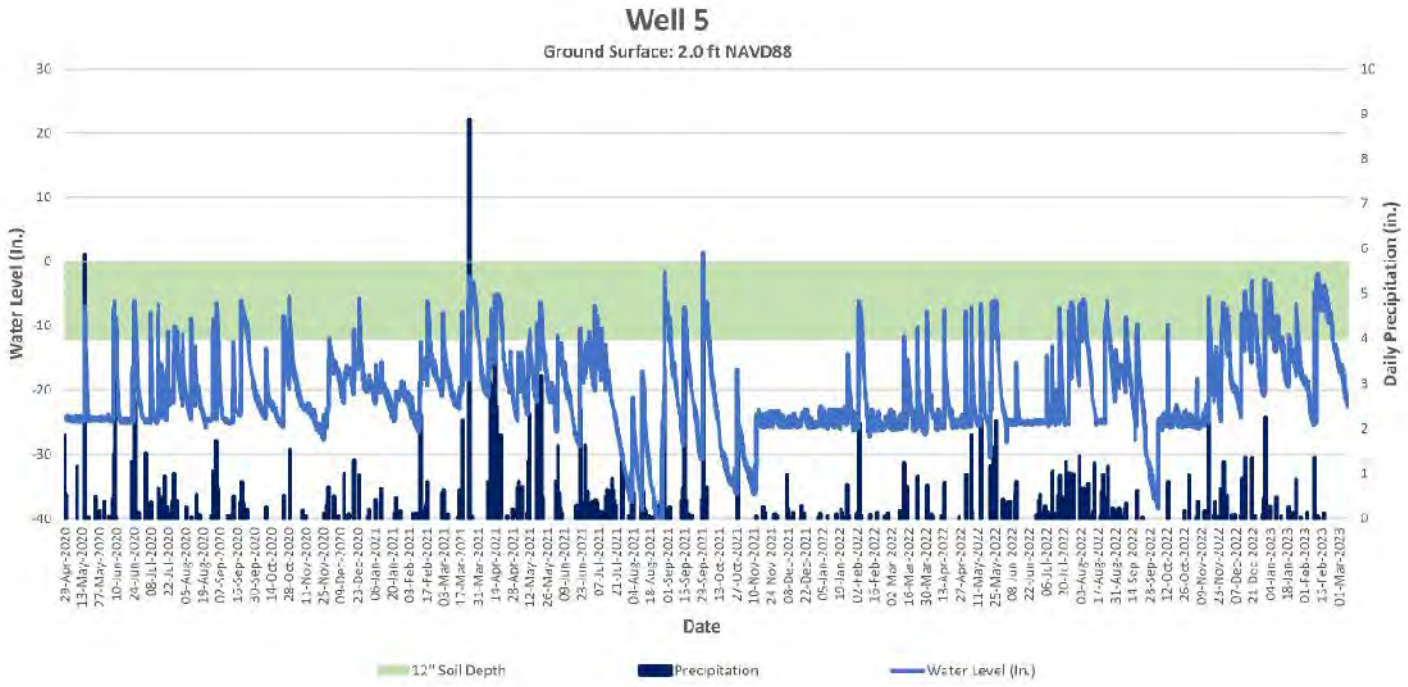


Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

N

Zero Ranch Mitigation Bank	
Low Land Investors, LLC	
Houma, LA	
GROUNDWATER WELL 2	
LAFOURCHE PARISH, LA	
Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	
FIGURE 22b	

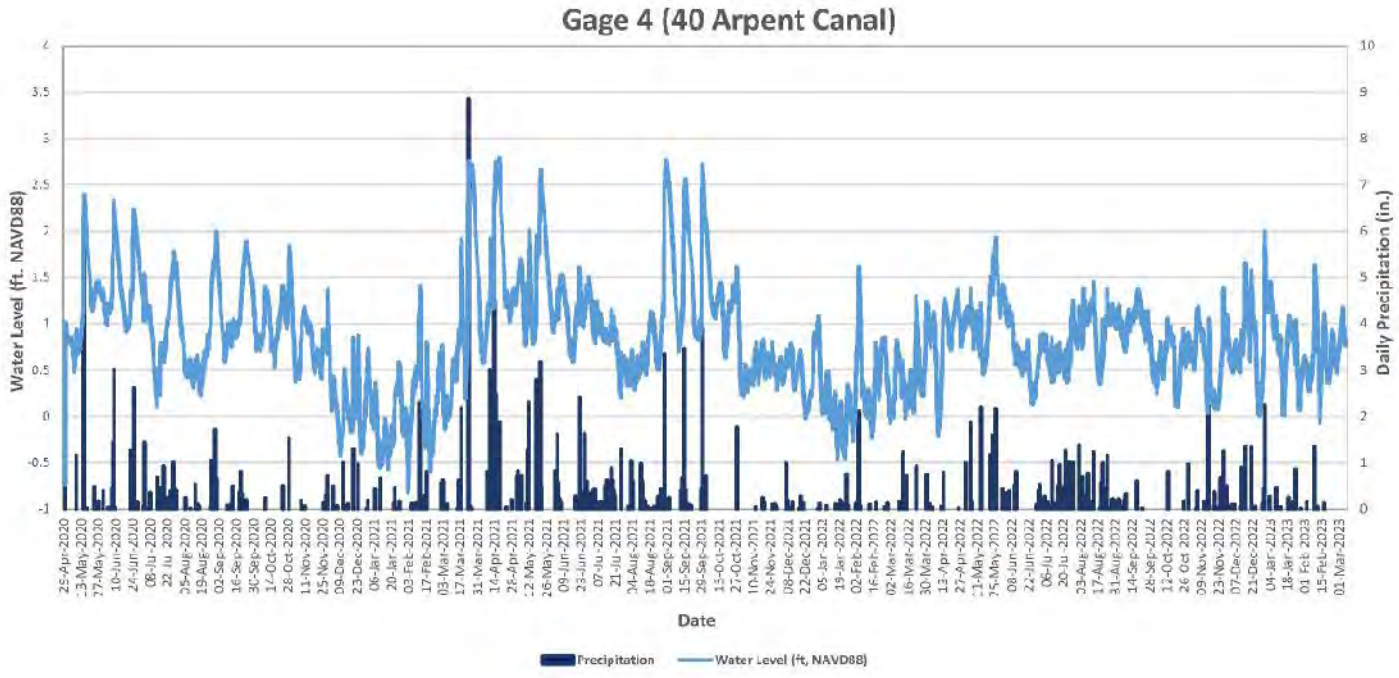


Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

N

Zero Ranch Mitigation Bank	
Low Land Investors, LLC	
Houma, LA	
GROUNDWATER WELL 5	
LAFOURCHE PARISH, LA	
Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	
FIGURE 22c	



Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

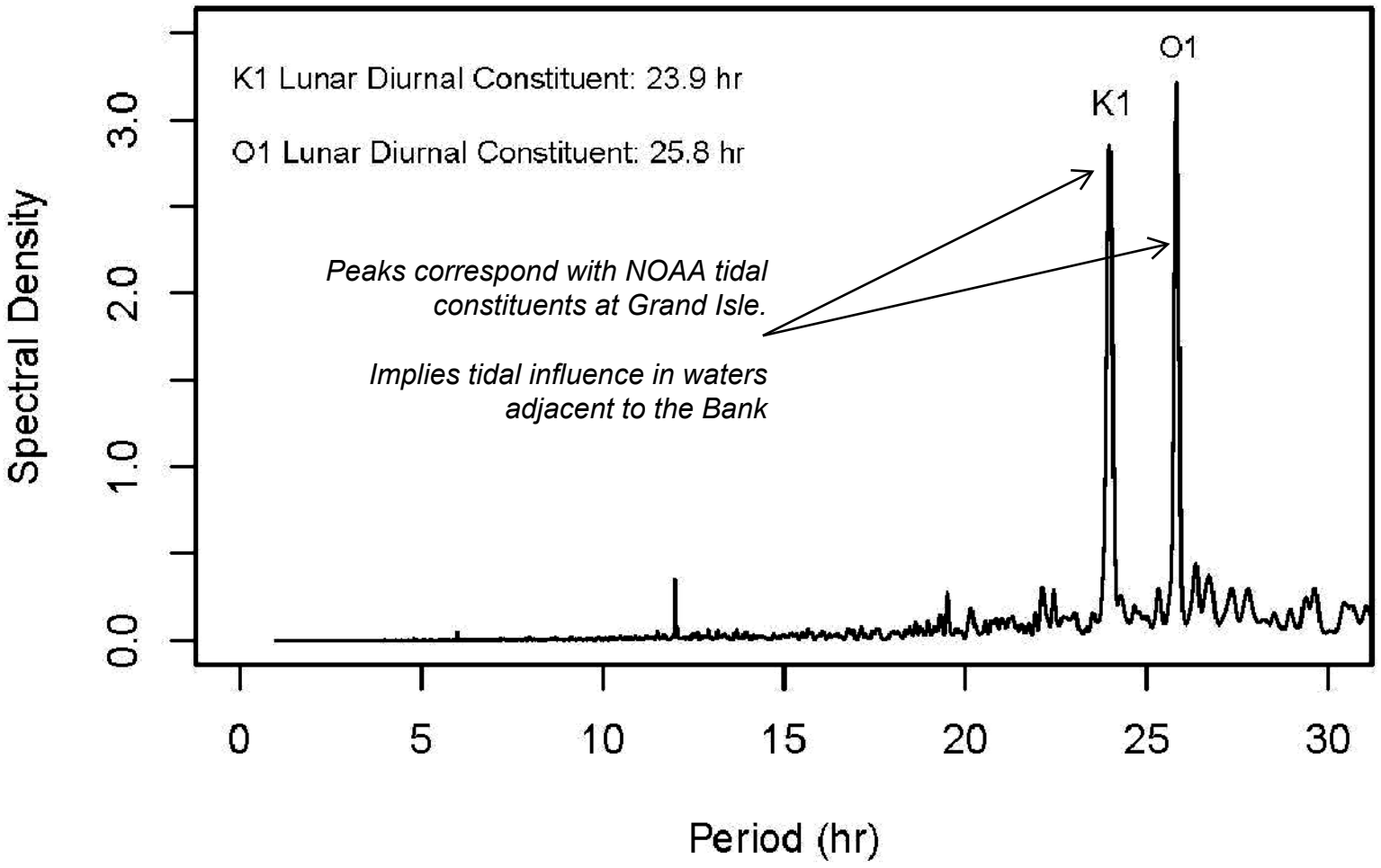
SURFACE GAGE 4

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 22d

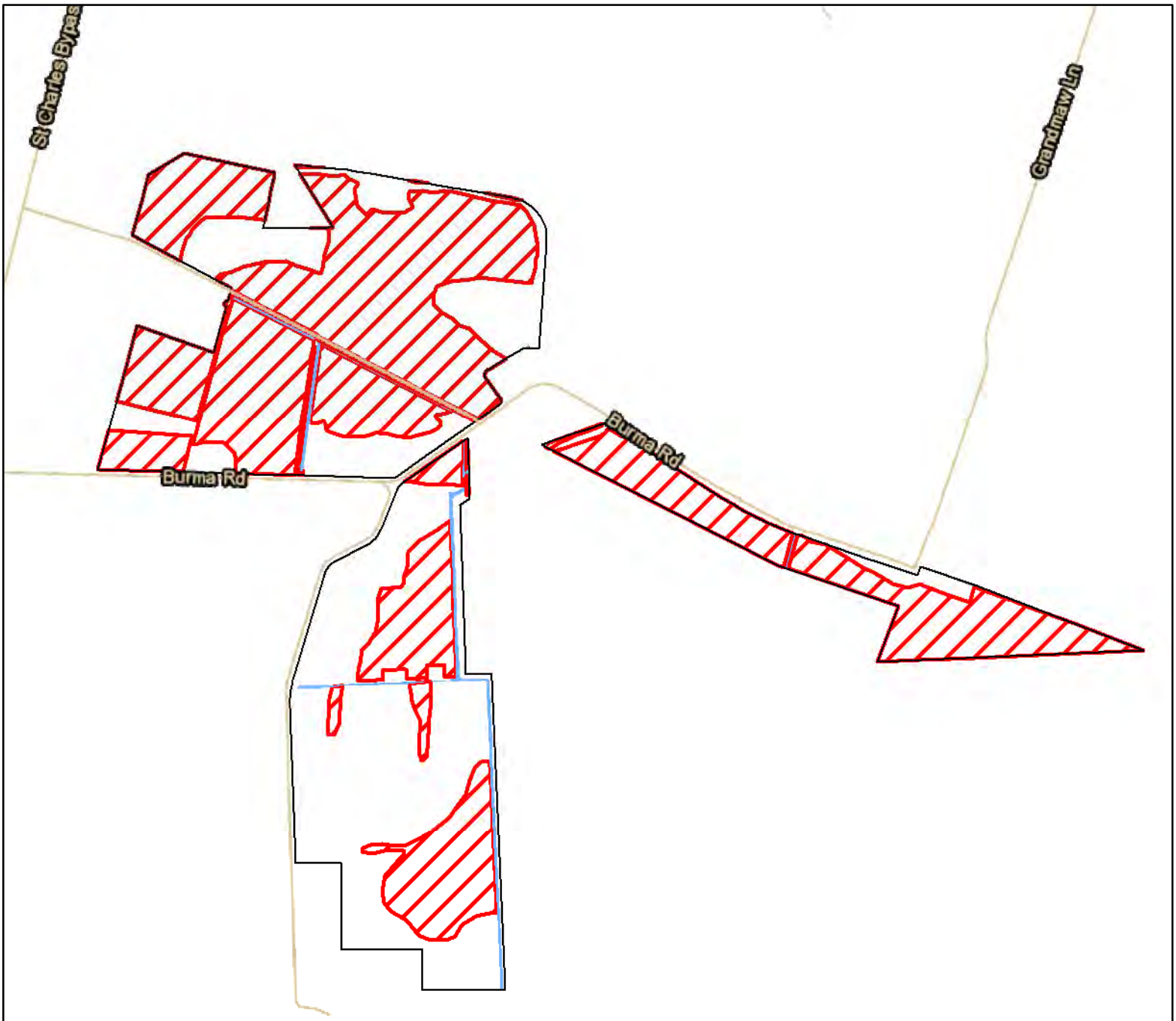
40 Arpent Canal Periodogram, 2020–2023



Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

N

Zero Ranch Mitigation Bank	
Low Land Investors, LLC	
Houma, LA	
PERIODOGRAM	
LAFOURCHE PARISH, LA	
Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	
FIGURE 23	



MVN-2021-01100-SG

Wetlands (200 acres)

Other waters (5.6 acres)

Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

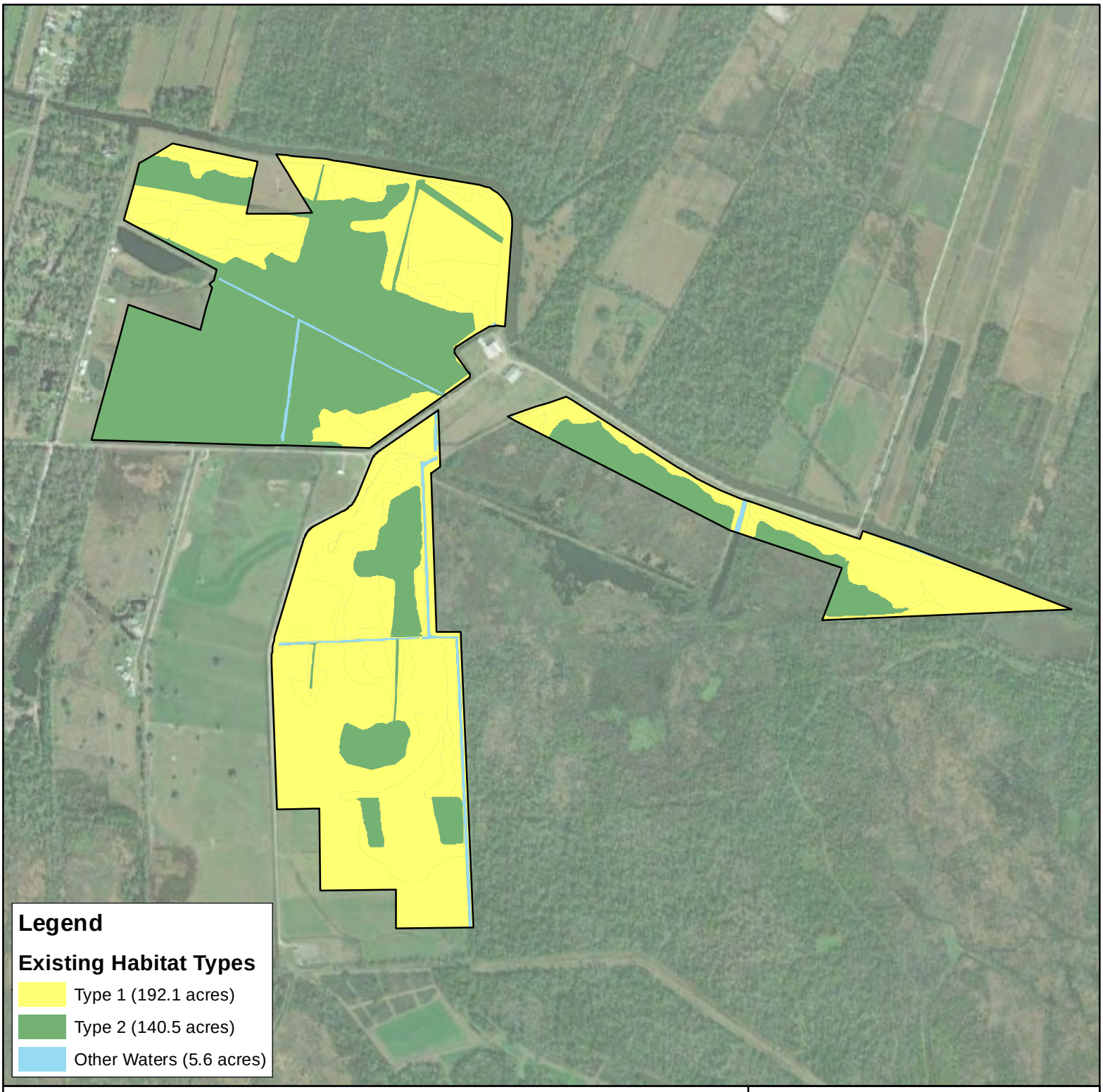
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

JD

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 24



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

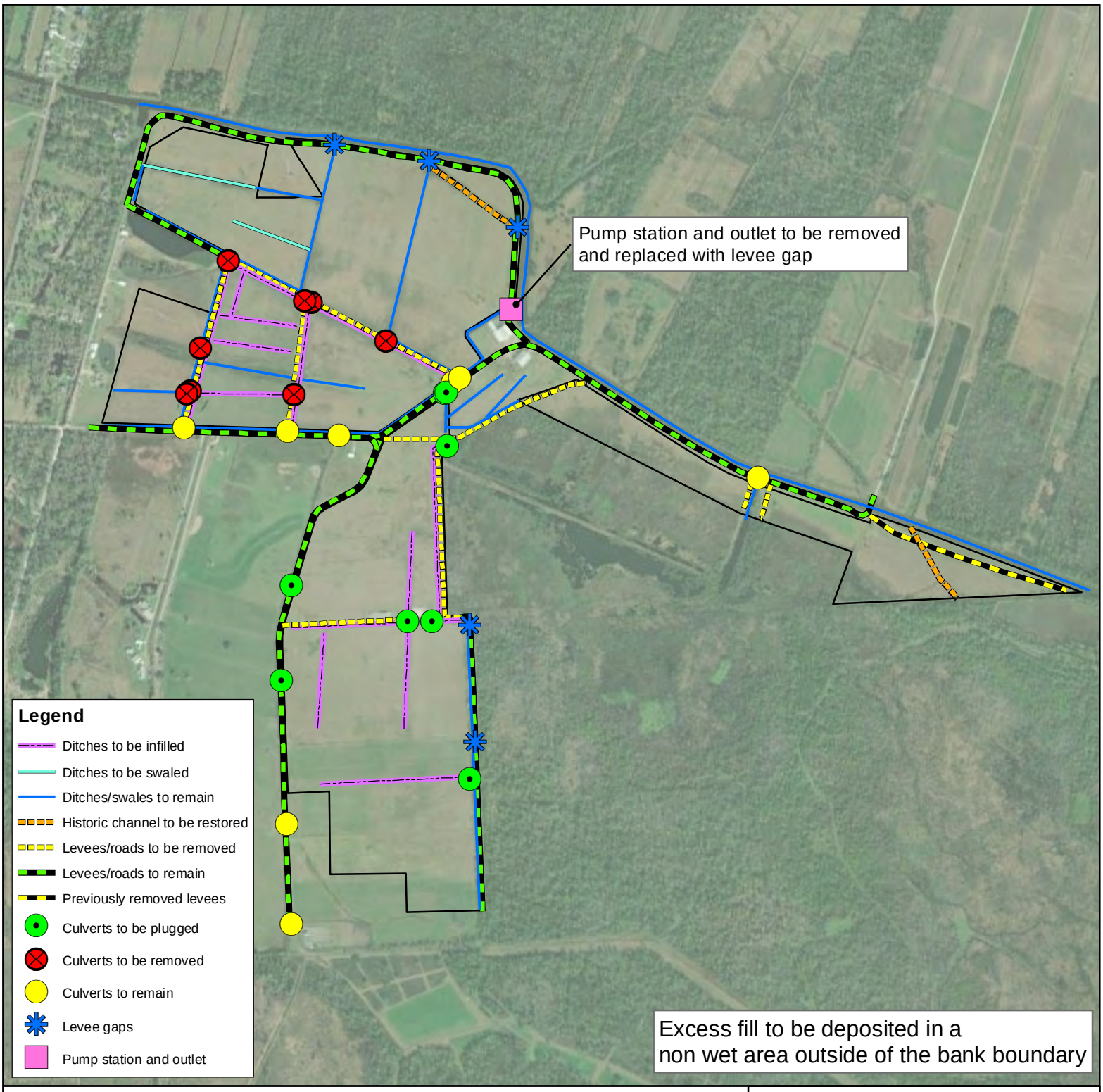
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

EXISTING HABITAT

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 25



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 Feet

N

Map Notes:

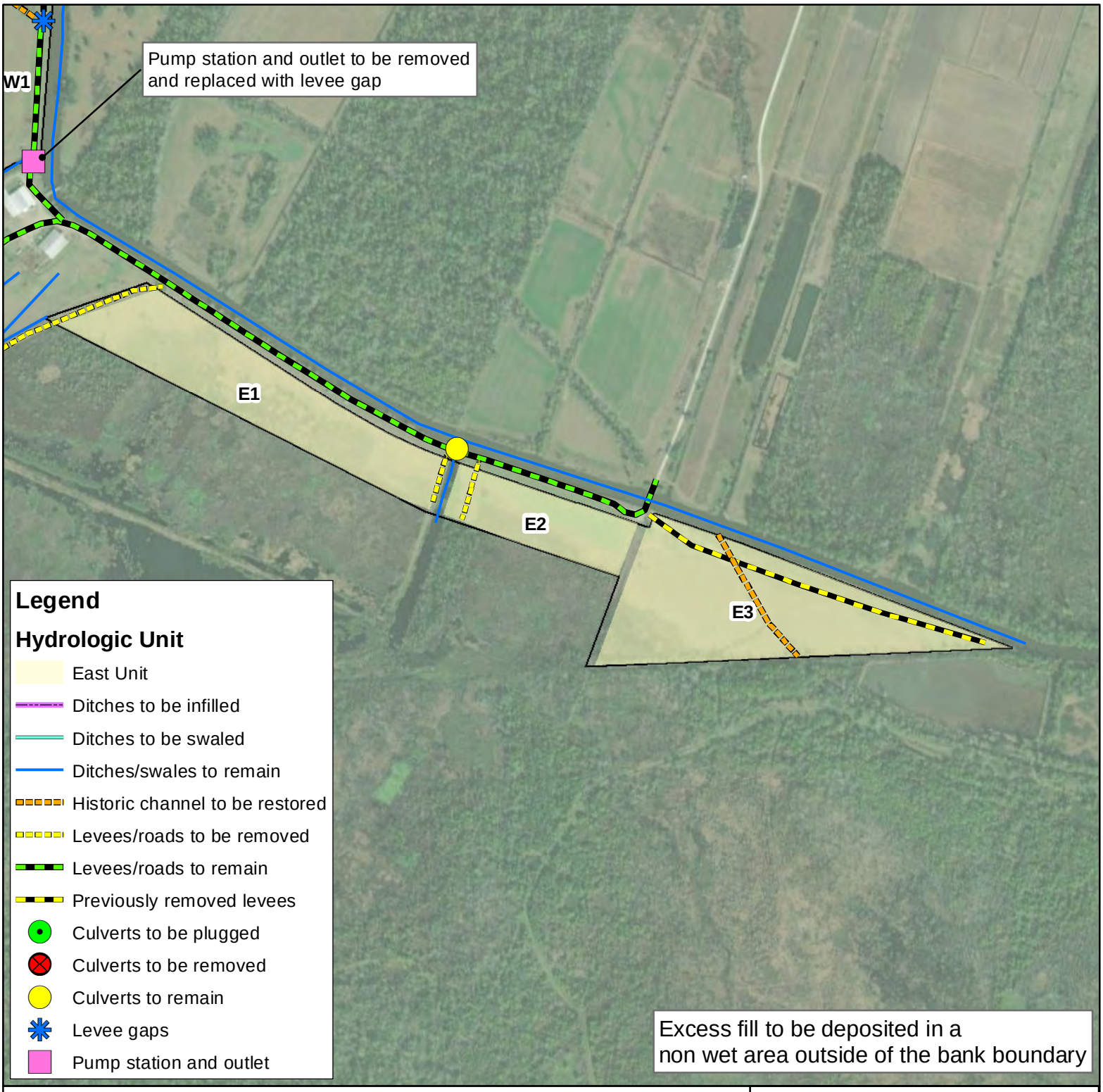
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HYDROLOGY WORK PLAN
OVERVIEW
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 26a



Legend

Project Boundary (338.2 acres)

700 350 0 700 Feet

N

NRP

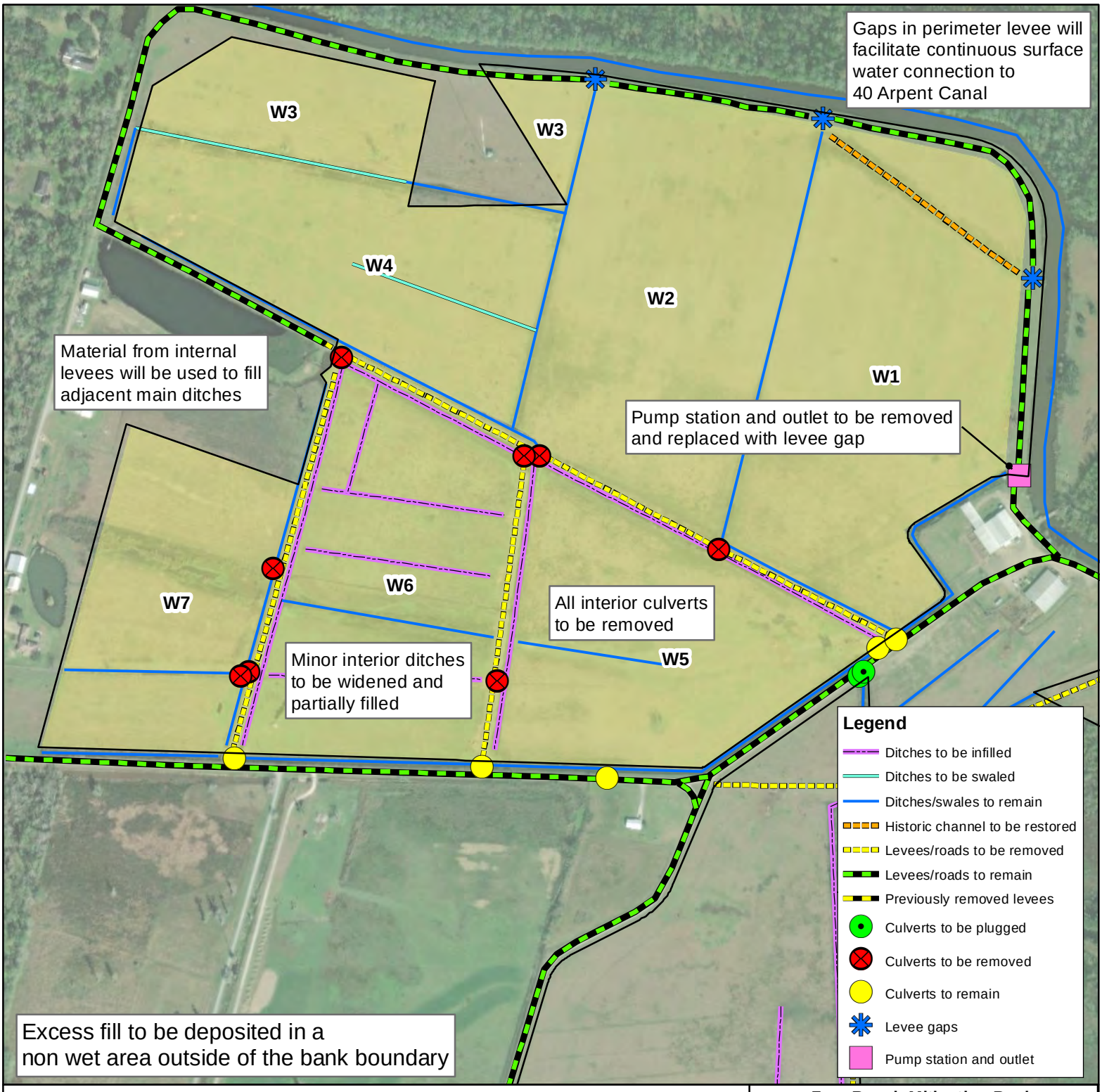
Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HYDROLOGY WORK PLAN
EAST UNIT
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 26b



Legend

Project Boundary (338.2 acres)

West Unit

500 250 0 500 Feet

N

NRP

Map Notes:

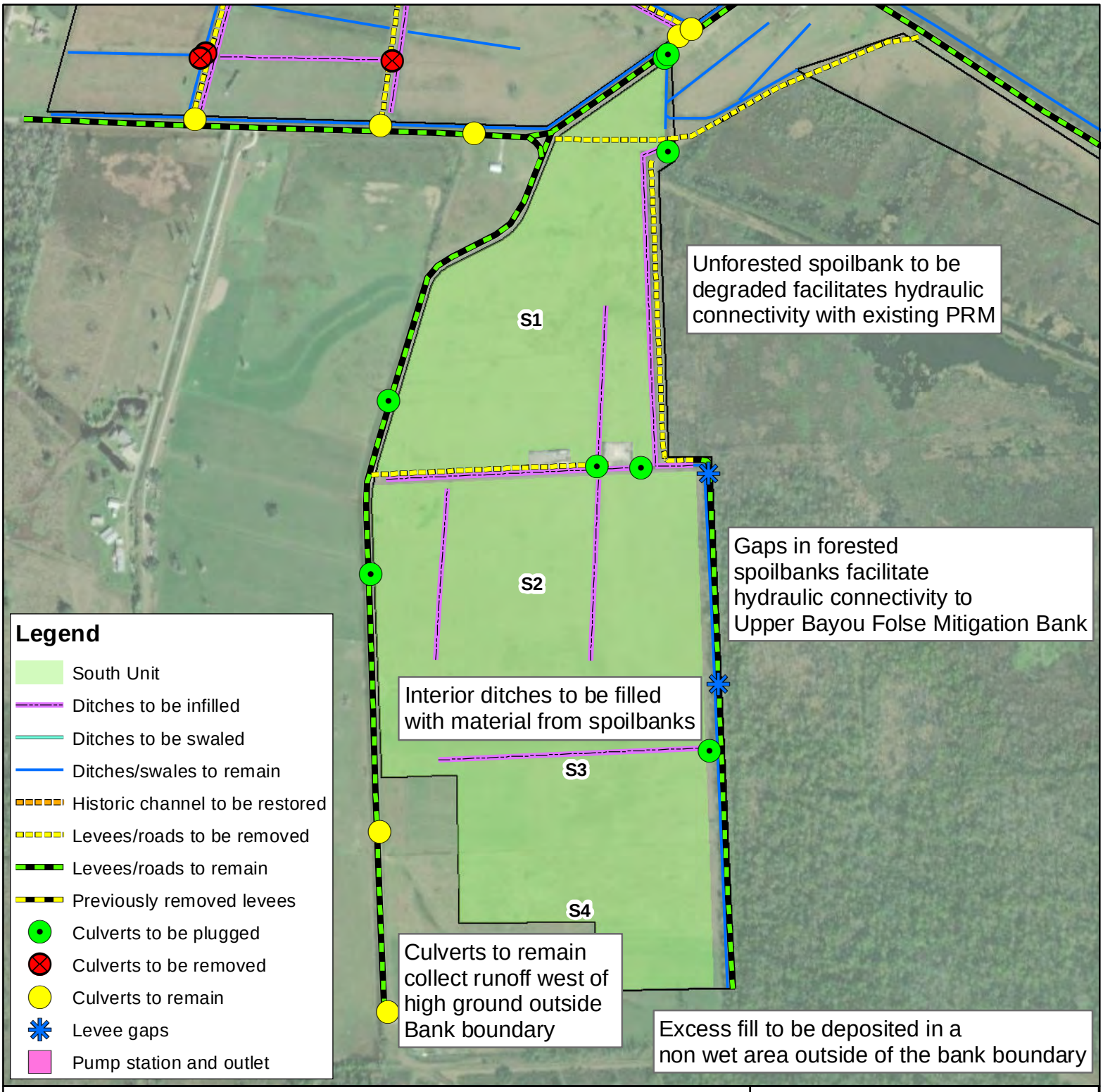
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HYDROLOGY WORK PLAN
WEST UNIT
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 26c



Legend

Project Boundary (338.2 acres)

500 250 0 500 Feet

N

NRP

Map Notes:

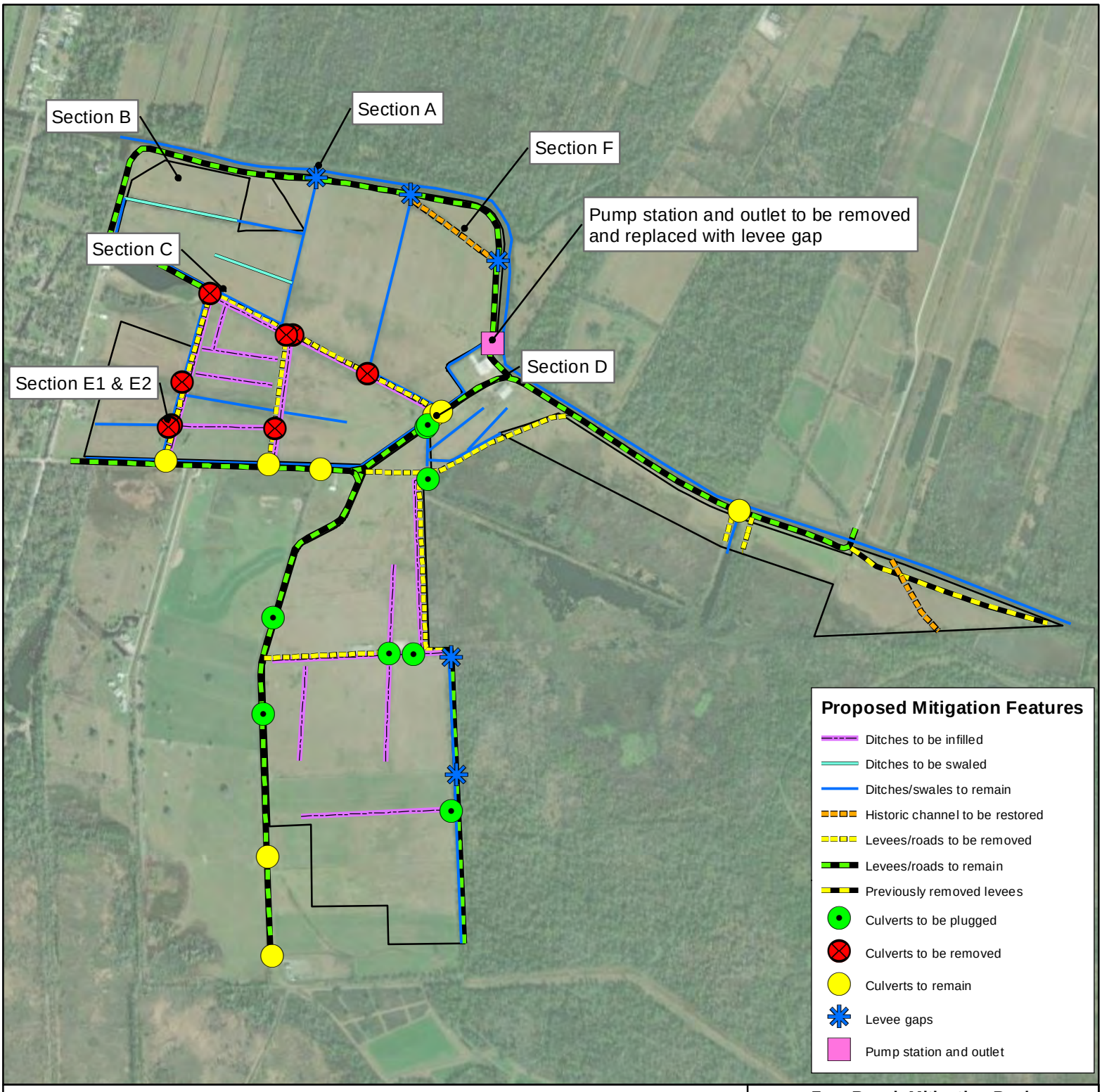
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HYDROLOGY WORK PLAN
SOUTH UNIT
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 26d



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

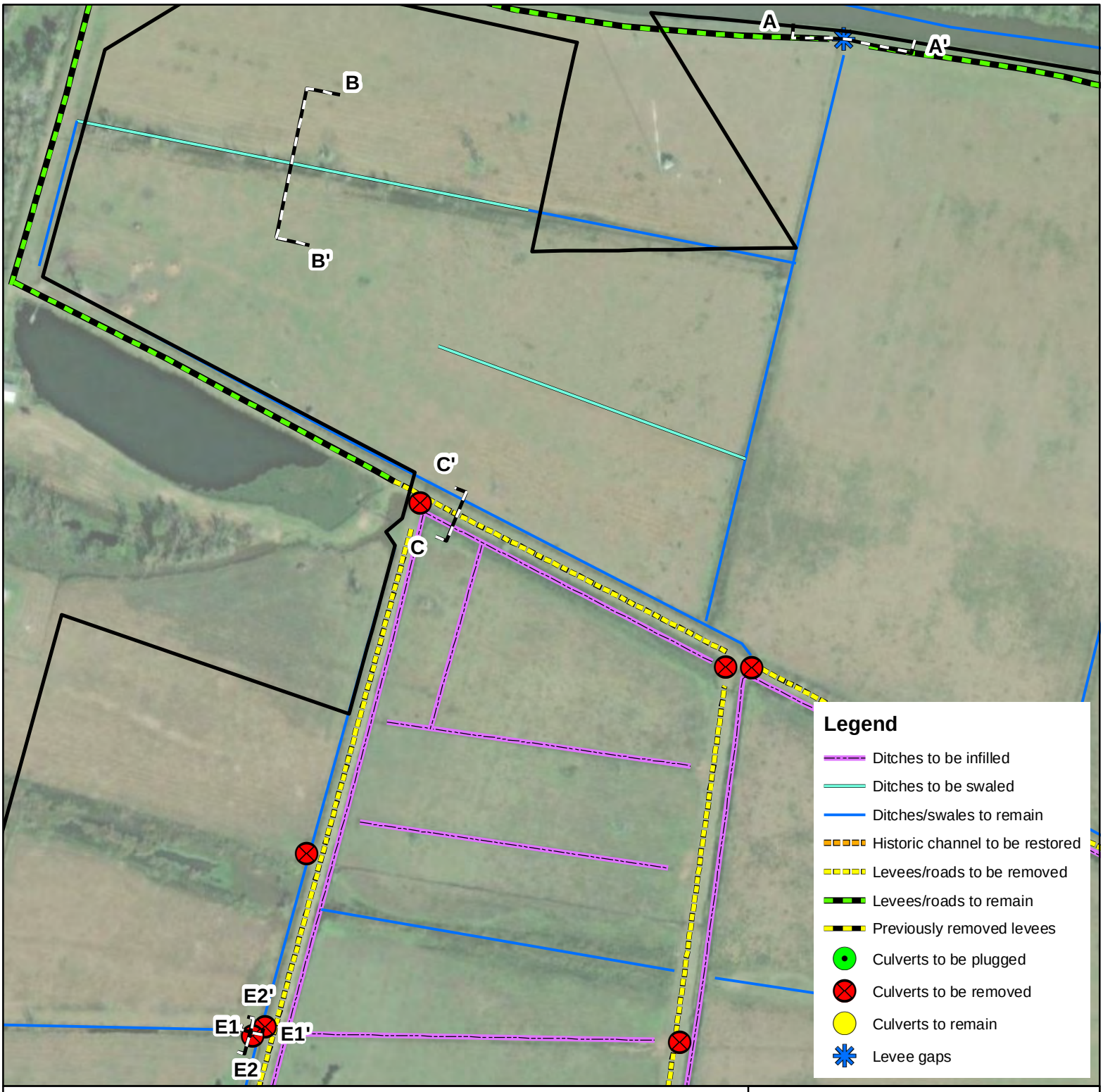
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 27a



Legend

Project Boundary (338.2 acres)

Cross Sections

250 125 0 250 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.

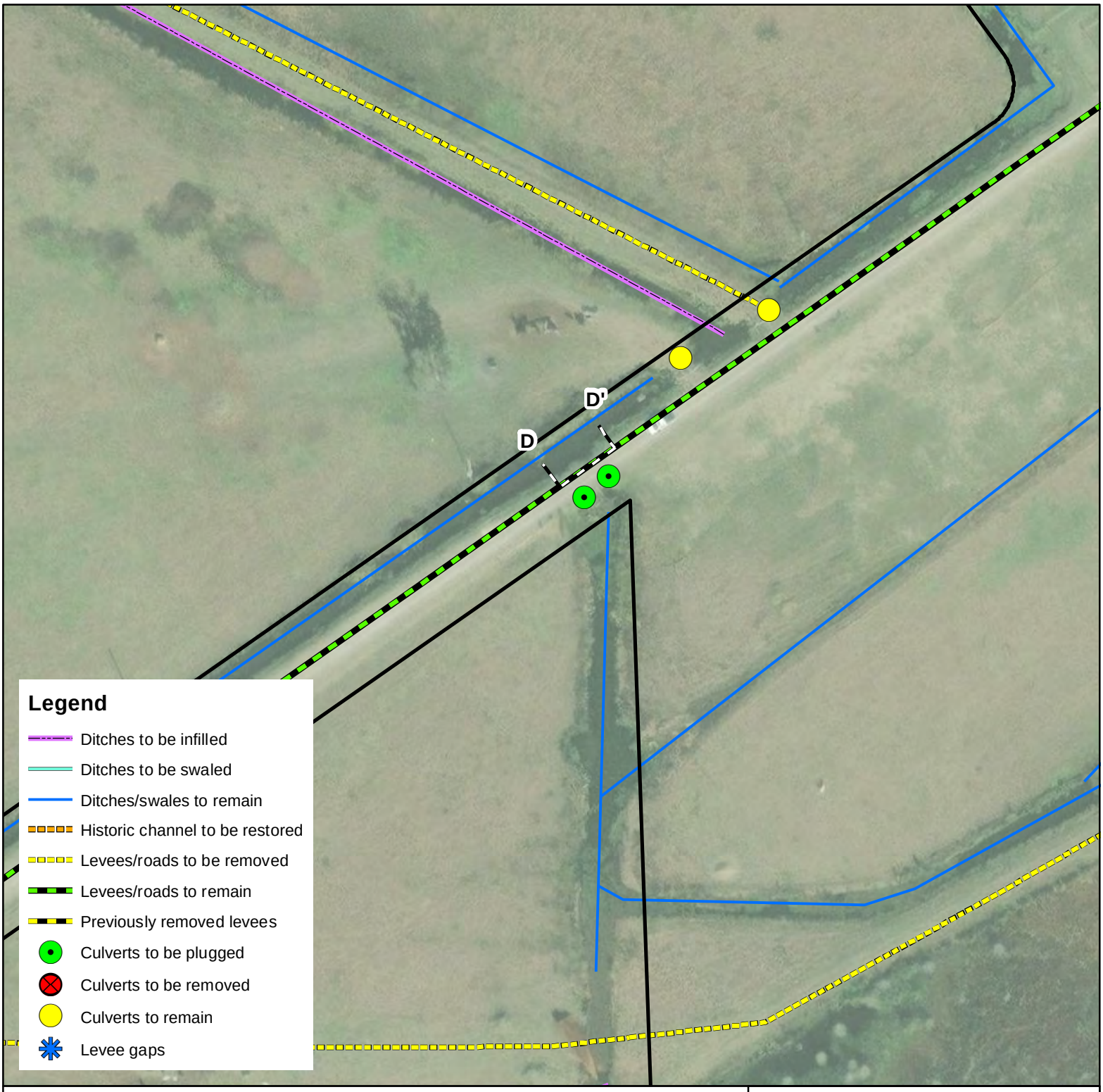
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 27b



Legend

Project Boundary (338.2 acres)

Cross Sections

250 125 0 250 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.

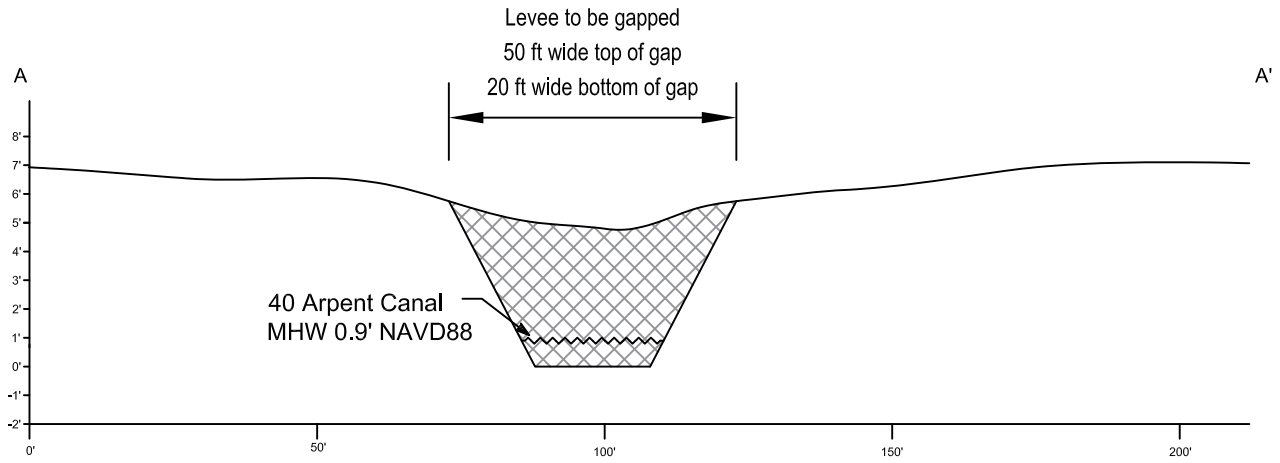
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION LOCATIONS

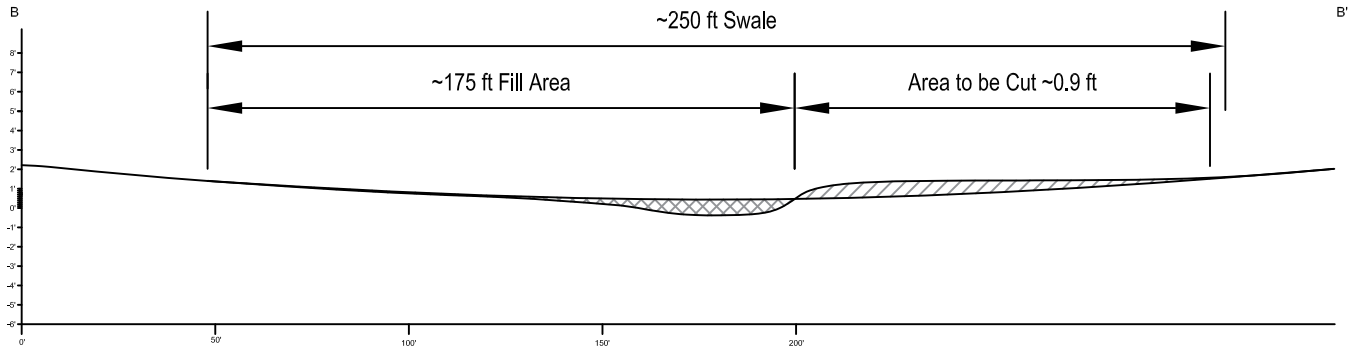
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 27c



Section A - A': Typical Levee Gap
5:1 Vertical Exaggeration



Section B - B': Typical Ditch to be Swaled
5:1 Vertical Exaggeration

Fill

Excavation

N

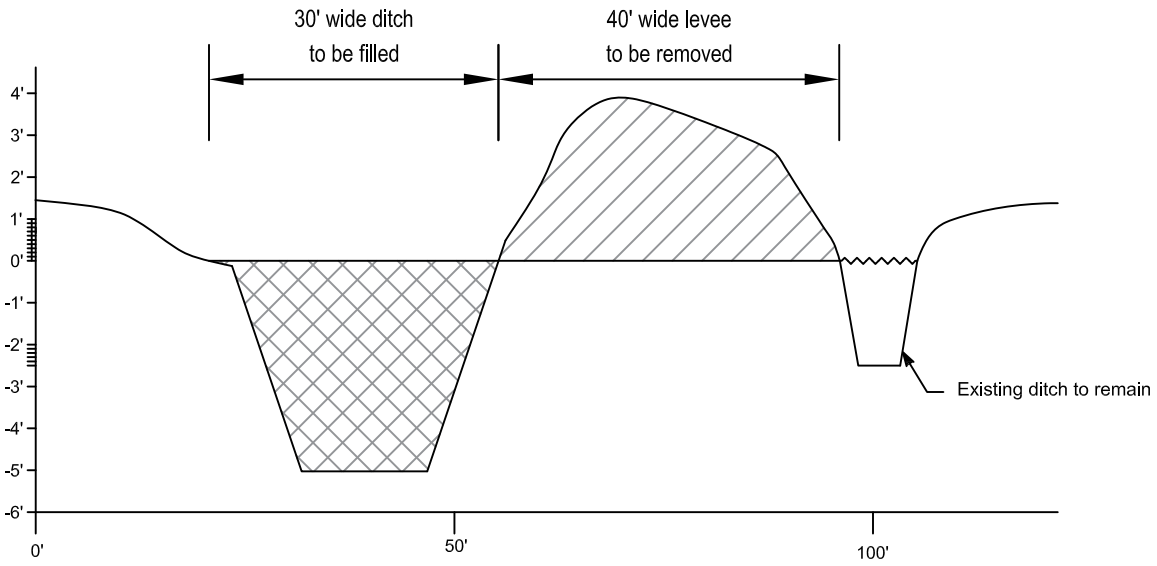
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION A & B

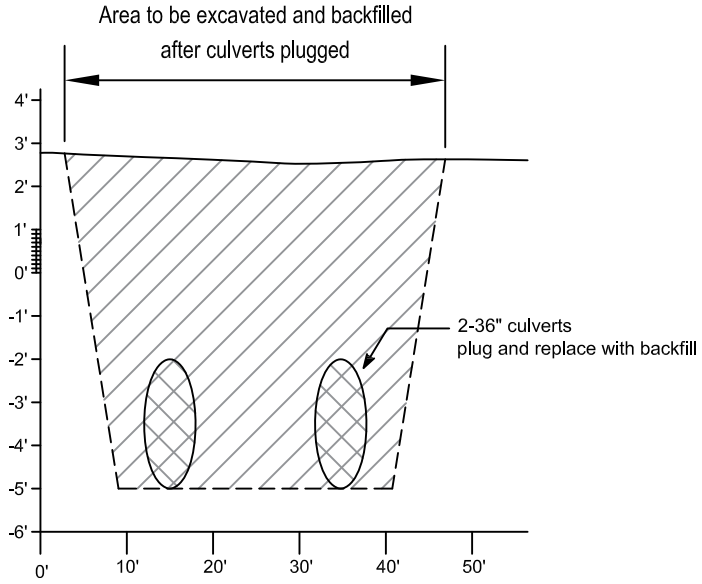
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	03/08/2023
Map No.:	

FIGURE 28



Section C-C': Typical Ditch to be Filled & Levee to be Removed
5:1 Vertical Exaggeration



Section D-D': Typical culvert to be plugged
5:1 Vertical Exaggeration

Fill

Excavation

N

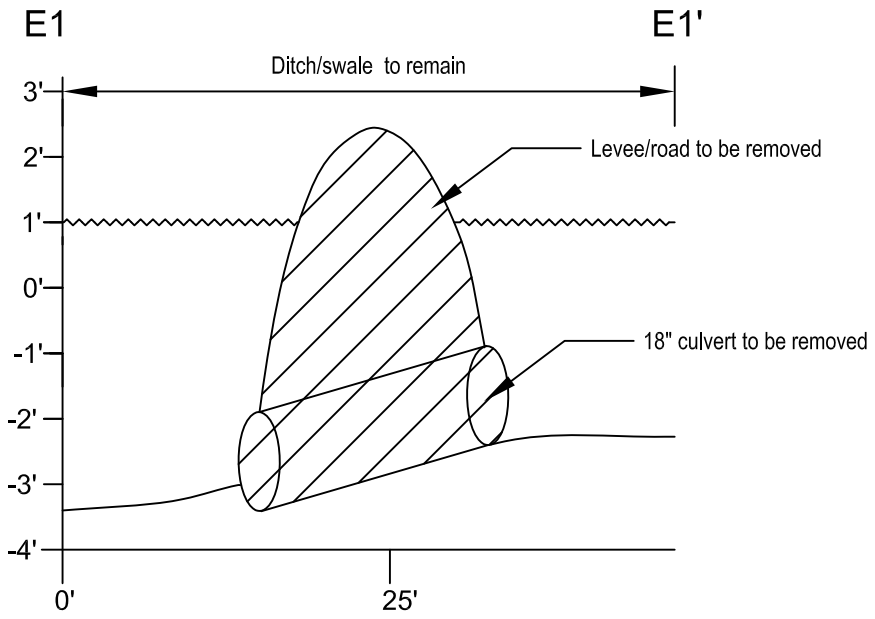
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION C & D

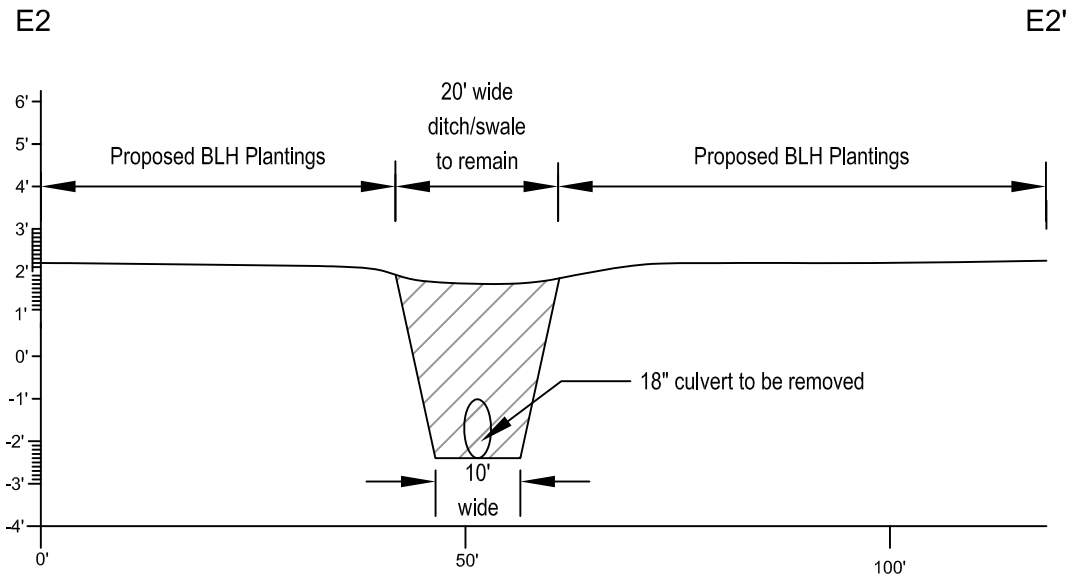
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	03/08/2023
Map No.:	

FIGURE 29



Section E1-E1': Typical Culvert to be Removed
5:1 Vertical Exaggeration



Section E2-E2': Typical Culvert to be Removed
5:1 Vertical Exaggeration

Fill

Excavation

N

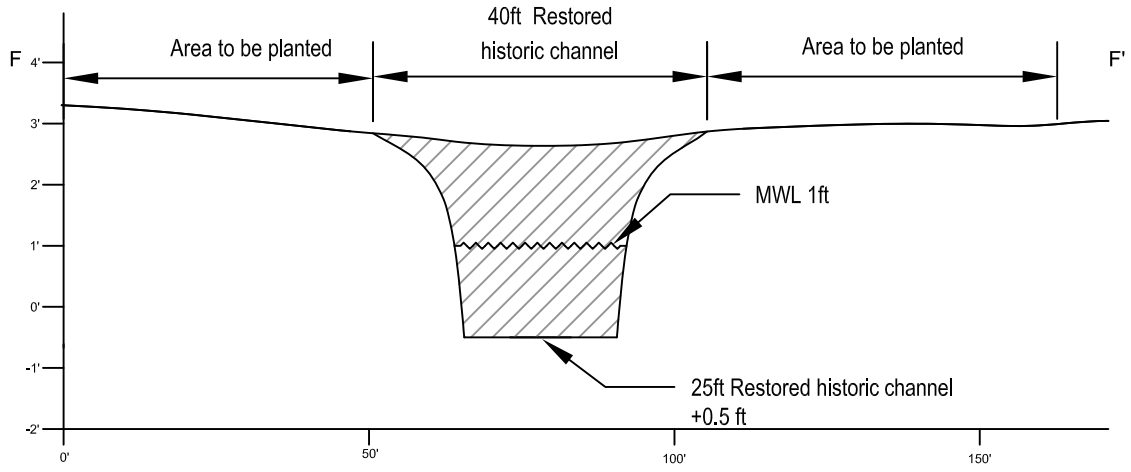
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION E1 & E2

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	03/08/2023
Map No.:	

FIGURE 30



Section F-F': Historic channel connectivity to be restored
10:1 Vertical Exaggeration

Fill

Excavation

N

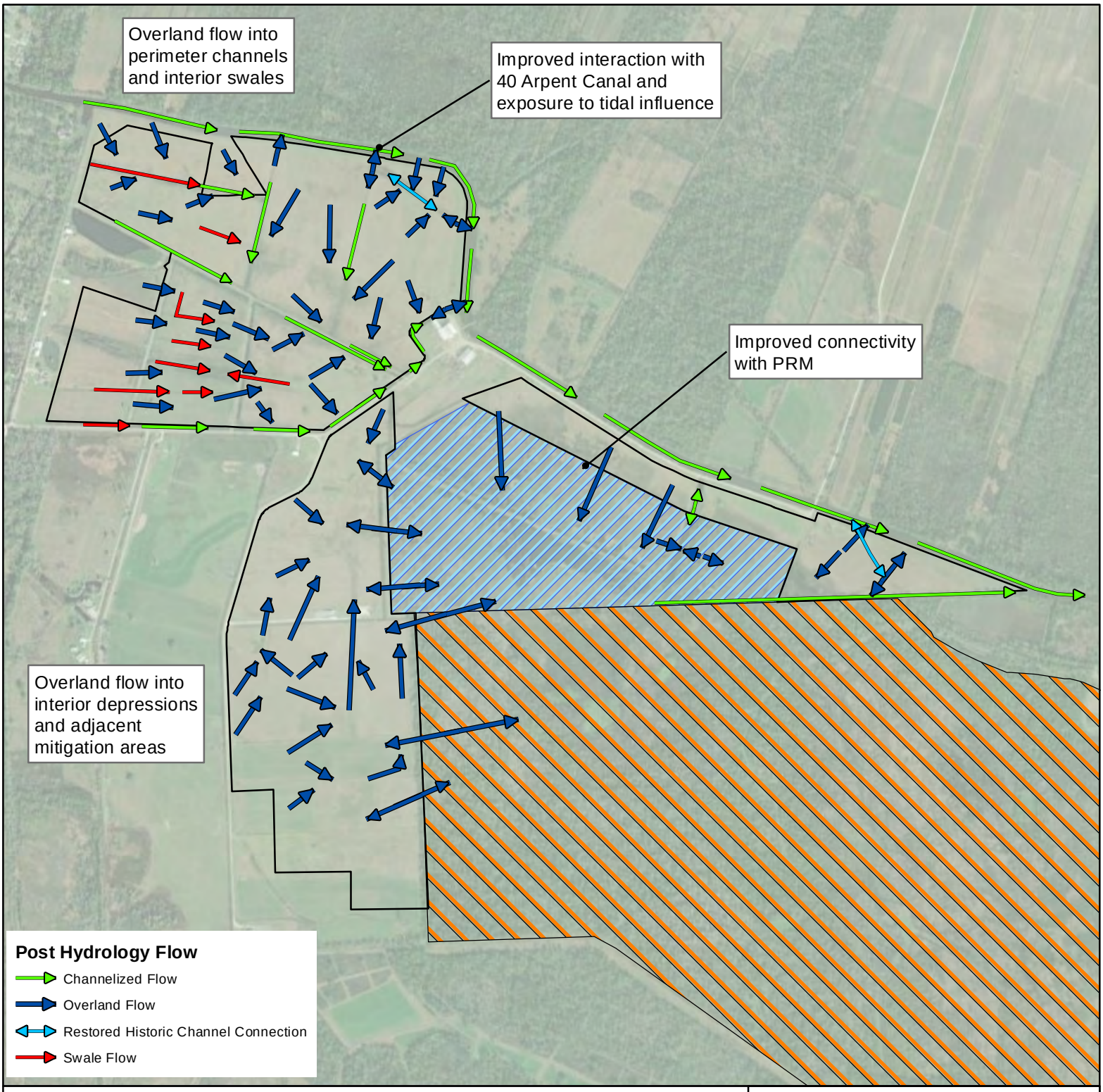
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CROSS SECTION F

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	03/08/2023
Map No.:	

FIGURE 31



Legend

- Project Boundary (338.2 acres)
- Upper Bayou Folse Mitigation Bank
- PRM

1,200 600 0 1,200 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.

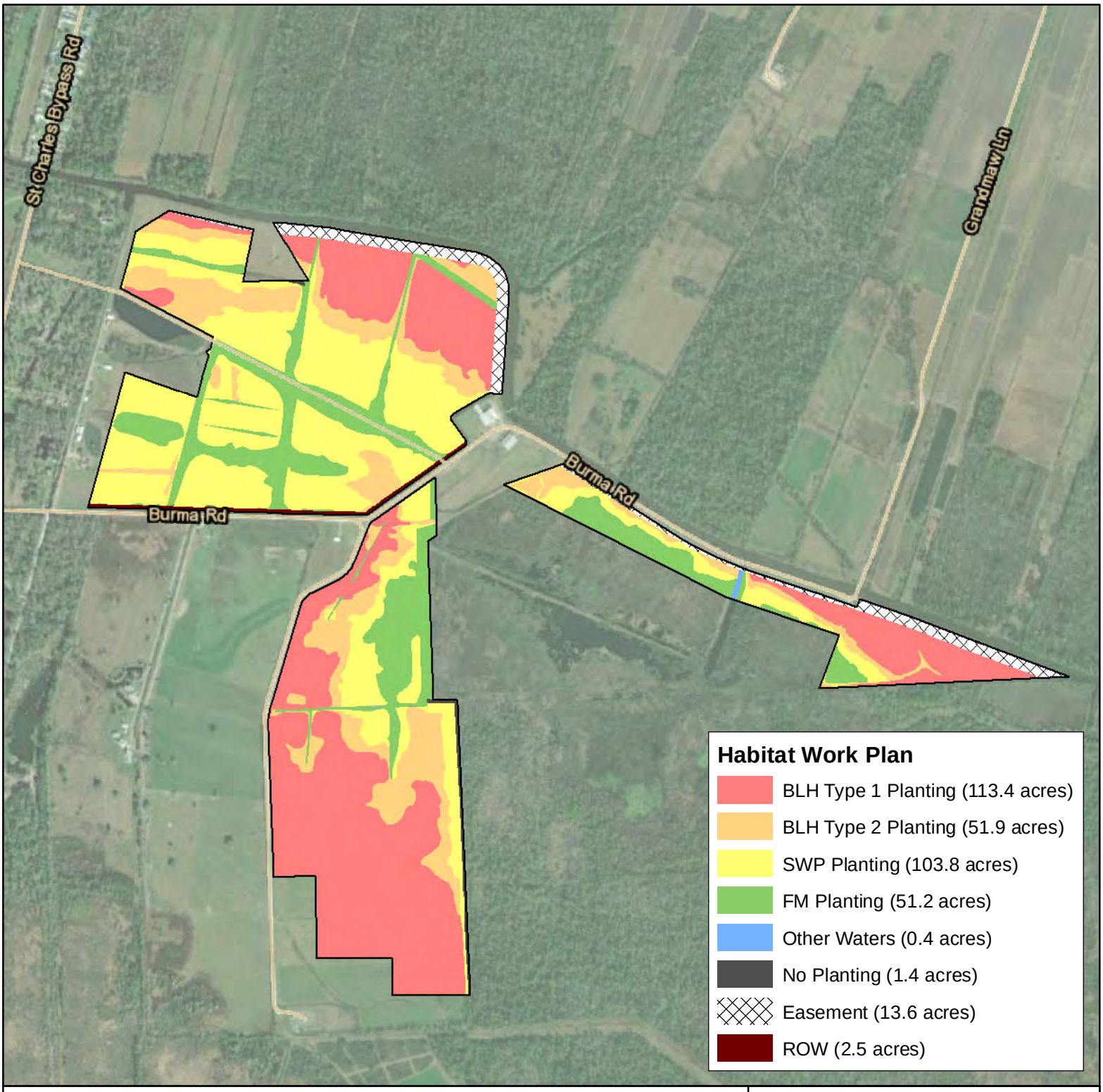
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

POST WORK PLAN HYDROLOGY

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 32



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

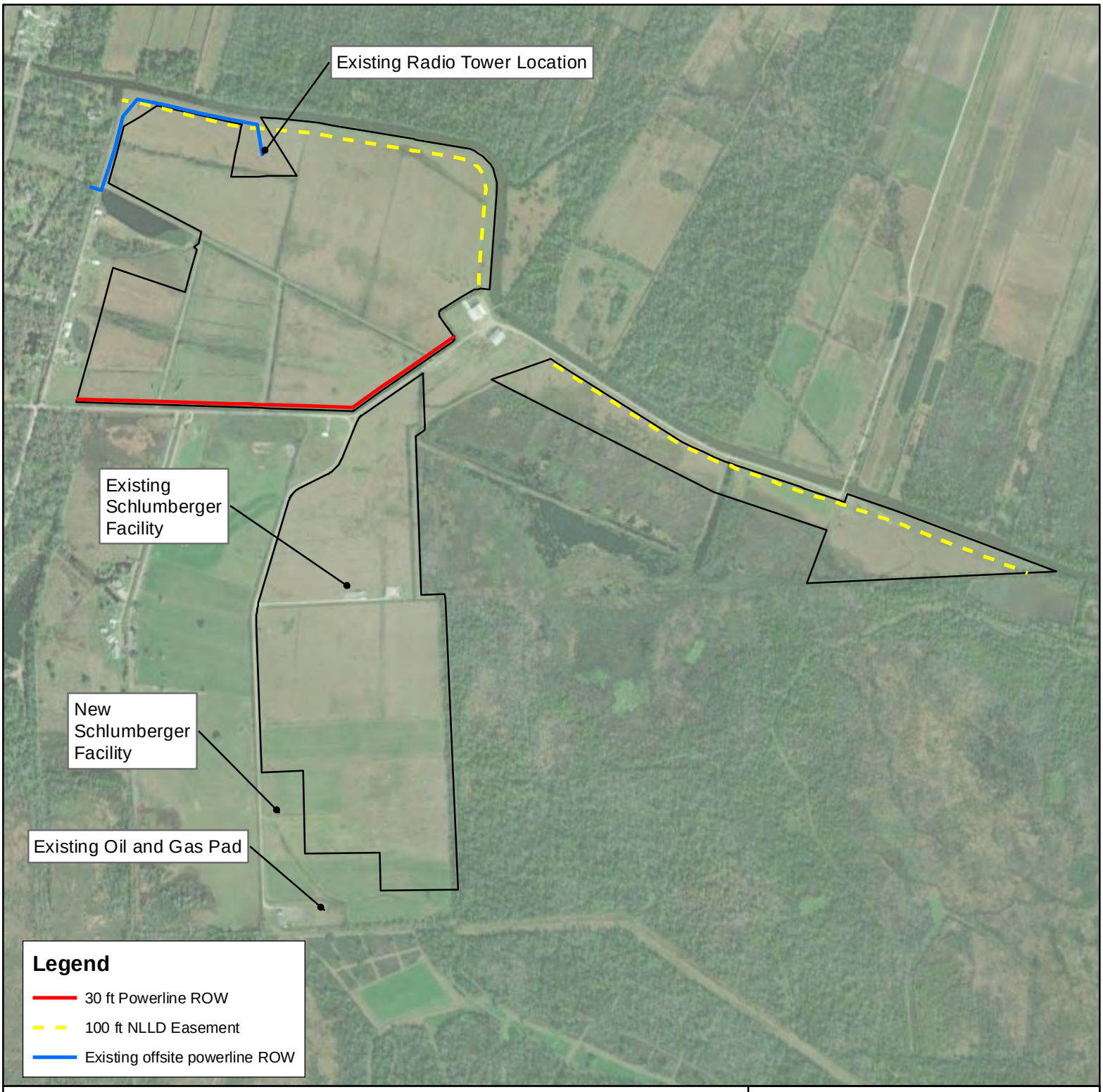
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

HABITAT WORK PLAN

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 33



Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

ROW/EASEMENT LOCATIONS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 34

1,200 600 0 1,200 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.

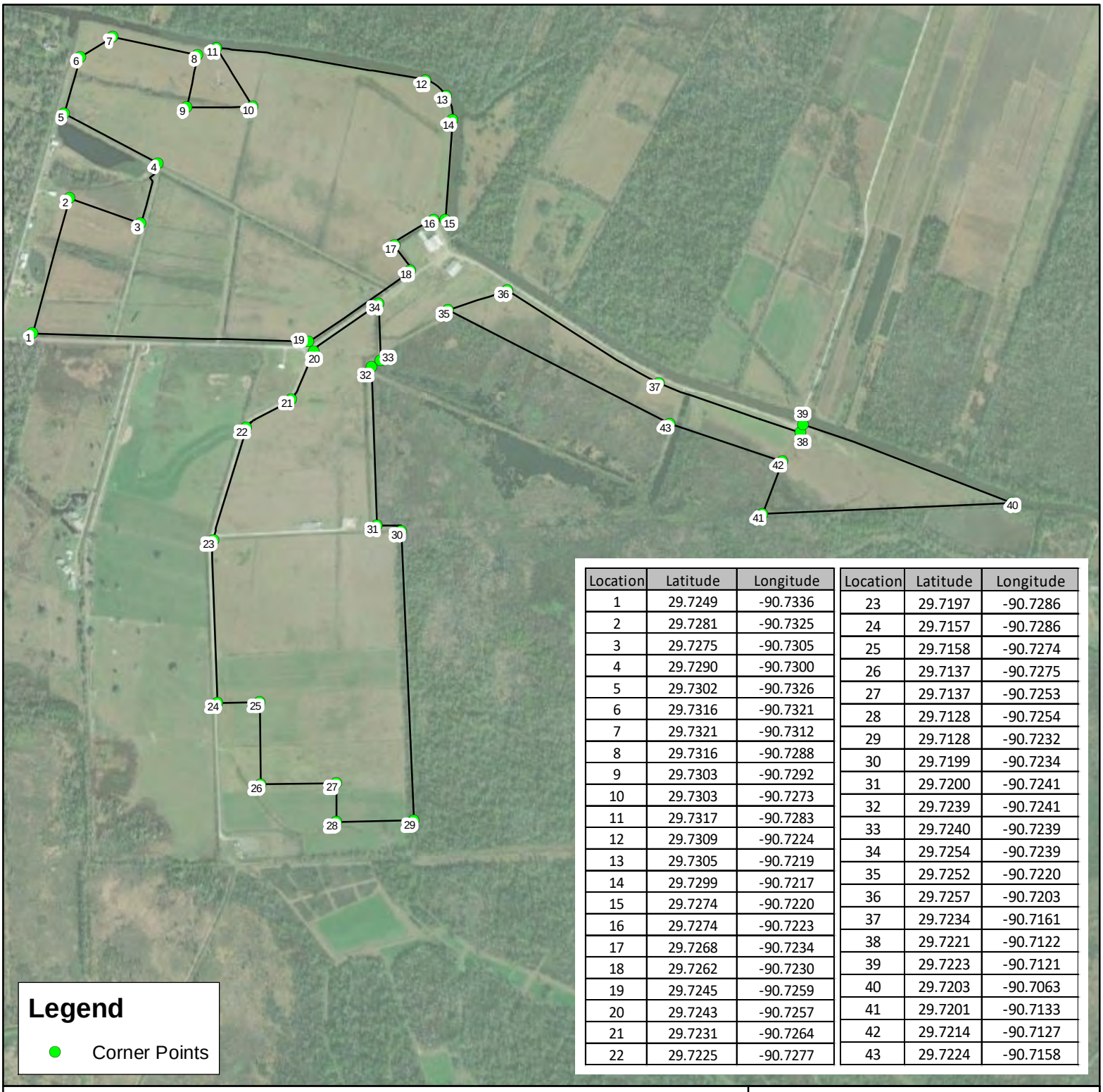
Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

SERVICE AREA

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 35



Location	Latitude	Longitude
1	29.7249	-90.7336
2	29.7281	-90.7325
3	29.7275	-90.7305
4	29.7290	-90.7300
5	29.7302	-90.7326
6	29.7316	-90.7321
7	29.7321	-90.7312
8	29.7316	-90.7288
9	29.7303	-90.7292
10	29.7303	-90.7273
11	29.7317	-90.7283
12	29.7309	-90.7224
13	29.7305	-90.7219
14	29.7299	-90.7217
15	29.7274	-90.7220
16	29.7274	-90.7223
17	29.7268	-90.7234
18	29.7262	-90.7230
19	29.7245	-90.7259
20	29.7243	-90.7257
21	29.7231	-90.7264
22	29.7225	-90.7277

Location	Latitude	Longitude
23	29.7197	-90.7286
24	29.7157	-90.7286
25	29.7158	-90.7274
26	29.7137	-90.7275
27	29.7137	-90.7253
28	29.7128	-90.7254
29	29.7128	-90.7232
30	29.7199	-90.7234
31	29.7200	-90.7241
32	29.7239	-90.7241
33	29.7240	-90.7239
34	29.7254	-90.7239
35	29.7252	-90.7220
36	29.7257	-90.7203
37	29.7234	-90.7161
38	29.7221	-90.7122
39	29.7223	-90.7121
40	29.7203	-90.7063
41	29.7201	-90.7133
42	29.7214	-90.7127
43	29.7224	-90.7158

Legend

Project Boundary (338.2 acres)

1,200 600 0 1,200 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.

Zero Ranch Mitigation Bank
Low Land Investors, LLC
Houma, LA

CONSERVATION SERVITUDE AREA

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	03/20/2023
Map No. :	

FIGURE 36