

**Scope of Services
for
Geotechnical Investigation**

**BS-24 Terracing and Marsh Creation
South of Big Mar
Plaquemines Parish, LA**

MARCH 2014

1.0 INTRODUCTION

The Terracing and Marsh Creation South of Big Mar Project has been approved for engineering and design by the Natural Resources Conservation Service (NRCS), in cooperation with the Coastal Protection and Restoration Authority of Louisiana (CPRA). This project is funded through the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) on Project Priority List 22.

2.0 LOCATION

The project site is located in Plaquemines Parish, Louisiana south of Big Mar, and west of Lake Lery, as shown on the attached drawings. Boreholes will be located within the project area as shown. Natural Resources Conservation Service (NRCS) personnel (or an NRCS surveying contractor) will locate and flag the exact borehole sites prior to the arrival of the geotechnical field crew.

3.0 DESCRIPTION

The primary goal of the project is to create approximately 65,000 linear feet of terraces in the shallow open water areas within the Caernarvon Diversion outfall area. The terraces will reduce wave fetch in the large open water areas and promote conditions conducive to growth of marsh vegetation and submerged aquatic vegetation. Additional benefits may be achieved through capturing suspended sediments. Creation of 334 acres of marsh is also proposed to reestablish the western shoreline of Lake Lery in association with the Lake Lery Shoreline Restoration and Marsh Creation Project (BS-16). A project fact sheet and map is included in Appendix A. Geotechnical information is required to determine terrace details, containment details, and dredge fill material placement height(s).

4.0 PROPOSED CONSTRUCTION METHOD

The terrace component of the project will most likely be constructed with marsh buggy mounted long reach excavators. The marsh creation area will be designed as a traditional marsh creation area utilizing earthen containment dikes constructed with marsh buggy mounted long reach excavators and used to contain fill material hydraulically dredged and pumped from a borrow area in Lake Lery.

5.0 SCOPE OF SERVICES

The scope of services shall include a geotechnical subsurface investigation using soil borings to determine subsurface soil conditions and stratification at the locations shown in the attached drawings (Appendix B). Information obtained from the subsurface exploration and

from subsequent laboratory testing is to be incorporated into a geotechnical engineering analysis. This analysis shall evaluate the stability of the in-situ soil and its capacity to support the proposed project features.

5.1 Permission and Access

Access shall be coordinated through Jason Kroll, Contracting Officer's Representative (COR) at (225) 665-4253 ext. 112 or jason.kroll@la.usda.gov **a minimum of 48 hours prior to accessing the site.**

Access to the project area shall be by airboat only. Field work completed in the marsh creation area shall take place from an airboat mounted drill rig. Airboat travel to drilling sites will only be allowed over open water and by the approved routes shown on the maps in Appendix C. No travel over existing marsh will be allowed.

A landowner right of entry letter and maps are provided in Appendix C. The Contractor shall be required to review the signed permission letters prior to performing geotechnical investigation activities in any part of the project area and to perform within the consent given by each landowner at all times. Rights of entry to privately owned property must be respected by all NRCS contractors. Failure to do so will be considered grounds for termination of the contract. NRCS will provide signed copies of the permission letters and any contact information known. The Contractor shall keep copies of these permission letters with the field crews at all times and shall show them to the appropriate landowners if requested.

NRCS shall be kept abreast of any relevant communications and courses of action and shall be provided a copy of all written documentation. Additionally, the Contractor shall notify NRCS **immediately** if any access issues cause a delay in the delivery schedule.

The contractor shall include the landowners (utilize names and addresses on Right of Entry letters in Appendix C) as additional insured parties on any and all pertinent liability insurance policies maintained by the Contractor during performance of this task order. **The Contractor shall provide copies of liability insurance policies with the additional insured parties listed above to the Contracting Officer a minimum of 48 hours prior to accessing the site.**

5.2 Field Investigation

A total of fifteen (15) undisturbed soil sample test bores shall be made in the project area as noted below and on the attached drawings. The coordinates of the boring locations are shown on the attached drawings in Appendix B. These suggested boring locations and depths should be reviewed by the Contractor to ensure that sufficient information will be collected for analysis and recommendations. NRCS should be notified if the Contractor has any suggested modifications to locations or depths.

A summary of the samples required include:

- i. Three (3) 30-foot borings within the planned marsh creation project boundary
- ii. Twelve (12) 30-foot borings within the planned terrace fields

To ensure that no magnetic anomalies occur at the sampling locations, the location of each borehole will be staked and a magnetometer investigation will be performed at each of the locations prior to mobilization by the Contractor. Louisiana One Call must be completed 72 hours prior to all field work.

Samples shall be labeled and reported on using the borehole and sample reporting nomenclature designated on the attached drawings.

5.3 Sampling Requirements

All borehole elevations and depths shall be referenced to NAVD 88, Geoid12A along with the water elevation, date, and time of the boring. NRCS will provide surface elevations at each sampling location. Final locations shall be recorded in the State Plane Coordinate System, Louisiana South Zone, U.S. Feet, NAD83.

For the boreholes, continuous sampling will be required for the first twenty (20) feet of depth. Intermittent sampling will be required at each significant horizon below twenty (20) feet in depth, with a minimum of one sample being taken at each five-foot (5-ft) interval. Samples shall be taken in holes stabilized by the use of casing or drilling mud to obtain representative undisturbed samples. Undisturbed samples of cohesive soils for laboratory analysis will be obtained at each significant horizon using a three-inch (3-in.) diameter thin-wall Shelby tube or equal sampling barrel. Samples of cohesionless soils shall be obtained using a standard two-inch OD split spoon sampler. After sampling, boreholes shall be filled with cement-bentonite grout according to Louisiana Administrative Code (Title 70, Part XIII), Louisiana Department of Environmental Quality (LDEQ), and Louisiana Department of Transportation and Development (LADOTD) procedures.

The Contractor shall have a field vane shear apparatus for testing shear strength in the boreholes. This apparatus shall conform to the latest edition of ASTM D2573 and shall be used to obtain at least two vane shear tests per hole in the marsh creation areas as needed to complete the required analyses during the drilling operation. All samples will be sealed in moisture-proof containers to ensure preservation prior to laboratory testing.

NOTE: The Contractor shall be on the alert for cultural resource deposits. Resource materials with potential cultural significance consist of the remains of prehistoric (Native American) or historic maritime or terrestrial activity, or human remains. Typical examples of cultural resources found in coastal Louisiana include, but are not limited to, material from historic shipwrecks, prehistoric (aboriginal) dugouts, fire hearths, pottery, or human bones. As undisturbed soil core samples are collected, any non-natural material found within or adhering to the collection equipment that has or may have potential cultural resource value, must be documented and preserved as stated below. All such materials with potential cultural significance, excepting human remains, shall be photographed as found on the equipment and collected in moisture proof containers. Containers shall be clearly labeled and logged with reference to the photograph(s), the specific bore location from which the material originated, and the depth at which it was located in the core. In the event such material is discovered, the preserved samples shall be presented to the designated NRCS personnel within 24 hours for further

evaluation. Should human remains be discovered during the field collection of soil samples, the boring operation for that hole shall cease and the NRCS Contracting Officer's Representative (COR) shall be contacted immediately. Documentation of discovered cultural resource material shall be included in and recorded in the boring logs.

5.4 Testing and Analytical Requirements

The required laboratory tests and derived characteristics for each sampling location shall include, but are not limited to, sieve analyses, hydrometer, specific gravity, moisture contents, Atterberg Limits, unconsolidated-undrained shear and unconfined compression shear, consolidation, table vane, cohesion, and dry density. These suggested tests should be reviewed by the Contractor to ensure that sufficient information will be obtained for engineering analysis and recommendations. NRCS should be notified if the Contractor has any suggested modifications to the tests. Payment will be made on a per-test basis.

Prior to soils analysis, as undisturbed sample cores are opened or extruded, any non-natural material discovered (see above examples) shall be documented, preserved and labeled in a manner that is usable for a cultural resources evaluation by a qualified archaeologist. Documentation shall consist of 1) one or more clear photographs of the material as found in the core section, 2) a record of the log or label number of the core sample within which the material was collected, 3) a record of the depth (horizon) at which the material occurs in the core, and 4) the length of core section the material occupies. Each core section containing such material shall be preserved for inspection as a "whole piece" to the extent possible in a moisture proof, air-tight container clearly labeled and logged with reference to the above described documentation. The NRCS COR shall be notified immediately upon the discovery of such material, and the preserved samples shall be presented to the designated NRCS personnel within 24 hours for further evaluation.

A minimum of one consolidation test shall be completed for each of the marsh creation project area bore holes. Prior to performing consolidation tests, the Contractor shall provide to NRCS the proposed depth of sample for each boring for NRCS concurrence. Also if the Contractor feels the number of consolidation tests needs to exceed fifteen (15) in number, the Contracting Officer (CO) shall be notified for advance approval before the tests are run. The results of the consolidation tests shall provide the sample's initial void ratio, compression index, probable maximum preconsolidation stress, $e - \log p$ curve, and strain - square root of time curve.

The Contractor shall provide a copy of the field soil log report on all samples taken and a list of the samples to receive consolidation tests to the CO. All material encountered shall be classified according to the Unified Soil Classification System.

No samples will be taken from Lake Lery at this time. Any information needed for Lake Lery borrow area soil characteristics shall be extracted from the final geotechnical report prepared by GeoEngineers for the BS-16 Lake Lery Marsh Creation and Shoreline Restoration project dated January 21, 2011.

5.5 Engineering Services

The Contractor shall use information obtained from field and laboratory testing results along

with survey data supplied by NRCS to develop and provide engineering recommendations for design and construction of the project. The Contractor shall review project features, proposed construction methods, and suggested boring locations, depths, and analytical testing requirements before beginning work on this task order, and shall recommend changes to the COR if appropriate.

Based on analysis of test results from borings collected under this task order and the information in the geotechnical report from the Lake Lery Marsh Creation and Shoreline Restoration project (BS-16) dated January 21, 2011, the Contractor shall provide engineering design and construction recommendations specific to each project feature as described below:

i. Earthen Terraces

Earthen terraces will be constructed in the general locations shown on the fact sheet map in Appendix A. Construction of terraces will be by conventional methods with long reach marsh buggy excavators borrowing from in situ soils on either side of the terraces. The Contractor shall provide the below information for each borehole in the proposed terrace fields. Results of these analyses shall be presented in graphical and tabular form in the geotechnical report.

- (a) Slope stability analyses shall be performed to establish maximum stable side slopes and required berm widths of the terraces assuming no geotextile reinforcement. Based on previous terrace configurations, a fifteen (15) foot top width may be assumed with a maximum excavation limit of -10.0' in borrow areas adjacent to the terraces. If stable side slopes are found to be steeper than 5H:1V, a 5H:1V slope shall also be analyzed. To bracket the results, analyses shall be completed for constructed elevations of +2.0', +3.0', +4.0', and +5.0' NAVD 88, Geoid12A.
- (b) Settlement analyses shall be performed to quantify the expected settlement and establish the expected settled configuration of the terraces. Analyses shall be completed for all elevations using the maximum stable slope determined in the slope stability analyses and a minimum of two other milder side slopes. One of these runs shall consist of a 5H:1V slope. Analyses shall be completed in an iterative manner to predict initial settlement at construction and settlement at 6 months, 1 year, 5 years, 10 years, and 20 years after construction.
- (c) Bearing analyses shall be completed for all elevations and stable terrace configurations determined from the slope stability and settlement analyses.
- (d) A cut to fill estimation shall be made to determine the amount of excavated material that is needed to construct the terraces.
- (e) Construction and maintenance recommendations shall be made. This shall include an evaluation of the estimated durability of the terraces.

ii. Update of data from the BS-16 Report

A survey datum adjustment has been made since the completion of the BS-16 geotechnical investigation. Elevations in that report were referenced to NAVD 88, Geoid99. An update of

the geoid model in the project area to Geoid12A has been completed, which has resulted in the elevations shown in the BS-16 report being 0.325' above their Geoid12A elevation. The following information from that report shall be reproduced, with all elevations adjusted down by 0.325':

1. Table 4 – Elastic Construction Settlement of Foundation Soils in Marsh Fill Area
2. Appendix G, Figures G-1 through G-5

Rounding to the nearest tenth of a foot (0.1') is acceptable.

A thorough review shall be made of all data in the BS-16 geotechnical report related to settlement of the marsh fill material and stability of the marsh side containment dike. If any advancements have been made to prediction of either, the COR shall be notified.

iii. Dredge fill placement, marsh creation project area

Approximately 334 acres of marsh will be constructed in the location shown on the fact sheet map in Appendix A. Based on analysis of test results from the new borings taken within the marsh creation project area and the borrow area data from the BS-16 geotechnical report, the Contractor shall perform the analyses listed below. Target marsh elevation for this project is approximately +1.0' NAVD88, Geoid 12A. The target year for this elevation will be determined subsequent to this investigation (could range from target year 3 to target year 20). Water elevation shall be assumed as +0.5' NAVD88, Geoid 12A. The Contractor may assume a time of 60 days to fill the marsh creation area with dredge fill material.

- (a) Evaluate self weight consolidation over time (0 - 20 years) for the dredge fill material considering the proposed construction method.
- (b) Evaluate settlement over time (0 - 20 years) for the foundation material on which the marsh fill material will be placed considering the proposed construction method.
- (c) Evaluate total marsh fill settlement over time (0 - 20 years) considering the proposed construction method using the PSDDF model.
- (d) For each boring location, develop a curve showing fill surface elevation vs. time and a table showing the combined total anticipated settlement vs. time. Curves shall be based on a range of initial marsh fill elevations beginning with +2.0' and increasing in 0.5-foot increments to +4.5'. The time scale shall include initial marsh fill placement; end of construction; intervals of 6 months, 1, 3, 5, and 10 years after initial placement; and ultimate settlement (20 years).
- (e) Develop tables and graphs showing self weight consolidation, foundation settlement, and total settlement.
- (f) Provide an estimated cut to fill ratio.
- (g) Document all calculations, references, and assumptions.

h) Provide construction methods and sequencing recommendations

iv. Earthen containment dikes

To contain the dredge fill material, earthen containment dikes will be constructed in a continuous fashion around the perimeter of the marsh creation area. Construction of dikes will be by conventional methods with long reach marsh buggy excavators borrowing from in-situ soils within the marsh creation area. The containment dike on the east side of the marsh creation area will be constructed on top of the lake rim embankment that will be constructed as part of the BS-16 project. The elevation of the lake rim embankment shall be assumed as +1.5' for analyses. The Contractor shall provide the following information:

- (a) Maximum construction elevation considering desired marsh elevation and expected fill properties
- (b) Acceptable side slopes with and without geotextile reinforcement
- (c) Acceptable crown width
- (d) Settlement of dike during construction (~1 year)
- (e) Required berm width. A bottom elevation of -10.0' NAVD 88 shall be assumed for the borrow channel.
- (f) Bearing capacity analyses
- (g) Cut to fill ratio required for construction
- (h) Construction recommendations
- (i) Required setback distance, if any, for the dike to be located on top of the lake rim embankment.

NOTE: All horizontal and vertical coordinates are referenced to benchmark "BS16-SM-02" as described in the benchmark datasheet in Appendix D.

5.6 Deliverables

The following deliverables are required:

- i) List of equipment used and names of personnel involved in the drilling activities.
- ii) All field logs and notes (including pictures).
- iii) A geotechnical investigation report that includes the following as a minimum:
 - a. Project location and boring location maps
 - b. Project narrative
 - c. Description of sampling methods
 - d. Description of site and subsurface conditions
 - e. Borehole logs including mudline elevations and water depths
 - f. Drilling, sampling, and laboratory testing descriptions
 - g. Field vane results

- h. Consolidation test results
- i. Laboratory test results
- j. Graphical boring profiles
- k. Sieve analyses
- l. Updated figures from the BS-16 geotechnical report
- m. Bearing capacity analyses
- n. Slope stability analyses
- o. Foundation analyses
- p. Settlement analyses including tables and graphs
- q. Construction recommendations
- r. Calculations completed for all elements of sampling, testing, and analyses
- s. List of collected material with potential cultural significance
- t. Discussion of results
- t. Any other information necessary to convey the testing and analysis requirements in Sections 5.2 through 5.5.

A preliminary report shall be submitted within 60 days of the Notice to Proceed. A preliminary meeting between NRCS and CPRA shall be held within one week of submittal of the preliminary report. NRCS will provide comments within 2 weeks of the preliminary meeting. The final geotechnical report shall be submitted to NRCS no later than 2 weeks from receipt of NRCS comments.

Reports shall be printed on loose-leaf paper, punched with a large-hole three-ring punch, and assembled in three-ring binders. Spiral-bound reports are unacceptable. Bound reports shall be clearly labeled on the spine of each binder so they may be readily identified while on a bookshelf. A minimum of 6 bound copies of the final geotechnical report and a CD copy with the report in .pdf format shall be submitted to the CO.

- iv) Borehole logs shall be submitted in digital CAD format (.dwg or .dxf) on a compact disc (CD).

6.0 ADDITIONAL INFORMATION

IMPORTANT NOTE: The Government requires any of its private contractors to include the property owner as an additional insured on any and all pertinent liability insurance policies maintained by the contractor while conducting activities on the property.

The Contractor shall coordinate and confirm access to the sites through the COR, Mr. Jason Kroll. Mr. Kroll may be reached at (225) 665-4253 ext. 112 or jason.kroll@la.usda.gov. Questions about sample collection, analyses, or testing requirements shall also be submitted to Mr. Kroll.

Questions about project design or construction requirements may be directed to Mr. Dain Gillen at (225) 665-4253 ext. 109 or dain.gillen@la.usda.gov.

Vicki Supler will serve as the CO for this Scope of Services. She may be reached at (318) 473-7645 or vicki.supler@la.usda.gov. Only the CO may authorize changes to this task order.

The Contractor shall review this Scope of Services and provide any recommendations he considers necessary to clarify the scope and achieve the items above.

DRAFT

Appendix A
FACT SHEET

PPL22 PROJECT NOMINEE FACT SHEET
September 6, 2012

Project Name:

Terracing and Marsh Creation South of Big Mar

Coast 2050 Strategy:

- Coastwide: Dedicated dredging to create, restore, or protect wetlands
- Coastwide: Terracing
- Coastwide & Regional Ecosystem Strategy: Manage outfall of existing diversions

Project Location:

Region 2, Breton Sound Basin, Plaquemines Parish, south of Big Mar and west of Lake Lery

Problem:

From 1932 to 1990, the Caernarvon Mapping Unit lost 14,240 acres of its marsh. Prior to Hurricane Katrina, the greatest lost documented occurred between 1956 and 1974 and coincided with Hurricane Betsy and extensive canal building. Hurricane Katrina devastated the area resulting in substantial marsh loss. According to USGS Open File Report (2006-1274), approximately 39 square miles of marsh around the upper and central portions of Breton Sound were converted to open water by ripping of the marsh or by marsh submergence.

Goals:

The primary goal is to create terraces in the shallow open water areas within the Caernarvon Diversion outfall area. Terraces will reduce wave fetch in the large open water areas and promote conditions conducive to growth of marsh vegetation and submerged aquatic vegetation. Additional benefits may be achieved through capturing suspended sediments. Marsh creation is also proposed to reestablish the western shoreline of Lake Lery in association with the Lake Lery Shoreline Restoration Project (BS-16).

Proposed Solutions:

Approximately 65,000 linear feet of terraces (37 acres) will be constructed with in-situ material to reduce fetch and turbidity and capture suspended sediment. Sediments will be hydraulically dredged from Lake Lery and pumped via pipeline to create and restore approximately 334 acres of marsh in the project area.

Preliminary Project Benefits:

- 1) *What is the total acreage benefited both directly and indirectly?*
Approximately 1,334 acres would be benefited directly and indirectly. Direct benefits include 334 acres of marsh creation/nourishment and 37 acres of terraces. Indirect benefits would occur within the terrace fields which encompass approximately 1000 acres.
- 2) *How many acres of wetlands will be protected/created over the project life?* 302 acres
- 3) *What is the anticipated loss rate reduction throughout the area of direct benefits over the project life (<25%, 25-49%, 50-74% and >75%).*
Background loss rates would be reduced by 50% in the marsh creation and nourishment and terracing areas, and by 33 % in existing areas of marsh protected around the terrace fields.
- 4) *Do any project features maintain or restore structural components of the coastal ecosystem such as barrier islands, natural or artificial levee ridges, beach and lake rims, cheniers, etc.?*
Yes, 334 acres of marsh along the Lake Lery shoreline will be restored.

5) *What is the net impact of the project on critical and non-critical infrastructure?*

None identified.

6) *To what extent does the project provide a synergistic effect with other approved and/or constructed restoration projects?*

This project will work synergistically with the following projects to 1) maintain the integrity of Lake Lery, 2) provide storm surge benefits to areas to the north, 3) protect and enhance fish and wildlife resources for Breton Sound Basin, and 4) better utilize sediments and freshwater delivered by the Caernarvon Freshwater Diversion:

- Caernarvon Freshwater Diversion Project,
- Caernarvon Diversion Outfall Management (BS-03a), and,
- Lake Lery Shoreline Restoration (BS-16).

Identification of Potential Issues:

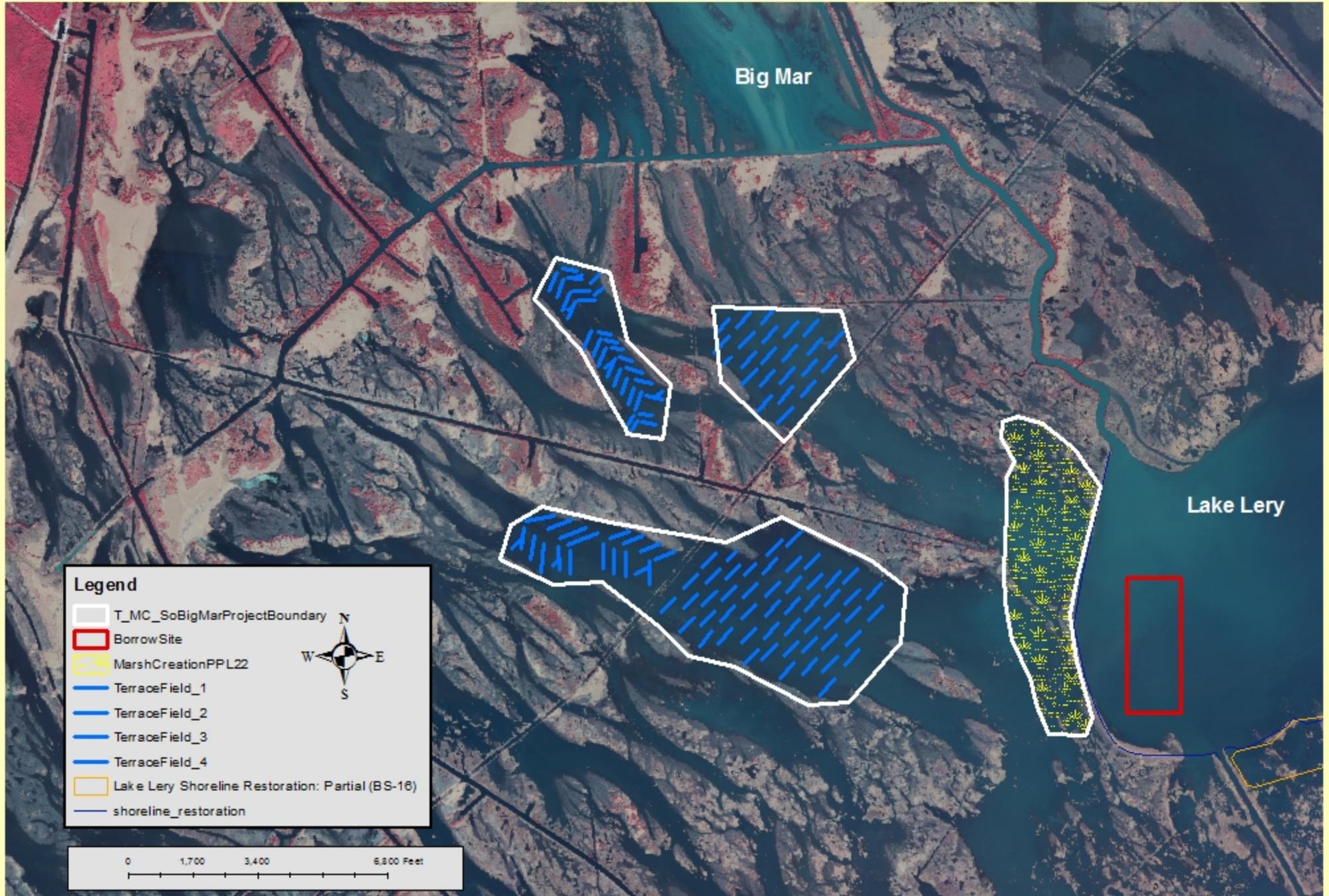
There are no known potential issues to this project. The major landowner, Delacroix Corp., is fully aware of the project concept and has voiced their support. There are several pipelines in the area which should be avoidable with no issue. There are no oyster leases.

Preliminary Construction Costs:

The estimated construction cost including 25% contingency is \$18,320,161. The fully-funded cost range is \$20M - \$25M.

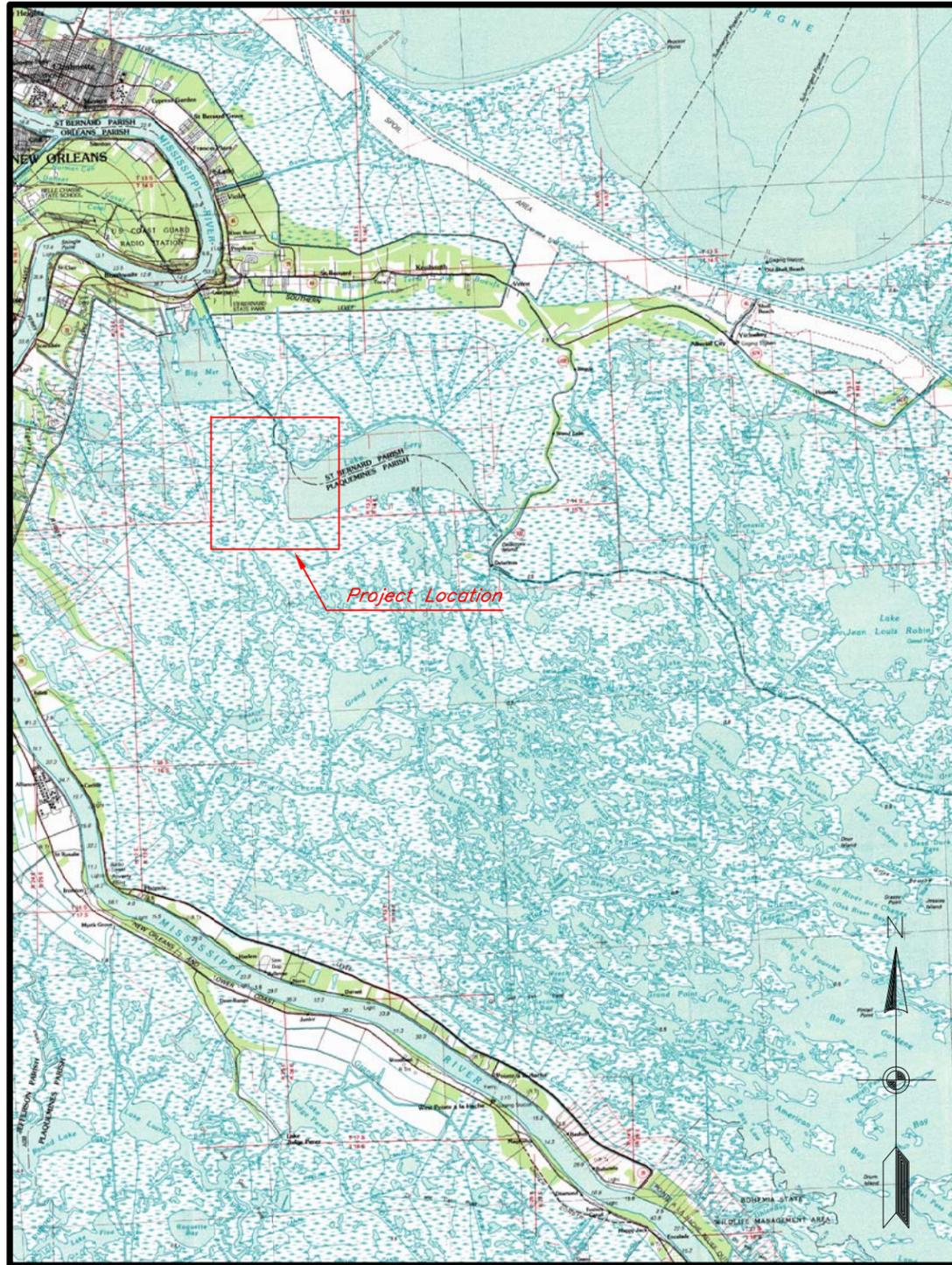
Preparer(s) of Fact Sheet:

Angela Trahan, USFWS, 337/291-3137, angela_trahan@fws.gov



Appendix B

GEOTECHNICAL BOREHOLE DETAILS



VICINITY MAP

BS-24 TERRACING AND MARSH CREATION SOUTH OF BIG MAR

BS-24
TERRACING AND
MARSH CREATION
SOUTH OF BIG MAR
GEOTECHNICAL
INVESTIGATION PLAN

TO BE BUILT UNDER THE COASTAL WETLANDS
PLANNING, PROTECTION, AND RESTORATION
ACT OF PUBLIC LAW 101-646

BY THE U.S. FISH AND WILDLIFE SERVICE
AND THE
NATURAL RESOURCES CONSERVATION SERVICE
OF THE
UNITED STATES DEPARTMENT OF AGRICULTURE

MARCH 2014



Location in Louisiana

Designed	D. GILLEN	Date	03/14
Drawn	D. GILLEN		03/14
Checked	J. KROLL		03/14
Approved			

GEOTECHNICAL INVESTIGATION PLAN
BS-24 TERRACING AND MARSH
CREATION SOUTH OF BIG MAR
PLAQUEMINES PARISH, LA



File No.	BS-24 Geotech Drawings - Sheet 1 - Cover.dwg
Drawing No.	---
1/31/14 3:58 PM	Sheet 1 of 2



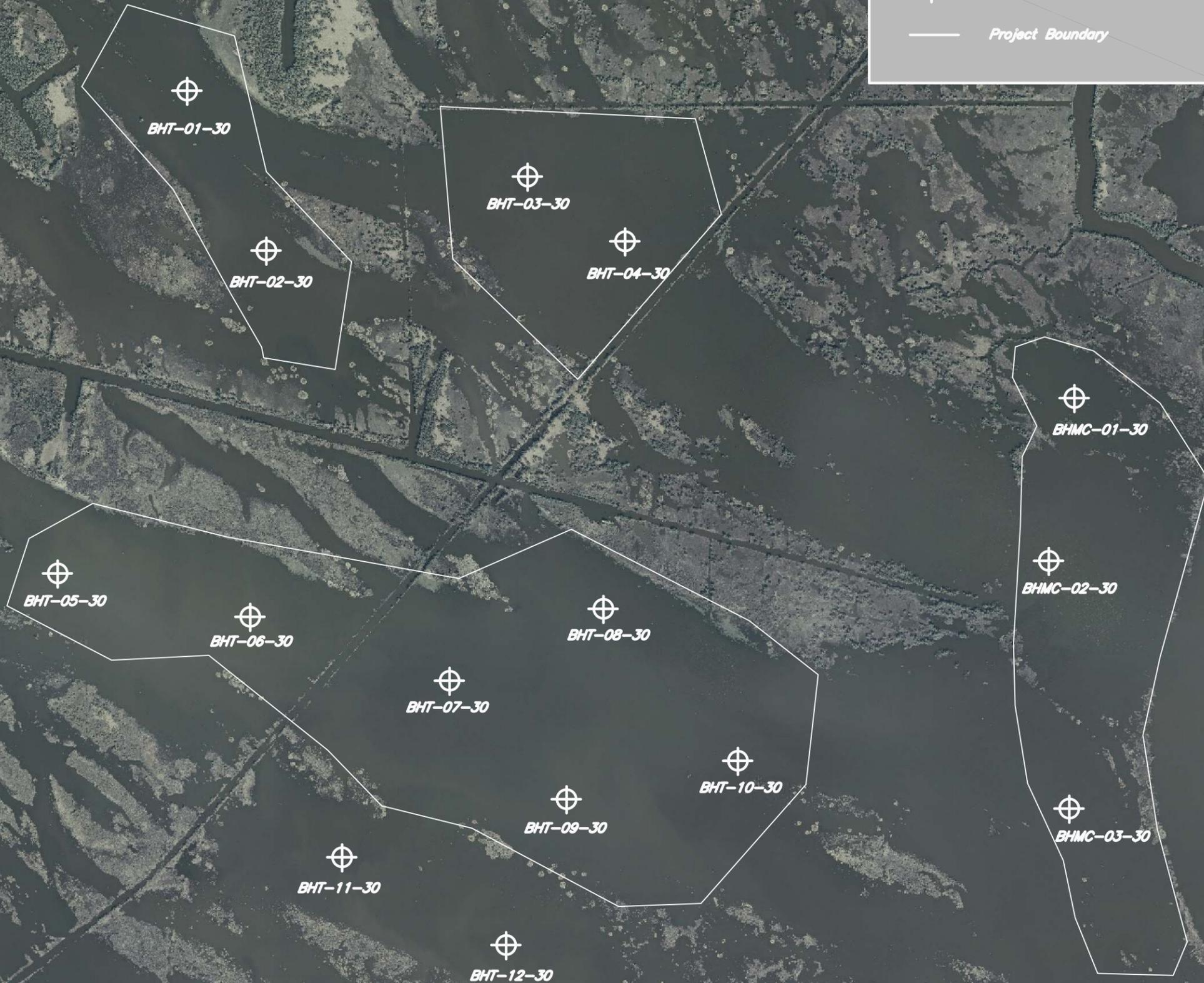
Geotechnical Borehole Locations

ID	Northing	Easting
BHMC-01-30	476347.6	3741458.7
BHMC-02-30	474375.2	3741138.1
BHMC-03-30	470812.5	3741424.8
BHT-01-30	480211.0	3729947.8
BHT-02-30	478222.8	3730851.5
BHT-03-30	479262.1	3734161.3
BHT-04-30	478211.5	3735595.9
BHT-05-30	473952.8	3728050.0
BHT-06-30	473297.6	3730851.5
BHT-07-30	472515.1	3733328.6
BHT-08-30	473331.5	3735403.9
BHT-09-30	470812.5	3734952.0
BHT-10-30	471527.3	3737227.0
BHT-11-30	470186.6	3731932.1
BHT-12-30	468917.8	3734062.7

LEGEND

⊕ Borehole Locations

— Project Boundary



Designed	D. GILLEN	Date	03/14
Drawn	D. GILLEN		03/14
Checked	J. KROLL		03/14
Approved			

**BORING LOCATIONS
BS-24 TERRACING AND MARSH
CREATION SOUTH OF BIG MAR
PLAQUEMINES PARISH, LA**



Appendix C
RIGHT OF ENTRY
AND
ACCESS INFORMATION

UNITED STATES OF AMERICA
Department of the Interior, Fish and Wildlife Service
RIGHT OF ENTRY FOR SURVEY AND GEO-TECHNICAL INVESTIGATIONS

**Terracing and Marsh Creation
South of Big Mar Project (BS-24)
Requests for Surveys, Geo-Technical
And Cultural Resources Investigations
Plaquemines Parish, Louisiana**

**Delacroix Corporation
206 Decatur Street
New Orleans, Louisiana 70130**

The undersigned, hereinafter called the "Owner", hereby grants to the **UNITED STATES GOVERNMENT**, hereinafter called the "Government" (which term includes the Government's employees, contractors and sub-contractors, the Department of Agriculture's employees, contractors and sub-contractors and the Natural Resources Conservation Service's employees, contractors and sub-contractors), a permit or right of entry upon the following terms and conditions:

1. The Owner hereby grants to the Government, its employees, contractors and sub-contractors a right to enter upon the lands hereinafter described at any time during the period **commencing September 13, 2013 and ending September 12, 2015 with the exception of restricted access during certain periods of time relative to the entire 2013-2014 and 2014-2015 waterfowl hunting seasons as set by the Louisiana State Department of Wildlife and Fisheries in accordance with the guidelines provided by the United States Fish and Wildlife Service and during certain periods of time during the alligator mating and nesting season**, in order to conduct surveys, geo-technical and cultural resources investigations, and to carry out such other exploratory work as may be necessary to complete the investigations being made of said lands by the Government. There will be **restricted access** to and activity on all areas of Owner's property shown on the attached map during the entire 2013-2014 and 2014-2015 waterfowl hunting seasons. The Government will be able to access the Owner's property from September 29, 2013 through November 5, 2013 and December 2, 2013 through December 9, 2013. The Government will be able to access **a single area** of Owner's property during waterfowl hunting season both years which is marked as such by the pink arrow on the attached map and made a part hereof; however, no activity or entry is allowed on said lands until after 9:30 a.m. during the 2013-2014 and 2014-2015 waterfowl hunting seasons. As the dates for the 2014-2015 waterfowl hunting season as set by the Louisiana Department of Wildlife and Fisheries in accordance with the guidelines provided by the United States Fish and Wildlife Service has not been set as of the signing of this agreement, the Government will coordinate with the Owner to determine the open access dates between teal season and the start of the regular waterfowl hunting season for the 2014-2015 waterfowl hunting season. There will be **no access** to or activity on Owner's property from the period of May 15, 2014 through July 1, 2014 and the period of May 15, 2015 through July 1, 2015 due to the alligator mating and nesting season and the collection of eggs by the Owner.

2. The permit includes the right of ingress and egress on other lands of the Owner not described below, provided that such ingress and egress is necessary and not otherwise conveniently available to the Government. If such entry onto other lands of the Owner is necessary, the Government through its representative will notify the Owner's Land Manager Michael Farizo at 504-583-8192 of which lands the Government will be entering. Said notice to Owner's representative will be given forty-eight (48) hours in advance of any such entry onto other lands of the Owner. Should said entry on other lands of Owner be necessary, said entry is subject to all the same restrictions as detailed in the preceding and following paragraphs.

3. All tools, equipment, and other property taken upon or placed upon the land by the Government shall remain the property of the Government and shall be removed by the Government at any time within a reasonable time period after the expiration of this permit or right of entry. All such property will be removed from Owner's property within a maximum of thirty (30) days after expiration of this permit or right of entry unless written permission to extend the maximum period of time is given by the Owner.

4. If any action of the Government's employees or agents in the exercise of this right of entry results in damage to the real property, the Government will, at its option, either repair such damage or make appropriate settlement with the Owner. In no event shall such repair or settlement exceed the fair market value of the fee interest of the real property at the time

immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any other damages than provided herein.

5. If aircraft flights over said lands, or entry upon the land by means of helicopter or other type of aircraft are necessary, the Government shall notify the Owner, in advance, of each such flight or entry. Aircraft flights over the property are prohibited during the 2013-2014 and 2014-2015 waterfowl hunting seasons.

6. This right of entry agreement is further subject and subordinate to any and all mineral and surface leases, permits, licenses, rights-of-way or other agreements recorded or unrecorded, which now, or hereafter may affect Owner's property, to the extent such rights and uses are apparent or identified to the Government, and the Government will not unreasonably interfere with Owner's permittees use of the property or with Owner's normal course of business operation.

7. Nothing in this agreement shall be taken to imply that Owner cedes or subjugates its ownership, possession, control or any of its other rights as Owner to any of its properties located in the State of Louisiana to Federal, State or local governments or to any other entity whether acting in concert with the foregoing or in its own capacity. And, no information gathered through this right of entry may be used in any proceeding for condemnation or any proceeding involving a taking of Owner's property, with the following limitation and exceptions. In the event that items of a historical or cultural significance are discovered, the Owner and the Government will coordinate to determine the most reasonable and best method of preservation of such items; however, Owner cedes no ownership interest in or rights that it has to any artifact located on its property. In the event that contamination of the property is discovered, then the Owner and the Government will coordinate to determine the most reasonable method of dealing with the contamination issue; however, all reasonable consideration will be given to the Owner's rights in its property.

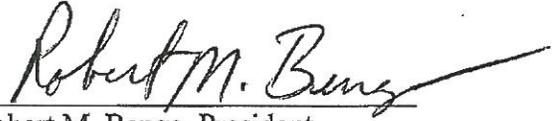
8. Any and all vessels used by the Government, its employees, contractors or subcontractors must use the **approved access route as designated on the attached map**. Should there be a problem with said access route, then Owner's representative, Michael Farizo, may approve another route of access for the Government to use. No marsh buggies are allowed on Owner's property. The Government shall have the right to survey cross-sections of the Delacroix Corporation property as shown on the attached map. Only two passes along a single survey line on land will be allowed. If the data shows that a third pass along a survey line on land is necessary for follow-up and additional information, then a third pass will be allowed. All geotechnical investigations shall operate within the limits of this Right of Entry as shown on the attached map. It is understood that Owner has multiple concerns regarding the contractors that will be on its property during the term of this Right of Entry. Owner specifically authorizes T. Baker Smith, Chem-Spray and GeoEngineers and the subcontractors that may be chosen by those companies to operate on Owner's property; however, this listing of authorized contractors is not exclusive and does not limit the Government from seeking additional or other contractors. Given the Owner's concerns should additional contractors be necessary to the project, the Government will coordinate with Owner to allow other contractors and subcontractors not named within to access the property. The Owner requires that it be named as an additional insured on the liability policy provided by any contractors or sub-contractors working on this project and any contractor or sub-contractor operating on Owner's property.

9. It is a requirement that a signed copy of this agreement shall be in the possession of any contractor, subcontractor, or employee of the Government when they are on Owner's property and in Owner's canals and waterways. Failure to present such copy of this agreement to any of Owner's representatives will result in immediate expulsion from Owner's property until the requisite documentation has been provided to Owner's field representative.

10. The land affected by this permit or right of entry is only that owned by the Delacroix Corporation as and is located in the Parish of Plaquemines, State of Louisiana, and is described as follows:

Situated in Township 14 South, Range 13 East, Sections 41, 42, 43, 46, 47, 48, 49, 50, 57 and 58. And, the East Half (E/2) of Section 55, Township 14 South, Range 13 East (comprising approximately 410 acres, more or less), and the West Half of Section 56, Township 14 South, Range 13 East (comprising approximately 308 acres, more or less). And, that part of Section 5, lying south of the extension of the East and West line separating Lot No. One from Lots Nos. Two, Three and Four of Section 29, Township 14 South, Range 13 East. And, Sections 7 and 8, back of the Forty Arpent Line. All as more fully shown on the attached map which is made a part hereof.

WITNESS MY HAND this 13th day of SEPTEMBER, 2013.



Robert M. Bengé, President
Delacroix Corporation

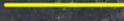
ACCEPTED BY THE
UNITED STATES OF AMERICA:



Jeffrey D. Weller
Field Supervisor
Louisiana Ecological Services Office

ACCESS COORDINATES		
Point	Northing	Easting
1	473604	3743306
2	475872	3738229
3	475179	3737907
4	475292	3736982
5	475249	3735966
6	474974	3735992
7	474597	3735892
8	474957	3734295
9	474696	3734295
10	473982	3734518
11	470508	3733166
12	477104	3735471
13	477553	3732922
14	477598	3731786

LEGEND

 Access Route

 BS-24 Project Features

 BOAT LAUNCH

Access allowed after 9:30 a.m.
during waterfowl seasons



Date 09/13
Designed D. GILLEN
Drawn D. GILLEN
Checked J. KROLL
Approved _____

DATA COLLECTION ACCESS ROUTE
BS-24 TERRACING AND MARSH
CREATION SOUTH OF BIG MAR
PLAQUEMINES PARISH, LA



File No. BS-24 Access Route Map.dwg
Drawing No. ---
9/26/13 8:41 AM
Sheet 1 of 1

RECEIVED

SEP 20 2013

FISH & WLDL. SERV
LAFAYETTE, LA.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506



September 13, 2013

Mr. Lester Evans
1615 Bayou Road
St. Bernard, Louisiana 70085

RE: Terracing and Marsh Creation South of Big Mar Project (BS-24)
Surveying/Geotechnical Landrights Request

Dear Mr. Evans:

When executed by you, this letter shall grant a permit or right-of-entry to the UNITED STATES OF AMERICA, acting through the Department of the Interior, Fish and Wildlife Service, and the Department of Agriculture, Natural Resources Conservation Service, hereinafter called the "Government" to conduct survey work, cultural resources work, field trip reconnaissance, and/or geotechnical investigations at sites which are located on your property within the Terracing and Marsh Creation South of Big Mar Project area (Figure 1). These sites are located in Section 56, T14 South-R13 East, in Plaquemines Parish, Louisiana, shown on the attached map.

The survey work, cultural resources work, and/or geotechnical investigations proposed by the Government is needed for advanced engineering and design planning for the Coastal Wetland Planning, Protection and Restoration Act (CWPPRA), Terracing and Marsh Creation South of Big Mar Project (BS-24) described in the enclosed fact sheet. This permit or right-of-entry is subject to the following conditions:

1. The Owner hereby grants to the Government, its employees, contractors and sub-contractors a right to enter upon the lands hereinafter described at any time during the period **commencing on the date accepted below and ending September 20, 2015, with the exception of restricted access during the period of time relative to the entire 2013-2014 and 2014-2015 waterfowl hunting seasons as set by the Louisiana State Department of Wildlife and Fisheries in accordance with the guidelines provided by the United States Fish and Wildlife Service**, in order to conduct surveys, geo-technical and cultural resources investigations, and to carry out such other exploratory work as may be necessary to complete the investigations being made of said lands by the Government. There will be restricted access to and activity

on Owner's property during the entire 2013-2014 and 2014-2015 waterfowl hunting seasons, and this Right of Entry for Survey and Investigations will be restricted to the hours after 9:30 a.m. during said waterfowl hunting seasons.

2. All tools, equipment, and other property taken upon or placed upon the land by the Government shall remain the property of the Government and shall be removed by the Government at any time within a reasonable time period after the expiration of this permit or right of entry. All such property will be removed from Owner's property within a maximum of thirty (30) days after expiration of this permit or right of entry unless written permission to extend the maximum period of time is given by the Owner.

3. If any action of the Government's employees or agents in the exercise of this right of entry results in damage to the real property, the Government will, at its option, either repair such damage or make appropriate settlement with the Owner. In no event shall such repair or settlement exceed the fair market value of the fee interest of the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any other damages than provided herein.

4. If aircraft flights over said lands, or entry upon the land by means of helicopter or other type of aircraft are necessary, the Government shall notify the Owner, in advance, of each such flight or entry. Aircraft flights over the property are prohibited during the 2013-2014 and 2014-2015 waterfowl hunting seasons.

5. This right of entry agreement is further subject and subordinate to any and all mineral and surface leases, permits, licenses, rights-of-way or other agreements recorded or unrecorded, which now, or hereafter may affect Owner's property, to the extent such rights and uses are apparent or identified to the Government, and the Government will not unreasonably interfere with Owner's permittees use of the property or with Owner's normal course of business operation.

6. Nothing in this agreement shall be taken to imply that Owner cedes or subjugates its ownership, possession, control or any of its other rights as Owner to any of its properties located in the State of Louisiana to Federal, State or local governments or to any other entity whether acting in concert with the foregoing or in its own capacity. And, no information gathered through this right of entry may be used in any proceeding for condemnation or any proceeding involving a taking of Owner's property, with the following limitation and exceptions. In the event that items of a historical or cultural significance are discovered, the Owner and the Government will coordinate to determine the most reasonable and best method of preservation of such items; however, Owner cedes no ownership interest in or rights that it has to any artifact located on its property. In the event that contamination of the property is discovered, then the Owner and the Government will coordinate to determine the

most reasonable method of dealing with the contamination issue; however, all reasonable consideration will be given to the Owner's rights in its property.

7. All vessels used by the Government, its employees, contractors or subcontractors must use **noted access routes as designated on the attached map** to access any survey or exploration site on the property. The only boats that may be used by the Government under this Right of Entry are airboats and out board motor boats. All geo-technical investigations shall operate within the limits of this Right of Entry as shown on the attached map.

8. The land affected by this permit or right-of-entry is only that owned by the Evans Family as and is located in the Parish of Plaquemines, State of Louisiana, and is described as follows:

Entirely located within Section 56, Township 14 South, Range 13 East.

9. It is a requirement that a signed copy of this agreement shall be in the possession of any contractor, subcontractor, or employee of the Government when they are on Owner's property and in Owner's canals and waterways. Failure to present such copy of this agreement to any of Owner's representatives will result in immediate expulsion from Owner's property until the requisite documentation has been provided to Owner's field representative.

10. This letter agreement shall be effective upon the date of your acceptance indicated on this letter and shall remain in effect until September 20, 2015; however, should either party choose to terminate this agreement prior to the expiration date, either party may do so by providing thirty (30) days written notice to the other party. Such termination shall be effective upon receipt of such written notice.

If you have any questions regarding this matter, please contact Ms. Angela Trahan, Fish and Wildlife Service project manager at the following address.

U.S. Department of Interior
Fish and Wildlife Service
Louisiana Ecological Services Office
646 Cajundome Blvd., Suite 400
Lafayette, LA 70506
337-291-3137

If you agree to the foregoing terms and provisions, please indicate your approval and acceptance by executing two (2) originals (enclosed), and return one (1) original to Ms. Angela Trahan in the envelope provided. Thank you for your cooperation in this matter.

Sincerely,



Jeffrey D. Weller
Field Supervisor
Louisiana Ecological Services Office
Fish and Wildlife Service

ACCEPTED AND APPROVED THIS 9 DAY OF 17 B, 2013.


Signature

LESTER J. EVANS
Typed or printed name

Title: LAND



Appendix D
SURVEY MONUMENT



VICINITY MAP

Not to Scale

Reproduced from 2010 DOQQ Aerial Photography

Station Name: "BS16-SM-02"

Monument Location: Monument is located on the western bank of a location canal south of Lake Lery. Monument is located approximately 0.25 miles south of the intersection of Lake Lery and the location canal. It is approximately 0.6 miles north of the intersection of the location canal with another canal. Monument is located in Plaquemines Parish, northwest of the town of Delacroix.

Monument Description: NGS style floating sleeve monument; datum point set on 9/16" stainless steel sectional rods driven 84 feet to refusal, set in sand filled 6" PVC pipe with access cover set in concrete, flush with the ground.

Installation Date: August 2013

Date of Survey: August 2013

Monument Established By: T. Baker Smith, LLC

For: *Natural Resources Conservation Service*

Adjusted NAD 83 (2011) Geodetic Position

Lat. 29° 46' 31.97" N

Long. 89° 51' 50.31" W

Adjusted NAD 83 Datum LSZ (1702) Feet

N= 466,857.617

E= 3,746,965.627

Adjusted NAVD88 (2010.0) Height

Elevation = 1.761 feet (0.537 mtrs.) (Geoid12A)

Ellipsoid Height = -24.924 mtrs.

Geoid12A Height = -25.461 mtrs.

FOR REFERENCE ONLY

Adjusted NAVD88 Height (2006.81) (Geoid03)

Elevation = 1.574 feet (0.480 mtrs)

Ellipsoid Height = -81.903 feet (-24.964 mtrs)

Geoid 03 Height = -83.477 feet (-25.444 mtrs) (2004.65)

