Bayou DuLarge Ridge, Marsh, and Hydrologic Restoration

Proposal Report
Magnetometer Survey

October 1, 2018
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Prepared for:

U.S.D.A.
Natural Resources Conservation Service

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Prepared by:

For

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1. INTRODUCTION

The Bayou DuLarge Ridge, Marsh, and Hydrologic Restoration project has been approved for engineering and design by the Natural Resources Conservation Service (NRCS) on behalf of the Federally Recognized Chitimacha Tribe of Louisiana, in cooperation with the Gulf Coast Ecosystem Restoration Team (GCERT). This project is funded through the RESTORE Act.

2. LOCATION

The project site is located in Terrebonne Parish, Louisiana, on the lower end of Bayou DuLarge between Lake Mechant and Caillou Lake and about 10 miles southwest of Theriot, LA. The approximate center of the project area is located at Northing 278,119.323 - Easting 3,407,512.796.

3. DESCRIPTION

The major objective of this restoration project is to use borrow material from Lake Mechant to create and nourish marsh on the south side of Bayou DuLarge; restore the ridge along the southern bank line of Bayou DuLarge; and reestablish historic hydrologic and salinity conditions by installing a structure that reduces the cross section of Grand Pass and the intrusion of Gulf marine waters into the project area. Sediments will be hydraulically excavated from Lake Mechant and placed to create marsh habitat in current open water and to nourish existing fragmented marsh. The marsh creation areas will utilize earthen containment dikes, existing marsh and/or partial containment features to control hydraulically excavated material. A project map showing preliminary marsh creation / nourishment areas, preliminary borrow area, structure location, and ridge restoration area can be found in the government furnished information. This preliminary layout avoids known cultural resource sites, avoids oyster seed grounds, and minimizes disturbance to oyster leases, and attempts to reduce conflicts with known pipelines.

Preliminary features are as follows:

- Ridge Restoration – approximately 22,308 linear feet of ridge with a 20 ft crown width, 5:1 (H:V) side slopes. The top elevation will be determined after survey data has been collected. In areas where the ridge conflicts with existing camps and/or overhead utilities, the constructed ridge will be shifted south to avoid any impacts.
- Marsh Creation – create/nourish approximately 661 acres with hydraulically dredged and pumped sediment.
- Structure – structure in Grand Pass to reduce the size of the opening from approximately 900 ft wide and 36 ft deep to approximately 150 ft wide and 16 ft deep. See Lonnie Harper report in government furnished information for more details regarding the conceptual structure alternatives.
- Other features as needed, such as earthen plugs or bank improvements as necessary to prevent compromising the existing ridge and bayou bank line as a result of project features.
4. MAGNETOMETER SURVEY APPROACH

The magnetometer survey of the project will be conducted by both T. Baker Smith (TBS) and APTIM. APTIM will perform the magnetometer survey of the dredge material borrow area in Lake Mechant, the potential project access route through Caillou Lake to Grand Pass, and along potential dredge pipe corridors. TBS will perform the magnetometer survey through the marsh creation / nourishment areas, Grand Pass structure site, ridge restoration limits, and geotechnical investigation borehole and testing locations. TBS will also perform hazard investigations for anomalies identified by both APTIM and TBS crews.

Project control is being established as per the Project Scope of Work Section 8.1.2 and described in the Secondary Monument Establishment Plan. The monuments established by the project team will be used for control in the magnetometer surveys. All data will reference the coordinates as determined in the secondary monument establishment efforts.

5. BORROW AREA, ACCESS ROUTE & DREDGE PIPE CORRIDOR

APTIM will perform the magnetometer surveys for these project features while simultaneously performing bathymetric and side scan sonar surveys. During this investigation, geophysical data will be collected within the borrow area to achieve a total combined line spacing of 30 m (approximately 98 ft.). The following equipment will be used for conducting the multi-use survey:

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Trimble 5700 Real Time Kinematic (RTK) Global Positioning System (GPS)</td>
</tr>
<tr>
<td></td>
<td>interfaced with Hypack Inc.’s Hypack 2017® software</td>
</tr>
<tr>
<td>Motion Compensation</td>
<td>TSS DMS-25 or equivalent</td>
</tr>
<tr>
<td>Sounder (Bathymetry)</td>
<td>Odom Hydrographic Systems, Inc. “Hydrotrac” Hydrographic Echo Sounder</td>
</tr>
<tr>
<td>Sidescan Sonar</td>
<td>EdgeTech 4200 sidescan sonar system</td>
</tr>
<tr>
<td>Magnetometer</td>
<td>Geometrics G-882 Digital Cesium Marine Magnetometer interfaced with</td>
</tr>
<tr>
<td></td>
<td>Hypack Inc.’s Hypack 2017® software</td>
</tr>
</tbody>
</table>

Magnetometer data will be collected to provide information relative to pipeline and/or obstruction locations to aid in the delineation of the borrow area and access and pipeline corridors. This information will be provided to the construction contractor to facilitate access planning and to show potential existing infrastructure that may require excavation buffers. A Geometrics G-882 Digital Cesium Marine Magnetometer (or equivalent) will be used to perform a cursory investigation of magnetic anomalies throughout the survey areas. The purpose of the magnetometer survey is to establish the presence of any potential underwater wrecks, submerged hazards, infrastructure, or any other features of interest. The Hypack 2017® software will record magnetic anomalies directly from the Geometrics magnetometer. The G-882 will be floated on the surface of the water (due to the shallow nature of the survey area) at a sufficient distance away from the survey vessel to not record magnetic signatures from the survey vessel.
A joint geophysical investigation (sidescan sonar images, magnetometer, and bathymetric data) will be conducted for a potential dredge access corridor through Caillou Lake, and then to Lake Mechant in the event a potential bidder requires flotation in excess of existing water depths, assuming access from the Gulf of Mexico. A similar investigation will be conducted for a submerged pipeline corridor from the final borrow area to the marsh creation and nourishment areas. The data that are collected will be reviewed for infrastructure, environmental, and other potential issues that may impact both the dredge access and pipeline corridors. All data will be provided to the federal agencies so that they can complete their cultural resource review and clearance of both corridors.
All magnetometer data will be interpreted for magnetic anomalies with results presented as plan view maps of the survey area depicting each individual magnetic anomaly. Magnetic anomalies will be compared to known oil and gas infrastructure, and specific anomalies that line up within 150 feet of known oil and gas infrastructure will be colored red, while the remaining magnetic anomalies will be colored yellow.

6. MARSH CREATION/NOURISHMENT AREAS, GRAND PASS STRUCTURE SITE, RIDGE RESTORATION, AND BOREHOLE SITES

Magnetometer survey transects will be laid out in the open water and broken marsh covering the proposed marsh creation area locations and will be spaced in 500 foot intervals in the north-south (37 transects) direction and 1000 foot intervals in the east-west (7 transects) direction. Additional magnetometer survey transects will be laid out through Grand Pass perpendicular to Bayou DuLarge at 250 foot intervals (5 transects). Additionally, 2 magnetometer survey lines will run parallel to the centerline of the southern ridge of Bayou DuLarge, and 3 magnetometer survey lines will run parallel to the centerline of Bayou DuLarge. All magnetometer transects and survey lines are shown on the attached drawings.

The magnetometer survey will be performed using a Geometrics G-882 Digital Cesium Marine Magnetometer to perform a cursory investigation of magnetic anomalies throughout the survey areas. TBS field crews will interpolate the data to identify the presence of any potential underwater wrecks, submerged hazards, infrastructure, or any other features of interest. The Hypack software will record magnetic anomalies directly from the G-882 magnetometer. The G-882 will be floated on the surface of the water due to the willow nature of the survey areas when necessary and at a sufficient distance away from the survey vessel to not record magnetic signatures from the survey vessel.

All magnetic data will be interpreted for magnetic anomalies with results presented as plan view maps of the survey area depicting each individual magnetic anomaly. Magnetic anomalies will be processed with Hypack and compared to known oil and gas infrastructure. Anomaly points will be color coded based on the gamma strength of the anomaly and listed in a point table.

Further investigation by probing will take place at all anomaly locations identified in the initial magnetometer survey. A determination will be made as to whether the source of the anomaly is a pipeline, well, submerged hazard, or infrastructure and location, water depth, depth of cover, bottom elevation and top of obstruction elevation will be recorded. All submerged pipelines, wells, or other obstructions will be shown on plan view drawings.
NOTES:
BACKGROUND IMAGERY REPRODUCED FROM 2015 DOQQ AERIAL PHOTOGRAPHY.