

ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT NO. (TE-117)

DATA COLLECTION REPORT

PREPARED FOR:

COASTAL PROTECTION AND RESTORATION AUTHORITY
OF LOUISIANA



APRIL 27, 2016

SUBMITTED BY:



ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT NO. (TE-117)

DATA COLLECTION REPORT

Prepared for: C.P.R.A.
Coastal Protection and Restoration Authority of Louisiana
450 Laurel Street
Baton Rouge, LA 70801

Submitted By: T. Baker Smith, LLC
412 South Van Ave.
Houma, LA 70363

ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT NO. (TE-117)

DATA COLLECTION REPORT

TABLE OF CONTENTS

1.0	INTRODUCTION	5
2.0	PROJECT OVERVIEW	5
3.0	DATA COLLECTION SUMMARY	5
3.1	STAFF GAUGE.....	6
3.2	MARSH CREATION AREA SURVEYS	7
3.3	HAZARD/MAGNETOMETER SURVEYS	7
3.4	SURFACE FEATURES AND INFRASTRUCTURE SURVEYS.....	8
3.5	MARSH ELEVATION SURVEYS.....	8
4.0	METHODOLOGY	9
4.1	SURVEY CONTROL AND DATUM INFORMATION	9
4.2	TOPOGRAPHIC SURVEYS.....	9
4.3	BATHYMETRIC SURVEYS	10
4.4	MAGNETOMETER SURVEYS	10

LIST OF APPENDICES

APPENDIX A ---Survey Benchmark Datasheets

INDEX TO DRAWINGS

OVERALL PLAN VIEW.....	1
CROSS-SECTION PLAN VIEW	2
CONTOUR MAP	3
CROSS-SECTIONS.....	4-9
MAG DRAWINGS	10-18
PIPELINE PROFILES	19-20
PUMP STATION PLAN VIEW	21
PUMP STATION CROSS-SECTIONS.....	22-23
AVERAGE MARSH ELEVATION	24-29

Digital Appendix

- Data Collection Report file (PDF format)
- Project digital drawing files (AutoCAD, and PDF format)
- Topographic and Bathymetric digital survey point data (csv format)
- Survey Field Notes (PDF Format)

DATA COLLECTION REPORT

ISLAND ROAD MARSH CREATION AND NOURISHMENT PROJECT NO. (TE-117)

1.0 INTRODUCTION

The purpose of this document is to identify and outline data collection tasks necessary to support the design of the Island Road Marsh Creation and Nourishment Project No. (TE-117). T. Baker Smith, LLC (TBS), under our 2015 Survey IDIQ Contract (Contract #2503-15-33), has been tasked with collecting topographic, bathymetric, and geophysical data across the project area as described in the Scope of Services dated November 2015. The services provided under this task order are intended to assist the Coastal Restoration and Protection Authority (CPRA) with the necessary data needed in an organized and workable format for design.

2.0 PROJECT OVERVIEW

The TE-117 project is funded through the Coastal Wetlands Planning, Protection and Restoration Act under Priority Project List 23. This project is sponsored by The CPRA in conjunction with the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA-NMFS). The Terrebonne Basin, located in Terrebonne Parish, has been experiencing substantial wetland loss due to natural causes such as subsidence and hurricanes, as well as from man-made features such as oil and gas canals.

This project proposes to hydraulically dredge sediments from a borrow area in Lake Felicity, and pump the sediment to the project area near Isle de Jean Charles. The marsh creation areas will be constructed by pumping dredged material into the proposed earthen containment dikes to an elevation that represents natural marsh elevations within the area.

3.0 DATA COLLECTION SUMMARY

During the period of January 2016 through March 2016, TBS field crews collected field data throughout the project area as specified in the scope of work provided by CPRA dated November 2015. This data collection task consisted of topographic, bathymetric, and magnetometer surveys within the Island Road Marsh Creation and Nourishment (TE-117) project

area. Once access was granted from all land owners, TBS field crews began data collection on the project using airboats for marine transportation.

3.1 STAFF GAUGE

A staff gauge was set near the project area on March 22, 2016 at an approved location by CPRA, and field verified by Laurie Rodrigue of the CPRA Thibodaux Regional Office. A 4"x4"x12' treated post with a 60d nail driven in the side, along with a ceramic staff gauge was set as per the guidelines listed in section K of the survey manual titled *A Contractor's Guide to Minimum Standards*, January 2013, provided by CPRA. The RTK base station was set up over secondary benchmark "TE10-SM-08" and used to transmit real time corrections to the rover unit where horizontal and vertical positions were established on the staff gauge. A reading was taken on the staff gauge, and taped measurements were performed from the top of post to the nail shank, from the top of post to the water surface, and from the top of post to the three (3) foot mark on the staff gauge. During the project, daily top of water shots were taken with RTK, and compared to the electronic top of water data gathered from the CRMS3296-H01, which is located on the project site. The electronic data from CMRS3296-H01 spans from 5/15/2009 through 3/11/2016 and is adjusted to NAVD 88 for an accurate comparison with the top of water data gathered daily during the project. There was a total of 54 top of water elevation shots gathered and compared with the electronic data, which resulted in an average comparison difference of -0.02' in elevation. This data from 5/15/2009 through 3/11/2016 was also utilized to calculate the MSL (the arithmetic mean of hourly heights), MHW (the average of all the high water heights), and MLW (the average of all low water heights). The MSL, MHW, and MLW levels derived for this project were also compared to both the NOAA (8761724) and the USGS (073802516) gauges as a check. The following table shows the breakdown of the computed average tidal data from each of the three (3) tide gauges in NAVD88 datum:

CRMS3296-H01 Tide Gauge		NOAA (8761724) Grand Isle Station	USGS (73802516) Barataria Pass @ Grand Isle
MHW	1.09'	1.31'	1.21'
MSL	0.55'	0.70'	0.69'
MLW	-0.02'	0.05'	0.16'
Diurnal Range	1.11'	1.26'	1.05'

3.2 MARSH CREATION AREA SURVEYS

Topographic and Bathymetric surveys were performed along 20 transects located within the proposed marsh creation area at 500-foot intervals. The position of the proposed transects were produced from scanned project plans provided by CPRA, and upon discussions with CPRA personnel was found to be within an acceptable tolerance from the planned transect locations for the project. Data was gathered along these transects at 25-foot intervals or where elevation changes of greater than 0.5 feet occur. Other topographic data collected as a part of this task included surface features, timber piles, wooden wharves, sunken boats, and bulkheads located within the project area.

Upon commencement of the project NTP, TBS office personnel identified a potential sensitive area located around the existing RSET rod for the CRMS3296 site. The existing RSET rod was located 87' south of the existing transect T-15. In order to avoid impacting the CRMS3296 site, coordination and approval from CPRA personnel was made to modify a portion of the existing transect T-15. The result was that a new transect T-15A was established 200' north and parallel to the existing transect T-15.

3.3 HAZARD/MAGNETOMETER SURVEYS

Magnetometer surveys were performed along 19 transects located within the proposed marsh creation area at 1,000 foot intervals. . The position of the proposed transects were also produced from scanned project plans provided by CPRA, and upon discussions with CPRA personnel was also found to be within an acceptable tolerance from the planned transect locations for the project. In conducting our survey, it was found that the existing RSET rod for the CRMS3296 site was also located 46' west of the existing transect M-4. Coordination and approval from CPRA personnel was made to modify a portion of the existing transect M-4. In order to avoid impacting the CRMS3296 site, a new transect M-4A was established 200' east and parallel to the existing transect M-4. TBS field crews investigated all magnetic anomalies found during the initial magnetometer survey by running a 50' x 50' rectangular grid around each anomaly with a magnetic gradiometer and using probing techniques to determine if metallic objects such as pipelines were present. TBS field crews also investigated additional areas with a magnetic gradiometer in the pipeline canal to the east of transect M-5 and in the area near transect M-9 as specified by CPRA

as shown on sheets 12 and 14 of the deliverables. Four (4) active pipelines were found running east to west in the twin pipeline canals located at the northern limits of the project area. An additional two (2) active pipelines were found running south to north, also located at the northern limits of the project area. No additional pipelines were found south of the twin pipeline canals. All magnetic anomalies that were field verified are specified in the tables shown on sheet 18 of the deliverables. With exception to the existing active pipelines found and located, it is our professional opinion that all other anomalies detected and investigated will not impact the proposed project area. However, prior to construction, it is recommended that the Contractor performing work at the project site shall be responsible to conduct a hazard survey and/or a Louisiana One Call prior to any excavation.

3.4 SURFACE FEATURES AND INFRASTRUCTURE SURVEYS

Topographic features such as fences, gates, light poles, building corners, levee toes and crowns, concrete pipe supports, and discharge pipes were collected at the pump station located on Island Road. Cross-sections A, B, C, and D were gathered as shown on sheets 21, 22, and 23 of the deliverables. Marsh creation bank lines were also delineated as part of this task.

3.5 MARSH ELEVATION SURVEYS

Average marsh elevations were gathered on March 3, 2016 and was attended by Laurie Rodrigue of the CPRA Thibodaux Regional Office. Ms. Rodrigue specified to the field crew the location of the five (5) average marsh elevation areas, and the crew obtained elevations accordingly. These five (5) areas are shown on sheet 24 of the deliverables.

The following table shows the breakdown of the average marsh elevation for each of these five (5) areas.

Point	Northing	Easting	Average Elevation
AV-1	327,994	3,551,840	0.50'
AV-2	327,262	3,552,058	0.64'
AV-3	325,515	3,553,148	0.57'
AV-4	327,436	3,554,851	0.55'
AV-5	325,406	3,557,019	0.52'

4.0 METHODOLOGY

4.1 SURVEY CONTROL AND DATUM INFORMATION

The equipment used for control and all data collected on this project was a Trimble R8 base station, a Trimble R8 rover unit, and a Trimble TSC-2 data collector. All survey data was recorded using established control from CPRA Secondary Benchmark “TE10-SM-08”. The established horizontal data for the monument is in Louisiana South Zone (1702) NAD 83, U.S. Survey feet, with vertical datum of NAVD 88 (Geoid 12A). The RTK base station was set up over secondary benchmark “TE10-SM-08” and used to transmit real time corrections to the rover unit where horizontal and vertical positions were established on all data collected within the project area. For QA/QC purposes, on a daily basis, the position of our Secondary Benchmark “TE10-SM-08” along with all data collected was verified by checking into a TBM set near the pump station on Island Road. Geographic coordinates are provided as NAD 83 latitudes and longitudes. The adjusted data was also converted to UTM, NAD 83 (Zone 15) meters. Mean high water (MHW) and mean low water (MLW) for this project was determined from electronic readings and staff gauge readings obtained from the CRMS3296-SG-H01 located within the project area as described in Section 3.1 of this report.

4.2 TOPOGRAPHIC SURVEYS

Topographic surveys were performed using TBS survey crews accessing the survey area by airboat. A Trimble R8 RTK unit was used to collect the topographic field data. For the subaqueous portions of cross-sections, water bottom data was collected with RTK GPS using a standard 2.0 meter range pole with a 6” diameter bottom plate, and also by taking manual soundings using a standard 25’ stadia rod with a 6” diameter bottom plate. RTK GPS was used for horizontal positioning of each sounding. All soundings were referenced to an RTK GPS observed top of water elevation at the time of survey. Topographic survey data was downloaded from the Trimble TSC-2 Data Collector into the Trimble Business Center software for processing. This software allows for additional QA/QC of GPS data, and was used to check for instrument setup errors, antenna height errors, and other blunders. Manual sounding data was processed by manually entering the soundings and observed tide readings into a formatted spreadsheet. The

spreadsheet was configured to automatically reduce each sounding from depths recorded to NAVD 88 (Geoid 12A) elevations.

Topographic data was exported to digital point files and then entered into AutoCAD Civil 3D for further processing. Using this point data, 3D surface models were produced for all areas. The 3D surface models incorporated all marsh bank line survey data as break lines, which helped to further refine the models. In all, two independent surface models were created for each area; one sub aerial and one subaqueous. These two surface models were combined and used to generate elevation contours and profiles for the final deliverable drawings. The processed survey data was also exported to one complete digital csv file containing X, Y, & Z coordinates. The 3D surface model is shown on sheet 3 of the deliverables.

4.3 BATHYMETRIC SURVEYS

Based on the water depths similar to previous deep water surveys near barrier islands and after conversations with CPRA personnel, it was decided and approved that a single frequency echo-sounder was sufficient to gather the bathymetric data on portions of the project. The bathymetric data was collected using an Odom Hydrotrac single frequency echo-sounder interfaced with the HyPack survey navigation software in conjunction with the Trimble R8 RTK GPS unit previously mentioned. The digital echo-sounder was calibrated several times a day for sound velocity, draft and index corrections. This was accomplished utilizing the bar check method by lowering the bar check, with precisely measured marks, below the transducer to various depths. The echo-sounder's sound velocity, draft, and index was then adjusted so that the echo-sounder read the precise depth of the bar check. The tide corrections of the onboard GPS system was also checked by taking elevations of the top of water and checking the real time tide adjustments through HyPack survey navigation software.

4.4 MAGNETOMETER SURVEYS

Geophysical instruments used during this survey consisted of a Marine Magnetics SeaSpy Magnetometer. Horizontal positioning of the airboat was accomplished using HyPack navigation software with a Trimble R8 RTK GPS unit. The magnetometer sensor was deployed 57 feet behind the positioning antenna and 4 feet Starboard.

All Magnetometer data was digitally recorded by the HyPack survey navigation software mentioned above. The magnetometer was set to a collection frequency of 2 Hz. The magnetic data was processed in HyPack to obtain the horizontal position, signature type, and strength of each anomaly. The HyPack processing software allows the user to view the magnetic data as gamma values along a continuous survey line. The user is able to detect anomalies as deflections from the normal magnetic field and note the position based on the center of the signature. Each magnetic anomaly is interpreted based on its gamma height, signature type and actual field observations. All magnetic anomaly data collected within the project area is shown on sheet 16 of the deliverables.

APPENDIX A

Survey Benchmark Datasheets



VICINITY MAP Scale: 1" = 2000'

2013 NAIP imagery provided by USDA Farm Service Agency

Station Name: "TE10-SM-08"

Location: To reach the station from the courthouse in Houma, travel south on Hwy 24 for 9.75 mi (15.69 km) to junction with Hwy 55. Travel south on Hwy 55 for 4.25 mi (6.84 km) to junction with Hwy 665. Turn left on Hwy 665 and travel south for 9.93 mi (15.98 km) and the station is on the left. The station is a 2 inch disk in concrete.

Monument Description: Survey disk set on top of steel rod imbedded in concrete flush with ground.

Stamping: 2525-A1987

Installation Date: 1987

Survey Date: May 2014

Monument Established By: Gulf South Engineers Inc.

For: Louisiana Department of Natural Resources, CRD

Adjusted NAD 83 Geodetic Position

Lat. 29°24'59.1791" N

Long. 90°26'49.5428" W

Adjusted NAD 83 Datum LSZ (1702) Feet

N= 334,370.51

E= 3,562,994.43

Adjusted UTM, NAD 83 Datum (Zone 15) Meters

N = 3,256,836.290

E= 747,692.275

Adjusted NAVD88 Height

Elevation Geoid12A = 1.09 ft (0.332 mtrs)

Elevation = 1.78 feet (0.543 mtrs)

Ellipsoid Height = -24.359 mtrs

Geoid 12A Height = -24.691 mtrs

Ellipsoid Height = -79.545 mtrs

Geoid99 Height = -81.701 mtrs

