
Annex A

CPRA Maps



STATE OF LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY

SCOPE OF SERVICES FOR TOPOGRAPHIC, BATHYMETRIC, MAGNETOMETER, AND GEOPHYSICAL SURVEYS CAMINADA HEADLANDS BACK BARRIER MARSH CREATION PROJECT (BA-171) LAFOURCHE, LA

November 2014

1.0 INTRODUCTION

The Caminada Headlands Back Barrier Marsh Creation Project (BA-171) is funded under the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) in Priority Project List 23. The Coastal Protection and Restoration Authority (CPRA), in partnership with the Environmental Protection Agency (EPA), have been authorized to execute Phase I (Engineering and Design) of BA-171. The objective of this project is to create, maintain, and nourish existing deteriorating wetlands through hydraulic dredging.

2.0 PROPOSED FEATURES

Approximately 430 acres of marsh will be and created/nourished in a marsh fill area adjacent to the Caminada Headlands. This scope of services involved topographic, bathymetric, magnetometer, and geophysical investigations within the marsh fill area, the pipeline access corridors, and the offshore borrow area of the project.

3.0 LOCATION

The BA-171 Project is located in Lafourche, Louisiana, west of the city of Port Fourchon, adjacent to Caminada. Approximate coordinates for the center of the project are 29°7'41.35" N and 90°9'19.66" W (NAD 83).

4.0 SCOPE OF WORK

The surveying firm, hereinafter referred to as "Contracting Party", shall perform all surveying necessary for the Caminada Headlands Back Barrier Marsh Creation Project (BA-171), as outlined in the following subsections.

4.1 Permission and Access

The Contracting Party shall be required to contact the landowners to secure access permission prior to performing surveys in any part of the project area. Rights of entry to privately owned property must be respected by all CPRA contractors. Failure to adhere to the above-stated CPRA policy will be considered grounds for termination of the contract. Access to the proposed marsh creation fill site can be secured by contacting the following individuals:

Amanda Phillips
Edward Wisner Donation
P.O. Box 52204
New Orleans, LA 70152
(504) 210-1152

Jay Caillouet
Caillouet Land Corporation
P.O. Box 292
Thibodaux, LA 70302
(985) 665-2123

4.2 Navigable Waterway Hazard Notification

The Contracting Party shall be responsible for notification and coordination with the USACE and any Levee Board agencies if the work to be performed under this scope of services is within the jurisdictional footprint that requires any such coordination. Additionally, if any work under this scope of services is expected to interfere with navigation, the Contracting Party shall be responsible for notification, coordination, and addressing with appropriate actions of all such potential navigational interferences with the USACE and the U.S. Coast Guard. CPRA shall be kept abreast of any relevant communications and courses of action and shall be provided a copy of all official written documentation.

4.3 Horizontal and Vertical Control

The Contracting Party shall provide survey coordinates in Louisiana State Plane Zone 1702 which is adjusted to CORS96, 202 Epoch using Geoid09. The field surveying shall be accomplished utilizing standard TK surveying procedures or an appropriate GNSS or GPS Real Time Network such as Gulfnet Virtual Real-time Network (VRS). The data shall be reported in feet to two decimal places. The data sheet for the project survey monument is provided in Appendix B.

4.4 Marsh Creation Fill Area Surveys

The Contracting Party shall perform topographic/bathymetric surveys within the proposed marsh creation fill area. Survey transects shall be laid out in the open water, broken marsh, and across pipeline canals at the proposed marsh creation locations and shall be spaced every 250 ft as shown in Appendix A, Sheet 1 – “Marsh Creation Area Transect Layout”. Transects shall begin at the centerline of the crown of the BA-45 (Caminada Headlands Beach and Dune Restoration Increment 1) dune and extend a minimum of 400 ft beyond the northern boundary of the fill area or to the northernmost bank of the canal adjacent to the servitude boundary where applicable. Position, elevation, and water depth shall be recorded at a minimum every 25 ft along each transect or where elevation changes of greater than 0.5 ft occur. Coordinates can be attained through digital CAD drawing provided by CPRA. An appropriate topo shoe shall be attached to the bottom of the survey rod to prevent the rod from sinking. Topographic and bathymetric survey methods shall be used as applicable to obtain all transects as shown in Appendix A. The topographic portions of all transects shall merge with the

bathymetric portion of all transects at the land/water interface. The topographic and bathymetric portion of the surveys shall overlap by a minimum of 50 feet. Side shots, as necessary, shall be taken to pick up variations in topographic features (highs and lows) such as trenasses, meandering channels, broken marsh areas, or any other existing features such as utility lines, well heads, rock dikes, and warning signs, which may affect project design implementation.

Bathymetric and magnetometer surveys shall be taken in the two pipeline canals that run parallel through the fill area, in the canal adjacent to the servitude boundary, and along the alignment of Bayou Moreau from the headland to the northernmost bank of the canal adjacent to the servitude boundary.

4.5 Healthy Marsh Elevation Surveys

Average healthy marsh elevation (NAVD 88) shall be determined at three healthy marsh elevation sites to be determined by CPRA. The average healthy marsh elevation is defined as the point where a survey rod is resting among living vegetative stems and is supported by soil containing living vegetative roots. In order to get a consistent reading, it may be necessary to cut stems in some marsh vegetation where stem density is extremely high. A minimum of twenty (20) elevations (each one separated by 20 to 40 ft) at each of the three (3) sites are required for this determination. The Contracting Party shall contact Todd Hubbell (985-447-0994) with CPRA up to 10 days prior to performing the average healthy marsh elevation survey. CPRA personnel shall be present at the time of the healthy marsh elevation survey.

4.6 Borrow Area Survey

The Contracting Party shall perform bathymetric and magnetometer surveys of the borrow area in the form of transecting cross-sections. Survey transects shall be spaced at approximately 200 ft as shown in Appendix A, Sheet 3—“Borrow Area Transect Layout”. Coordinates can be attained through digital CAD drawing provided by CPRA. Mudline elevations and bathymetry shall be recorded every one (1) second along the survey. All offshore points shall be within ± 30 feet horizontally of the established profile line. Calibration of the fathometer shall be performed for verification of accuracy at the beginning and end of each survey day through the use of a bar check plate or survey level rod based on the water depth of the survey area. Latency checks shall be conducted periodically throughout each day. The latency corrections shall be calculated and adjustments shall be made to the data. Field notes of the bar checks and latency calibrations shall be made available to the Engineer with the data submittal. If bathymetry data is not collected using RTK equipment, the data shall be corrected for tidal variations at least six (6) times a day during the field activities.

Additionally, the Contracting Party shall identify any protruding structures above mean water level, or otherwise noted during the course of the work performed, within the limits of the project areas such as—but not limited to—wellheads, warning signs, crab traps, and abandoned boats or any object that may prevent or hinder dredging operations.

4.7 Pipeline Access Corridor Survey

Bathymetric/side scan, seismic sub-bottom profiler or approved equal and magnetometer surveys shall be performed simultaneously within the marine portion of the access corridor. Topographic and magnetometer surveys shall be performed within the terrestrial portion of the access corridor. The bathymetric and topographic surveys shall overlap by 50 feet at the marine/terrestrial interface. The transects/track lines shall be spaced at 98 foot intervals as shown in Appendix A, Sheet 2 “Pipeline Access Corridor Transect Layout”.

For the topographic survey, the position and elevation shall be recorded at a minimum of 25 feet along each transect or where elevation changes of greater than 0.5 feet occur. An appropriate topo shoe shall be attached to the bottom of the survey rod to prevent the rod from sinking. Bathymetric and topographic surveys shall overlap by 50 feet at the land/water interface.

4.8 Magnetometer Survey

The Contracting Party shall perform a magnetometer survey in the borrow area, pipeline access corridors, the two fill area pipeline canals, the northern canal adjacent to the servitude boundary, and Bayou Moreau as shown on the Survey Layouts in Appendix A to locate any pipelines or obstructions in the area. The magnetometer lines shall be run during the same time frame as the survey lines when applicable. The CAD file provided by CPRA shows the coordinates of each bathymetric/topographic survey line. For each magnetic finding, the Contracting Party shall run a closed loop path with the magnetometer. This path shall completely enclose the original finding location, while maintaining a distance of approximately 25 ft from that location. A 25 ft radius circular, or 25 ft x 25 ft rectangular extending from southern end of survey north to waters edge, shall suffice. The Contracting Party shall determine the source (e.g., pipeline, well, etc.) of each finding. Once a pipeline is detected, the Contracting Party shall probe to the pipeline and determine the depth of cover and the elevation of the top of the pipeline.

The Contracting Party shall perform a 30’ radius magnetometer survey around 19 geotechnical boring locations located in either the marsh creation fill area or borrow area and around all significant magnetic anomalies (>50 gammas). Borings shall be repositioned to nearby locations and resurveyed if significant obstructions are detected. Refer to Appendix C, Geotech Layout, for boring locations.

4.9 Geophysical Survey

The Contracting Party shall perform a high resolution (3.5 kHz or greater) seismic survey using a sub-bottom profiler in the pipeline access corridors. A chirp sub-bottom profiler should preferably be used for proper depth-penetration and enhance resolution. Seismic stratigraphy shall then be developed on the basis of the sub-bottom profiles obtained. The seismic survey transects shall be run simultaneously with the offshore survey lines in the pipeline access corridors mentioned in Section 4.7.

4.10 Aerial Photograph Overlay

All surveys lines shall be overlaid onto 2010 or newer geo-rectified Digital Orthophoto Quarter Quadrangle (DOQQ) aerial photographs. The Contracting Party is responsible

for obtaining any additional information needed to reference the surveys required by this scope to the aerial photograph.

4.11 Preliminary Submittals

In addition to the deliverables requested in this scope of services, two sets of 11" x 17" preliminary drawings shall be delivered to Amanda Taylor, E.I., for technical review and comment before the remaining deliverables are finalized.

Please send all preliminary and final deliverables to the following address:

Amanda Taylor, E.I.
Coastal Protection and Restoration Authority
P.O. Box 44027
Baton Rouge, LA 70804-4027
(225)-342-9419

5.0 DELIVERABLES

5.1 One set of draft survey drawings shall be submitted to CPRA via email in AutoCAD format for Acceptance before the survey report is finalized.

5.2 Three (3) bound hard copies of the final survey report, data, and drawings shall be submitted to CPRA after Acceptance of the draft survey drawings. Each binder shall include one (1) digital copy of the final survey report (Adobe PDF), data (Microsoft Excel), and drawings (AutoCAD 2012 or later edition) on compact disk.

5.2.1 The survey report shall document the survey methodology employed in the field, survey control, calibrations, field equipment, field records, and all other pertinent information.

5.2.2 All survey data shall be provided in tables which include separate columns for the associated transect, point number, northing coordinate, easting coordinate, elevation, and description. Magnetometer survey data shall also include the amplitude, duration, and description for the probable cause of all magnetic anomalies.

5.2.3 The survey drawings shall conform to CPRA drafting standards, utilize half size (11"x17") borders, and include the following information:

5.2.3.1 Project name and number shall appear on all sheets;

5.2.3.2 All elevations shall reference NAVD88;

5.2.3.3 All horizontal coordinates shall reference the Louisiana State Plan Coordinate System South Zone, NAD83;

5.2.3.4 Overlay all boundaries of project construction features in plan view;

5.2.3.5 The location of all secondary survey monuments and temporary benchmarks shall appear in plan view;

5.2.3.6 Transects and profiles shall be shown in plan and profile and include mean high and mean low water levels;

5.2.3.7 Sub-bottom profiles shall show the seismic stratigraphy along each transect;

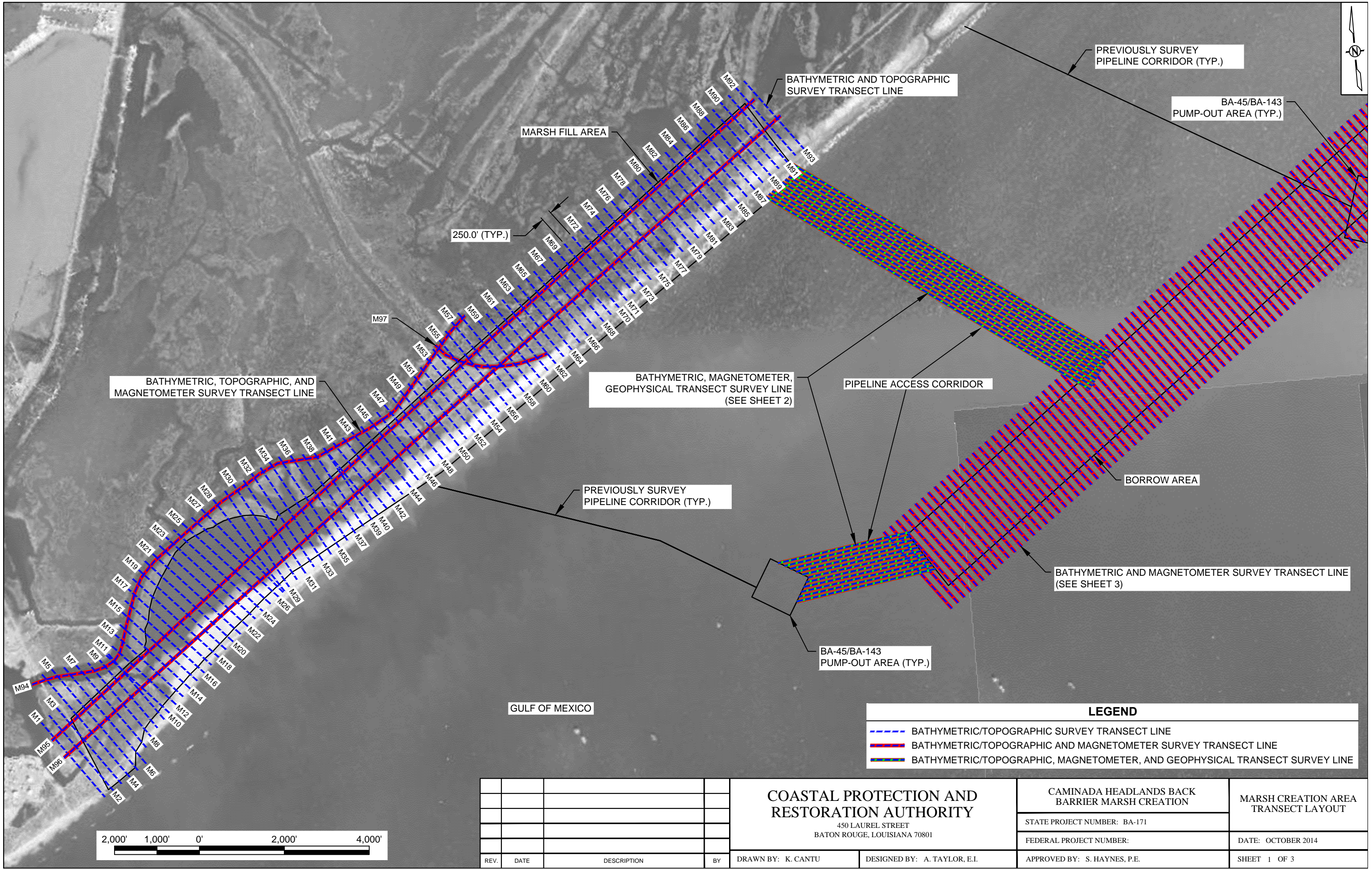
- 5.2.3.8 Spot elevations shall be shown or appropriately represented in plan view;
- 5.2.3.9 Topography shall be represented in plan view using +/-1.0 foot contours;
- 5.2.3.10 Bathymetry shall be represented in plan view using +/-2.0 foot contours;
- 5.2.3.11 Magnetometer survey track lines and readings shall be shown in plan view

6.0 CERTIFICATION

All deliverables shall be certified by a professional land surveyor licensed by the State of Louisiana.

Appendix A

Survey Layout



BATHYMETRIC, TOPOGRAPHIC, AND MAGNETOMETER SURVEY TRANSECT LINE

BATHYMETRIC, MAGNETOMETER, GEOPHYSICAL TRANSECT SURVEY LINE (SEE SHEET 2)

BATHYMETRIC AND MAGNETOMETER SURVEY TRANSECT LINE (SEE SHEET 3)

LEGEND	
	BATHYMETRIC/TOPOGRAPHIC SURVEY TRANSECT LINE
	BATHYMETRIC/TOPOGRAPHIC AND MAGNETOMETER SURVEY TRANSECT LINE
	BATHYMETRIC/TOPOGRAPHIC, MAGNETOMETER, AND GEOPHYSICAL TRANSECT SURVEY LINE



<p align="center">COASTAL PROTECTION AND RESTORATION AUTHORITY 450 LAUREL STREET BATON ROUGE, LOUISIANA 70801</p>				<p align="center">CAMINADA HEADLANDS BACK BARRIER MARSH CREATION</p>		<p align="center">MARSH CREATION AREA TRANSECT LAYOUT</p>	
				<p>STATE PROJECT NUMBER: BA-171</p>		<p>DATE: OCTOBER 2014</p>	
<p>FEDERAL PROJECT NUMBER:</p>		<p>APPROVED BY: S. HAYNES, P.E.</p>		<p>SHEET 1 OF 3</p>			
REV.	DATE	DESCRIPTION	BY	<p>DRAWN BY: K. CANTU</p>		<p>DESIGNED BY: A. TAYLOR, E.I.</p>	



PREVIOUSLY SURVEY PIPELINE CORRIDOR (TYP.)

BA-45/BA-143 PUMP-OUT AREA (TYP.)

PROJECT SERVITUDE BOUNDARY

BATHYMETRIC AND TOPOGRAPHIC SURVEY TRANSECT LINE (SEE SHEET 1)

GULF OF MEXICO

98.0' (TYP.)

98.0' (TYP.)

BATHYMETRIC, MAGNETOMETER, GEOPHYSICAL TRANSECT SURVEY LINES

PIPELINE ACCESS CORRIDORS

PL1
PL2
PL3
PL4
PL5
PL6
PL7
PL8
PL9
PL10
PL11

PL12
PL13
PL14
PL15
PL16
PL17
PL18
PL19
PL20
PL21
PL22

BORROW AREA

BATHYMETRIC AND MAGNETOMETER SURVEY TRANSECT LINE (SEE SHEET 3)

PREVIOUSLY SURVEY PIPELINE CORRIDOR (TYP.)

LEGEND	
	BATHYMETRIC SURVEY TRANSECT LINE
	BATHYMETRIC AND MAGNETOMETER SURVEY TRANSECT LINE
	BATHYMETRIC, MAGNETOMETER, AND GEOPHYSICAL TRANSECT SURVEY LINE



REV.	DATE	DESCRIPTION	BY

COASTAL PROTECTION AND RESTORATION AUTHORITY
 450 LAUREL STREET
 BATON ROUGE, LOUISIANA 70801

DRAWN BY: K. CANTU DESIGNED BY: A. TAYLOR, E.I.

CAMINADA HEADLANDS BACK BARRIER MARSH CREATION

STATE PROJECT NUMBER: BA-171

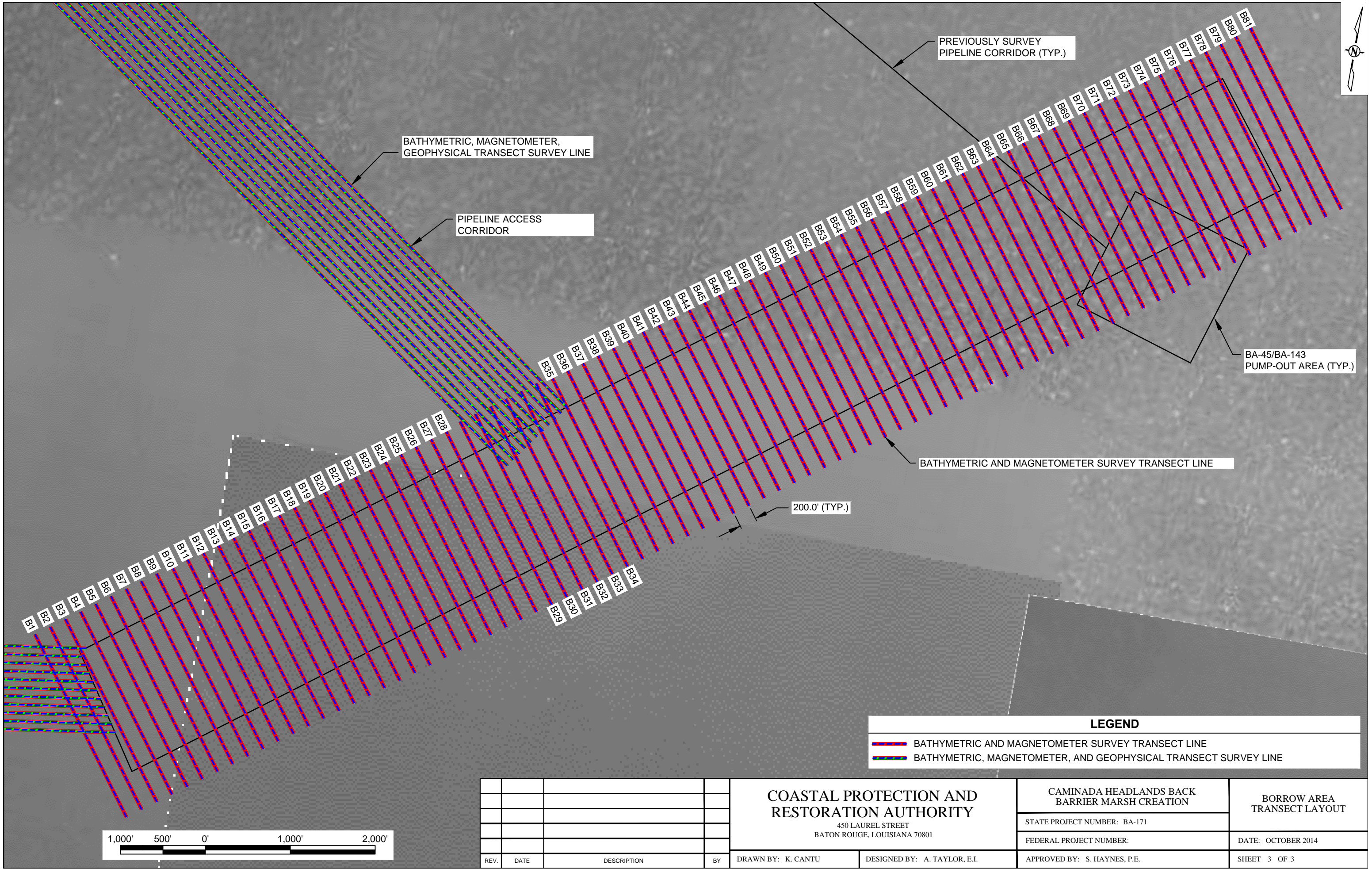
FEDERAL PROJECT NUMBER:

APPROVED BY: S. HAYNES, P.E.

PIPELINE ACCESS CORRIDOR TRANSECT LAYOUT

DATE: OCTOBER 2014

SHEET 2 OF 3



BATHYMETRIC, MAGNETOMETER,
GEOPHYSICAL TRANSECT SURVEY LINE

PIPELINE ACCESS
CORRIDOR

PREVIOUSLY SURVEY
PIPELINE CORRIDOR (TYP.)

BA-45/BA-143
PUMP-OUT AREA (TYP.)

BATHYMETRIC AND MAGNETOMETER SURVEY TRANSECT LINE

200.0' (TYP.)

LEGEND

- BATHYMETRIC AND MAGNETOMETER SURVEY TRANSECT LINE
- BATHYMETRIC, MAGNETOMETER, AND GEOPHYSICAL TRANSECT SURVEY LINE



REV.	DATE	DESCRIPTION	BY

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STATE PROJECT NUMBER: BA-171
 FEDERAL PROJECT NUMBER: APPROVED BY: S. HAYNES, P.E.

BORROW AREA TRANSECT LAYOUT

DATE: OCTOBER 2014
 SHEET 3 OF 3

Appendix B

Survey Monument



VICINITY MAP Not to Scale

Image Reproduced from Google Earth Pro © 2008 Google™

Station Name: TE23-SM-01

Monument Location: This Station is located southeast of Port Fourchon, 40 feet east of the centerline of La Hwy. 3090 and 65 feet northeast of the bridge approach near Pass Fourchon, Louisiana.

Monument Description: NGS Style floating sleeve monument; 9/16" stainless steel rods driven 96 feet to refusal, set in a sand filled 6" PVC pipe with access cover set flush with the ground.

Stamping: "TE23 SM 01"

Re-Adjusted: May 2008

Monument Established By: Morris P. Hebert, Inc.

Adjusted NAD83 Geodetic Position (NSRS2007)

Lat. 29° 06' 42.28538"N
 Long. 90° 11' 26.96472"W

Adjusted NAD83 Datum LSZ (1702) Ft (NSRS2007)

N= 224,296.40
 E= 3,645,688.72

Adjusted NAVD88 Height (2006.81)

Elevation = 7.61 feet (2.321 mtrs)

*Ellipsoid Hgt: -21.546 mtrs
 Geoid03 Hgt: -23.867 mtrs (2004.65)*

FOR REFERENCE ONLY

LCZ Adjusted NAVD88 Height (Geoid99)
 Elevation = 8.21 feet (2.502 mtrs)

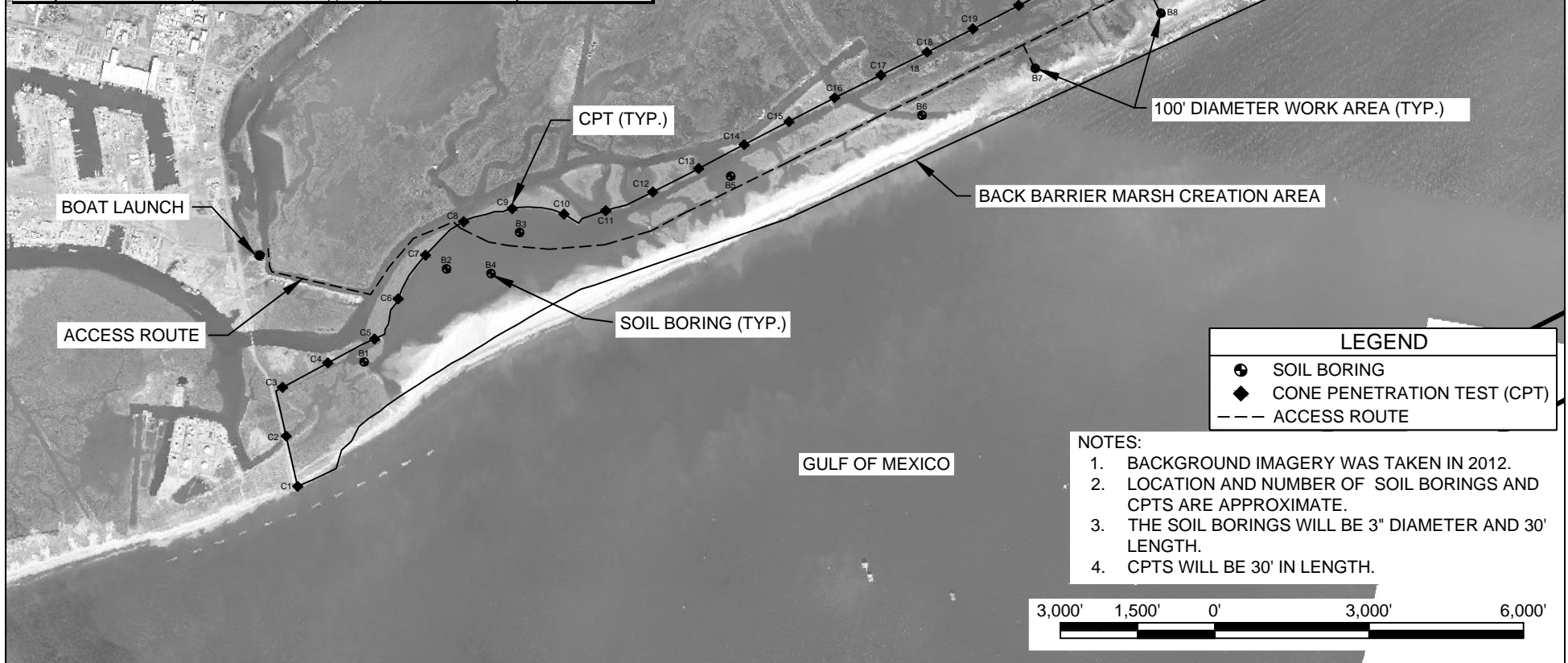


Appendix C

Geotech Layout

CONE PENETRATION TEST (CPT)			
	LATITUDE	LONGITUDE	
C1	29° 06' 12.32"	90° 11' 11.08"	
C2	29° 06' 21.48"	90° 11' 15.34"	
C3	29° 06' 30.60"	90° 11' 17.90"	
C4	29° 06' 36.66"	90° 11' 08.99"	
C5	29° 06' 42.68"	90° 10' 59.75"	
C6	29° 06' 51.04"	90° 10' 56.10"	
C7	29° 07' 00.17"	90° 10' 51.76"	
C8	29° 07' 07.72"	90° 10' 44.70"	
C9	29° 07' 11.74"	90° 10' 34.70"	
C10	29° 07' 12.32"	90° 10' 23.34"	
C11	29° 07' 14.28"	90° 10' 14.40"	
C12	29° 07' 19.32"	90° 10' 04.94"	
C13	29° 07' 25.20"	90° 09' 55.87"	
C14	29° 07' 31.15"	90° 09' 46.88"	
C15	29° 07' 36.93"	90° 09' 38.07"	
C16	29° 07' 42.88"	90° 09' 29.00"	
C17	29° 07' 48.66"	90° 09' 19.83"	
C18	29° 07' 54.43"	90° 09' 10.68"	
C19	29° 08' 00.31"	90° 09' 01.61"	
C20	29° 08' 06.19"	90° 08' 52.55"	
C21	29° 08' 12.07"	90° 08' 43.48"	
C22	29° 08' 17.97"	90° 08' 34.42"	
C23	29° 08' 23.88"	90° 08' 25.38"	
C24	29° 08' 29.79"	90° 08' 16.33"	
C25	29° 08' 35.69"	90° 08' 07.28"	
C26	29° 08' 28.93"	90° 07' 59.47"	
C27	29° 08' 20.78"	90° 07' 53.61"	

SOIL BORING			
	LATITUDE	LONGITUDE	
B1	29° 06' 38.01"	90° 11 01.18"	
B2	29° 06' 58.23"	90° 10' 46.70"	
B3	29° 06' 58.73"	90° 10' 36.92"	
B4	29° 06' 56.58"	90° 10' 35.80"	
B5	29° 07' 27.74"	90° 09' 48.60"	
B6	29° 07' 42.32"	90° 09' 09.49"	
B7	29° 07' 54.78"	90° 08' 46.67"	
B8	29° 08' 09.18"	90° 08' 21.51"	
B9	29° 08' 30.26"	90° 08' 09.65"	



APPLICATION BY:
 COASTAL PROTECTION & RESTORATION AUTHORITY
 P.O. BOX 44027
 BATON ROUGE, LA 70804

COASTAL PROTECTION & RESTORATION AUTHORITY
 450 LAUREL STREET
 BATON ROUGE, LOUISIANA 70801

CAMINADA HEADLANDS BACK BARRIER MARSH CREATION PROJECT
 STATE PROJECT NUMBER: BA-171

MARSH CREATION AREA DATA COLLECTION LAYOUT (MOD. 1)
 DATE: AUGUST 2014 (MOD. 8/2014)

DRAWN BY: K. CANTU

DESIGNED BY: A. TAYLOR, E.I.

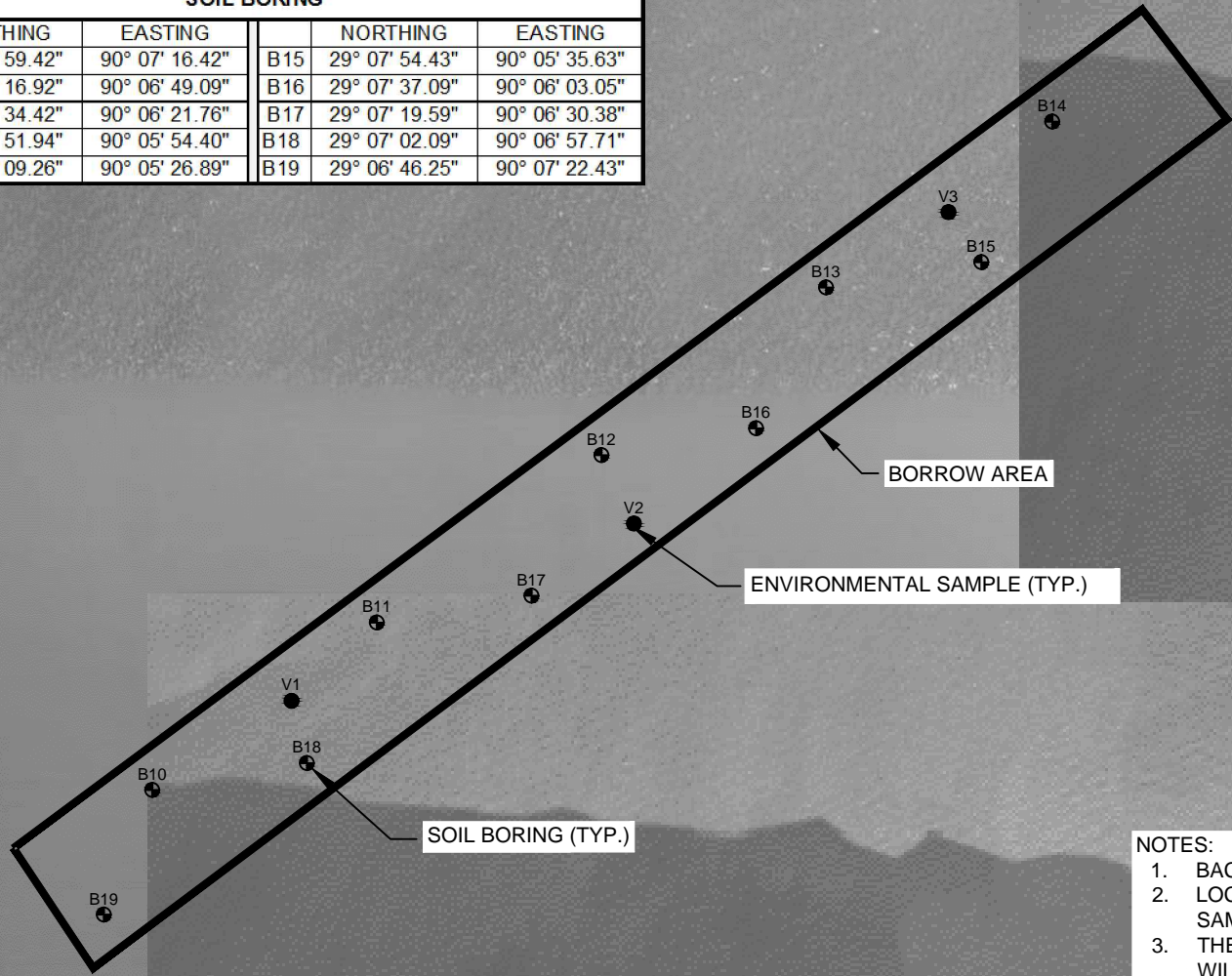
APPROVED BY: S. HAYNES, P.E.

FEDERAL PROJECT NUMBER:

SHEET 2 OF 4

VIBRACORE					
	LATITUDE	LONGITUDE		LATITUDE	LONGITUDE
V1	29° 06' 27.27"	90° 11' 06.09"	V3	29° 06' 58.23"	90° 10' 46.70"
V2	29° 07' 35.87"	90° 09' 16.79"			

SOIL BORING					
	NORTHING	EASTING		NORTHING	EASTING
B10	29° 06' 59.42"	90° 07' 16.42"	B15	29° 07' 54.43"	90° 05' 35.63"
B11	29° 07' 16.92"	90° 06' 49.09"	B16	29° 07' 37.09"	90° 06' 03.05"
B12	29° 07' 34.42"	90° 06' 21.76"	B17	29° 07' 19.59"	90° 06' 30.38"
B13	29° 07' 51.94"	90° 05' 54.40"	B18	29° 07' 02.09"	90° 06' 57.71"
B14	29° 08' 09.26"	90° 05' 26.89"	B19	29° 06' 46.25"	90° 07' 22.43"



GULF OF MEXICO

BORROW AREA

ENVIRONMENTAL SAMPLE (TYP.)

SOIL BORING (TYP.)

LEGEND	
	SOIL BORING
	VIBRACORES

- NOTES:
1. BACKGROUND IMAGERY WAS TAKEN IN 2012.
 2. LOCATION AND NUMBER OF ENVIRONMENTAL SAMPLES AND SOIL BORINGS ARE APPROXIMATE.
 3. THE ENVIRONMENTAL SAMPLES (VIBRACORES) WILL BE 10' DEEP AND 3" IN DIAMETER.



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BORROW AREA DATA COLLECTION LAYOUT

DATE: AUGUST 2014

SHEET 3 OF 4