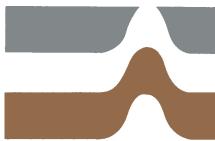


**FIELD AND LABORATORY DATA COLLECTION PHASE
NEW ORLEANS LANDBRIDGE SHORELINE STABILIZATION
& MARSH CREATION (PO-169)**

ORLEANS PARISH, LOUISIANA



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November 8, 2016

AAI File: 16-2872

Coastal Protection and Restoration Authority
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Attention: Mr. Garvin D. Pittman, PMP
Garvin.pittman@la.gov

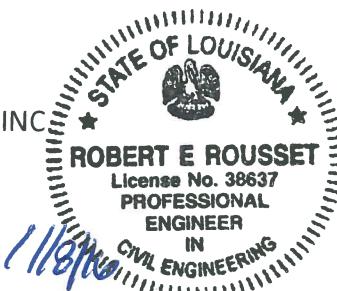
Cc: Mr. Gregory Mattson II, E.I.
Gregory.mattson@la.gov

Re: Data Report – Field and Laboratory Data Collection Phase
New Orleans Landbridge Shoreline Stabilization & Marsh Creation Project (PO-169)
Orleans Parish, Louisiana

We have completed the field exploration and laboratory data collection phase of the New Orleans Landbridge Shoreline Stabilization & Marsh Creation Project (PO-169). A summary of the field exploration and laboratory testing results, along with our evaluation of the data and discussion are provided in the attached Data Report. This work was authorized by Task #3 Notice to Proceed dated August 22, 2016 under our existing contract No. 4400005545 with the Coastal Protection and Restoration Authority (CPRA).

Sincerely,
ARDAMAN & ASSOCIATES, INC.


ROBERT E. ROUSSET, P.E.
BRANCH MANAGER/PROJECT ENGINEER




GEORGE SEGRE, E.I.
ASSISTANT PROJECT ENGINEER

Attachments: - Flash Drive

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New Orleans Landbridge Shoreline Stabilization & Marsh Creation Project (PO-169)
Data Report – Field and Laboratory Data Collection Phase
Confidential Information: Privileged and Confidential Work Product

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New Orleans Landbridge Shoreline Stabilization & Marsh Creation Project (PO-169)

Data Report – Field and Laboratory Data Collection Phase

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**DATA REPORT
FIELD AND LABORATORY DATA COLLECTION PHASE
NEW ORLEANS LANDBRIDGE SHORELINE STABILIZATION & MARSH CREATION (PO-169)**

ORLEANS PARISH, LOUISIANA

Results and findings of the field exploration and laboratory testing phases of the New Orleans Landbridge Shoreline Stabilization & Marsh Creation project are provided herein. Sediment sampling locations, visual classifications, laboratory test data, and generalized sand content contour maps are provided in the attached figures.

SECTION 1. GENERAL PROJECT INFORMATION

1.1 Project Description

The New Orleans Landbridge Shoreline Stabilization & Marsh Creation project aims to create, maintain, and nourish presently deteriorating wetlands through hydraulic dredging as well as by providing additional protection to lake shorelines via earthen berms. This project will create approximately 169 acres of marsh and an additional 109 acres will be nourished using hydraulically dredged material from area within Lakes St. Catherine and Pontchartrain.

The scope of work associated with the field and laboratory data collection phase for this project consisted of obtaining a total of 116 sediment samples from the Pontchartrain Basin (Lake St. Catherine and Lake Pontchartrain) and determining the *in-situ* sand content of the upper three (3) inches of the proposed borrow material at locations established by CPRA.

1.2 Site Location and Description

The sites are located in Region 1, Pontchartrain Basin, in Orleans Parish. A total of three (3) borrow areas were delineated by the CPRA, with one (1) on the west side of Hwy. 90 and in Lake Pontchartrain, and the remaining two (2) on the east side of Hwy. 90 and in Lake St. Catherine. A generalized plan map indicating the limits of these borrow areas is provided herein on Figure 1.

SECTION 2. FIELD EXPLORATION

2.1 Sediment Sampling

A total of 116 sediment samples were generally obtained at locations designated by the CPRA, and as shown in plan on Figures 2 thru 4. The sediment samples were designated by borrow area with an alphanumeric identification code.

Sediment sampling was performed between September 7 and September 14, 2016. Sediment sampling locations were determined in terms of Global Positioning System (GPS) WGS84.

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Data Report – Field and Laboratory Data Collection Phase
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Coordinates were recorded at each sampling location using a hand-held GPS device. The GPS coordinates at each boring location are presented in Figures 5 thru 9 alongside pertinent laboratory testing data. The water depth at each sampling location and the mean water elevation for the day the samples were collected is also presented in Figures 5 thru 9.

The sampling was performed from a "cabin crew boat" using an AMS Multi-Stage Sludge/Sediment Sampling (MSS) Kit. The MSS is a hand held tool with a 2-in I/D opening through which soil can enter an internal 12-inch long plastic tube, wherein a core catcher is utilized to maximize soil recovery. Discrete samples were obtained within the upper 12-inches in a single push within the three designated borrow areas.

Upon retrieval, the sample in the tube was visually classified and then the sample was sealed in the tube with plastic caps. Each sample tube was labeled, the top and bottom was labeled, and placed vertically in a fabricated tube rack to minimize any disturbance to the sample during transport. All the sample tubes obtained were transported to our laboratory for extrusion and testing on a daily basis.

2.2 Water Gage Readings

Based on a review of water gages in the area, it was determined that the USGS 301001089442600 Rigolets at Hwy. 90 near Slidell, Louisiana was the closest to the three borrow areas. It is located off of the Pelican Pointe Marina located on 28008 Chef Menteur Hwy. 90. The datum of the gage is at Elev. -1.0 feet NAVD88, and readings for the mean water elevation are presented alongside the sample data presented in Figures 5 thru 9.

SECTION 3. LABORATORY TESTING

Soil samples were transported to our laboratory on a daily basis. The tube samples were stored in secure racks in an upright position and protected from vibration and the elements. The top three inches of the samples were measured, and then a fine-toothed handsaw was used to separate the upper three inches from the remainder of the recovered sample. The sample was then visually classified and a plastic probe was used to discern if any miscellaneous debris (i.e. clams, pieces of wood, etc.) were present. Whenever clams or other material unrepresentative to the sample were discovered, they were subsequently removed, recorded, and weighed. This procedure enabled a more precise evaluation of the Grain Size determination. Results of the laboratory tests are presented on Figures 5 thru 9.

3.1 Classification and Index Testing

3.1.1 Visual Classification

Visual classification included description of soil color, consistency and type, and identification of structural conditions (layering, seams, etc.) and variations (organics, oxide inclusions, etc.). Visual classifications for the soil samples obtained from the site are incorporated alongside the laboratory test data presented on Figures 5 thru 9.

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3.1.2 *Moisture Content*

Moisture content determinations (ASTM D2216) were performed on every sample in conjunction with the preparation of test specimens. Moisture content values for each sample are included on Figures 5 thru 9.

3.1.3 *Particle Size Distribution*

Fines content determinations (ASTM D 1140) were performed on every sample. The test results, in terms of percent fines (i.e., percent by dry weight finer than the U.S. No. 200 sieve size, 0.074 mm, or combined silt and clay fraction) are included on Figures 5 thru 9. Percentages of gravel, sand, and silt/clay size particles based on results of this test are also summarized on Figures 5 thru 9.

SECTION 4. ENGINEERING SERVICES

Although this phase of work was limited to a field exploration program and laboratory testing, it was requested that the data (percent sand for each sample) be used to provide a contour map for each borrow area of interest. The GPS coordinates obtained during the field work were converted to NAD83 State Plane Coordinates Louisiana South (ft.), and the sand content determined during the laboratory testing phase was used as the "elevation" or z-axis value. These values were imported into the software package Civil 3D Version J.210.0.0, SP2 by Autodesk, Inc. for use as discrete surface points. A three-dimensional surface was then generated through the creation of a network of irregularly shaped triangles connected at the nearest points. These triangle form planes, which allow for the interpretation of an elevation, or in this case, sand contents at any location along the projected surface. Contour lines can then be determined along the surface at specific elevations, or sand contents. Data from each of the proposed borrow areas was used to generate a contour map for each location. Results of these contour maps are provided on Figures 10a thru 12b.

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SECTION 5. REFERENCES

ASTM Standard D1140, 2000 (2006), "Amount of Material in Soils Finer than No. 200 (75- μm) Sieve," ASTM International, West Conshohocken, PA, 2003, DOI: 10.1520/D1140-00R06.

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Germaine, J., and Germaine, A. (2009). *"Geotechnical Laboratory Measurements for Engineers"*. Hoboken, New Jersey: John Wiley and Sons, Inc.

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FIGURES:

Figure 1 – Project Features

Figure 2 – Sampling Locations (Borrow Area #1)

Figure 3 – Sampling Locations (Borrow Area #2)

Figure 4 – Sampling Locations (Borrow Area #3)

Figures 5 thru 9 – Laboratory Testing Results

Figures 10a thru 12b – Contour Maps

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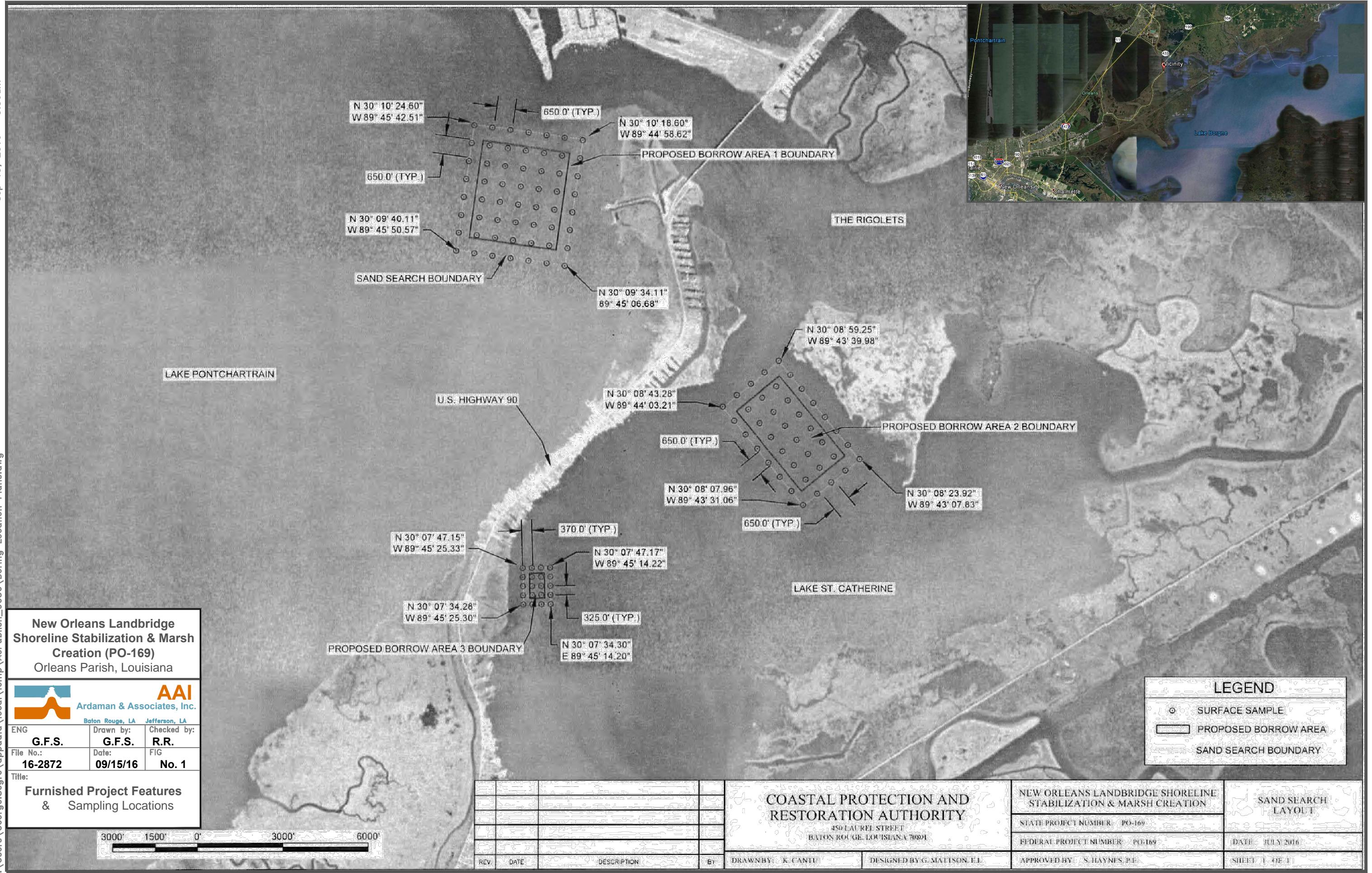
New Orleans Landbridge Shoreline Stabilization & Marsh Creation Project (PO-169)

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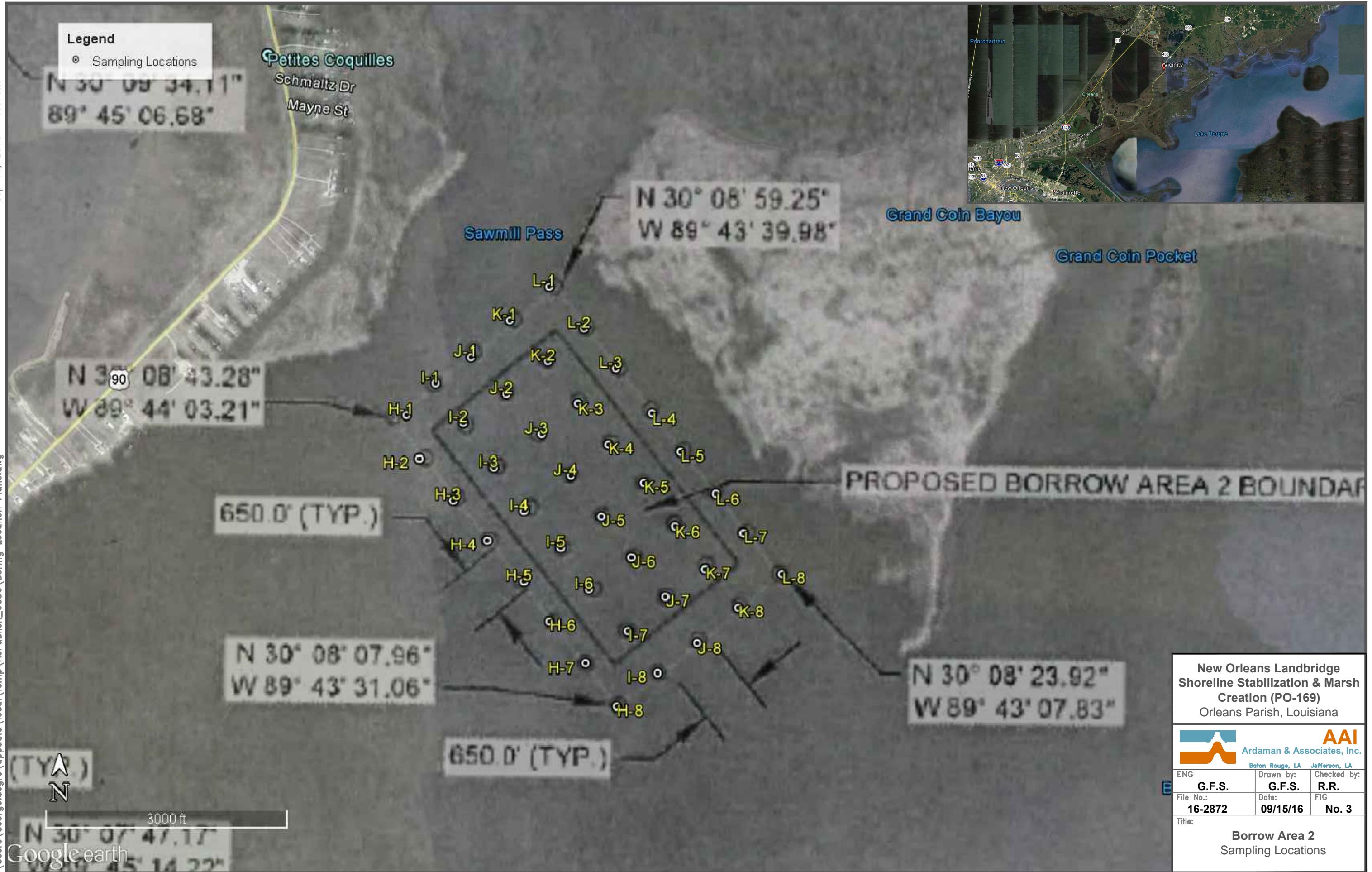
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Borrow Area 1

Boring Name	Date Sampled	Total Recovered Length (ft.)	Latitude (WGS84)	Longitude (WGS84)	Easting NAD83 (ft.)	Northing NAD83 (ft.)	Depth to Mudline (ft.)	Mean Water Surface Elevation, NAVD88 (ft.)	Mudline Elevation, NAVD88 (ft.)	Tare Weight (gm)	Wet Weight + Tare (gm)	Dry weight + Tare (gm)	Moisture Content (%)	Dry weight after Wash + Tare (gm)	Percent Silt & Clay (%)	Percent Sand (%)	Visual Description
A-1	9/12/16	0.67	30.1731944	-89.7617500	3777410.18	611882.77	17.0	0.95	-16.05	14.39	218.03	151.23	48.82	73.95	56.47	43.53	gray clay w/ sand
A-2	9/12/16	1.00	30.1714444	-89.7621111	3777304.81	611244.84	17.5	0.95	-16.55	14.56	196.63	107.86	95.14	32.10	81.20	18.80	gray clay w/ trace sand
A-3	9/14/16	0.67	30.1695000	-89.7625000	3777191.63	610536.08	17.0	0.95	-16.05	14.29	234.08	135.87	80.78	51.63	69.29	30.71	gray clay
A-4	9/14/16	0.83	30.1677778	-89.7628056	3777103.67	609908.49	15.0	0.95	-14.05	14.91	248.75	169.20	51.56	98.93	45.54	54.46	gray clay w/ sand
A-5	9/14/16	0.42	30.1660278	-89.7630556	3777033.40	609271.04	15.0	0.95	-14.05	14.62	272.55	164.84	71.70	90.96	49.18	50.82	gray clay w/ sand
A-6	9/14/16	0.33	30.1640556	-89.7633333	3776955.46	608552.67	15.5	0.95	-14.55	14.48	243.31	161.94	55.18	96.59	44.32	55.68	gray sandy clay
A-7	9/14/16	0.67	30.1626944	-89.7635833	3776883.24	608056.63	14.0	0.95	-13.05	14.47	249.69	174.46	47.02	112.98	38.43	61.57	gray sandy clay
A-8	9/13/16	0.75	30.1607778	-89.7640278	3776752.35	607357.74	14.5	0.90	-13.60	14.45	221.25	148.23	54.58	69.79	58.63	41.37	gray sandy clay
B-1	9/12/16	0.67	30.1728611	-89.7602778	3777877.00	611767.94	19.0	0.95	-18.05	14.75	208.93	125.65	75.09	62.60	56.85	43.15	gray clay w/ trace sand & organics
B-2	9/12/16	1.00	30.1711111	-89.7601944	3777912.06	611131.94	20.5	0.95	-19.55	14.46	188.81	92.50	123.41	18.65	94.63	5.37	gray clay
B-3	9/14/16	0.58	30.1693056	-89.7605000	3777824.53	610474.04	19.0	0.95	-18.05	14.46	241.42	155.87	60.50	85.93	49.46	50.54	gray clay w/ sand
B-4	9/14/16	0.58	30.1675278	-89.7610000	3777675.42	609825.41	17.5	0.95	-16.55	14.28	263.48	197.47	36.03	143.50	29.46	70.54	gray clayey sand
B-5	9/14/16	0.92	30.1656667	-89.7610278	3777675.93	609148.52	17.0	0.95	-16.05	14.71	287.50	212.33	38.04	150.18	31.45	68.55	gray clayey sand
B-6	9/14/16	0.42	30.1640833	-89.7612778	3777604.84	608571.67	16.5	0.95	-15.55	14.30	251.55	178.15	44.80	107.50	43.12	56.88	gray sandy clay
B-7	9/14/16	0.50	30.1623333	-89.7615556	3777525.79	607934.10	15.0	0.95	-14.05	14.34	223.28	168.90	35.18	117.41	33.31	66.69	gray clayey sand
B-8	9/13/16	0.67	30.1605278	-89.7619722	3777403.14	607275.73	15.0	0.90	-14.10	14.56	208.52	148.58	44.72	76.72	53.62	46.38	gray clay w/ sand
C-1	9/12/16	0.50	30.1726667	-89.7578889	3778632.75	611707.61	24.5	0.95	-23.55	14.53	184.84	85.96	138.43	34.31	72.31	27.69	gray clay
C-2	9/12/16	0.92	30.1708611	-89.7580278	3778597.89	611050.43	22.0	0.95	-21.05	14.52	203.65	122.04	75.90	55.75	61.65	38.35	gray clay w/ trace sand
C-3	9/12/16	0.92	30.1690278	-89.7584444	3778475.41	610381.95	22.0	0.95	-21.05	14.49	219.95	174.05	28.77	149.81	15.19	84.81	gray sand w/ trace clay
C-4	9/12/16	0.83	30.1672500	-89.7586389	3778422.85	609734.64	19.0	0.95	-18.05	14.84	202.77	136.83	54.05	79.27	47.18	52.82	gray clay w/ brown sand
C-5	9/12/16	1.00	30.1655000	-89.7591389	3778273.61	609096.11	18.0	0.95	-17.05	14.21	253.19	190.28	35.73	141.05	27.96	72.04	gray clayey sand
C-6	9/12/16	0.83	30.1638333	-89.7592778	3778238.05	608489.44	17.0	0.95	-16.05	14.42	254.12	187.47	38.51	130.40	32.98	67.02	gray clayey sand
C-7	9/12/16	0.92	30.1619722	-89.7598333	3778071.80	607810.26	16.5	0.95	-15.55	14.40	233.16	174.24	36.86	116.16	36.34	63.66	very soft gray clayey sand
C-8	9/13/16	0.92	30.1602222	-89.7597778	3778098.09	607174.13	16.5	0.90	-15.60	14.94	205.80	138.47	54.50	74.35	51.91	48.09	very soft gray sandy clay
D-1	9/12/16	0.33	30.1723056	-89.7557500	3779310.35	611585.59	26.0	0.95	-25.05	14.43	254.67	191.41	35.74	170.12	12.03	87.97	brown sand w/ clay
D-2	9/12/16	0.58	30.1703611	-89.7560556	3779223.54	610877.19	25.0	0.95	-24.05	15.09	227.75	166.12	40.81	134.94	20.64	79.36	brown clayey sand
D-3	9/12/16	0.83	30.1687778	-89.7564444	3779108.59	610299.74	22.0	0.95	-21.05	14.79	290.93	220.62	34.16	175.46	21.94	78.06	brown clayey sand
D-4	9/12/16	0.92	30.1670278	-89.7564722	3779108.57	609663.25	19.5	0.95	-18.55	14.64	229.79	157.24	50.88	109.21	33.68	66.32	brown sandy clay
D-5	9/12/16	0.42	30.1653611	-89.7570000	3778950.14	609054.89	18.0	0.95	-17.05	14.08	287.34	190.51	54.88	116.38	42.02	57.98	very soft brown sandy clay
D-6	9/12/16	0.92	30.1635000	-89.7573333	3778854.13	608376.67	16.0	0.95	-15.05	14.43	180.89	103.97	85.91	53.18	56.72	43.28	soft gray clay w/ sand & silt

Figure No. 5

Borrow Area 1 (continued)

Boring Name	Date Sampled	Total Recovered Length (ft.)	Latitude (WGS84)	Longitude (WGS84)	Easting NAD83 (ft.)	Northing NAD83 (ft.)	Depth to Mudline (ft.)	Mean Water Surface Elevation, NAVD88 (ft.)	Mudline Elevation, NAVD88 (ft.)	Tare Weight (gm)	Wet Weight + Tare (gm)	Dry weight + Tare (gm)	Moisture Content (%)	Dry weight after Wash + Tare (gm)	Percent Silt & Clay (%)	Percent Sand (%)	Visual Description
D-7	9/12/16	1.00	30.1618056	-89.7576389	3778766.05	607759.18	14.0	0.95	-13.05	14.45	212.74	136.80	62.07	76.14	49.58	50.42	gray clay w/ sand
D-8	9/13/16	0.33	30.1599167	-89.7578611	3778705.27	607071.35	11.0	0.90	-10.10	14.46	264.85	190.28	42.41	133.48	32.31	67.69	gray sandy clay
E-1	9/12/16	0.50	30.1719167	-89.7536944	3779961.76	611453.12	25.5	0.95	-24.55	14.49	260.85	182.87	46.31	148.79	20.24	79.76	gray clayey sand
E-2	9/12/16	0.67	30.1703333	-89.7539444	3779890.71	610876.27	23.5	0.95	-22.55	14.40	221.49	152.14	50.35	120.41	23.04	76.96	gray clayey sand
E-3	9/12/16	0.83	30.1684722	-89.7543333	3779777.16	610197.81	18.5	0.95	-17.55	14.32	203.21	137.90	52.85	94.85	34.84	65.16	gray clay w/ sand
E-4	9/12/16	0.50	30.1668056	-89.7546944	3779671.41	609590.18	16.0	0.95	-15.05	15.02	258.03	173.58	53.26	104.89	43.32	56.68	gray clay w/ sand layers
E-5	9/12/16	0.92	30.1651111	-89.7549722	3779592.13	608972.80	13.0	0.95	-12.05	14.72	243.84	174.31	43.57	110.97	39.69	60.31	gray sandy clay w/ shell
E-6	9/12/16	0.83	30.1633611	-89.7553611	3779478.01	608334.74	11.0	0.95	-10.05	14.49	252.42	182.13	41.93	114.89	40.11	59.89	gray sandy clay w/ trace shells
E-7	9/12/16	1.00	30.1614722	-89.7555833	3779417.25	607646.91	10.0	0.95	-9.05	14.46	219.85	161.03	40.13	95.75	44.54	55.46	gray sandy clay
E-8	9/14/16	0.50	30.1596389	-89.7558333	3779347.43	606979.15	9.5	0.95	-8.55	14.51	256.26	189.44	38.20	110.95	44.87	55.13	gray sandy clay
F-1	9/12/16	0.33	30.1716667	-89.7516944	3780594.93	611370.93	24.0	0.95	-23.05	14.47	214.94	141.44	57.89	108.47	25.97	74.03	gray clayey sand
F-2	9/12/16	0.92	30.1700278	-89.7519167	3780532.94	610774.00	16.0	0.95	-15.05	14.33	280.6	207.74	37.67	153.97	27.80	72.20	gray sandy clay
F-3	9/12/16	0.83	30.1683611	-89.7523611	3780400.87	610166.00	13.0	0.95	-12.05	14.82	221.09	128.18	81.96	50.3	68.70	31.30	gray clay w/ trace sand
F-4	9/12/16	0.92	30.1665000	-89.7527778	3780278.56	609487.41	14.0	0.95	-13.05	14.51	195.65	1015.38	-81.90	39.45	97.51	2.49	gray clay
F-5	9/12/16	0.92	30.1647222	-89.7530000	3780217.26	608839.98	13.0	0.95	-12.05	14.73	235.36	154.9	57.40	72.66	58.67	41.33	gray clay w/ organics
F-6	9/12/16	1.00	30.1629444	-89.7531944	3780164.73	608192.66	12.0	0.95	-11.05	14.43	225.39	136.9	72.25	48.48	72.20	27.80	gray clay
F-7	9/14/16	0.75	30.1611667	-89.7534444	3780094.65	607545.11	10.5	0.95	-9.55	15.03	247.13	151.93	69.54	52.54	72.60	27.40	gray clay
F-8	9/14/16	0.75	30.1596111	-89.7534167	3780111.23	606979.57	10.5	0.95	-9.55	14.45	233.2	144.2	68.59	52.77	70.47	29.53	gray clay w/ sand
G-1	9/12/16	1.00	30.1714722	-89.7495278	3781280.48	611309.68	16.0	0.95	-15.05	14.89	253.42	169.15	54.63	105.59	41.20	58.80	gray sandy clay
G-2	9/12/16	0.92	30.1696944	-89.7499444	3781157.76	610661.39	12.0	0.95	-11.05	14.44	201.8	103.9	109.43	17.94	96.09	3.91	gray clay
G-3	9/12/16	1.00	30.1680278	-89.7500556	3781131.03	610054.85	14.5	0.95	-13.55	14.49	242.08	155.34	61.58	65.99	63.44	36.56	gray sandy clay
G-4	9/12/16	1.00	30.1661111	-89.7506389	3780956.34	609355.33	12.0	0.95	-11.05	14.99	201.49	116.83	83.13	32.39	82.91	17.09	gray clay w/ shells
G-5	9/12/16	0.83	30.1644722	-89.7510000	3780850.47	608757.79	14.0	0.95	-13.05	14.72	182.52	77.06	169.17	17.35	95.78	4.22	gray clay w/ shells
G-6	9/12/16	0.92	30.1626944	-89.7512500	3780780.40	608110.23	13.0	0.95	-12.05	14.77	207.73	112.27	97.91	34.62	79.64	20.36	gray clay
G-7	9/14/16	0.92	30.1608889	-89.7514444	3780728.02	607452.82	11.0	0.95	-10.05	14.57	215.9	120.56	89.95	39.9	76.10	23.90	gray clay
G-8	9/14/16	0.83	30.1591389	-89.7520000	3780561.26	606814.03	10.5	0.95	-9.55	14.5	221.2	115.99	103.67	30.42	84.31	15.69	gray clay

Figure No. 6

Borrow Area 2

Boring Name	Date Sampled	Total Recovered Length (ft.)	Latitude (WGS84)	Longitude (WGS84)	Easting NAD83 (ft.)	Northing NAD83 (ft.)	Depth to Mudline (ft.)	Mean Water Surface Elevation, NAVD88 (ft.)	Mudline Elevation, NAVD88 (ft.)	Tare Weight (gm)	Wet Weight + Tare (gm)	Dry weight + Tare (gm)	Moisture Content (%)	Dry weight after Wash + Tare (gm)	Percent Silt & Clay (%)	Percent Sand (%)	Visual Description
H-1	9/8/16	0.83	30.1453056	-89.7339722	3786328.18	601862.81	6.5	1.17	-5.33	14.17	194.38	104.10	100.39	17.26	96.56	3.44	gray clay
H-2	9/8/16	1.00	30.1438333	-89.7334722	3786493.68	601329.66	5.5	1.17	-4.33	14.74	235.13	131.21	89.22	20.99	94.63	5.37	gray clay
H-3	9/8/16	0.92	30.1424167	-89.7321389	3786922.27	600820.40	6.0	1.17	-4.83	14.79	233.14	128.90	91.35	23.12	92.70	7.30	gray clay
H-4	9/9/16	0.83	30.1410556	-89.7308056	3787350.59	600331.34	7.0	1.22	-5.78	14.42	222.21	118.81	99.05	19.24	95.38	4.62	gray clay
H-5	9/9/16	1.00	30.1396667	-89.7293611	3787814.18	599832.68	7.0	1.22	-5.78	14.67	157.54	81.32	114.36	21.55	89.68	10.32	gray clay w/ trace shell
H-6	9/9/16	0.92	30.1383056	-89.7283611	3788137.17	599342.16	6.5	1.22	-5.28	14.44	229.90	121.19	101.84	22.69	92.27	7.73	gray clay
H-7	9/9/16	1.00	30.1368889	-89.7269444	3788592.15	598833.29	6.0	1.22	-4.78	14.29	190.45	104.45	95.39	21.59	91.90	8.10	gray silty clay
H-8	9/9/16	0.92	30.1354167	-89.7257222	3788985.96	598303.35	6.0	1.22	-4.78	14.54	151.11	80.70	106.42	20.08	91.63	8.37	gray clay w/ roots & silt
I-1	9/8/16	1.00	30.1463889	-89.7328333	3786682.62	602261.77	7.0	1.17	-5.83	14.36	197.39	103.63	105.03	16.55	97.55	2.45	gray clay
I-2	9/8/16	0.83	30.1450556	-89.7317500	3787031.76	601781.71	6.5	1.17	-5.33	14.46	196.32	100.28	111.91	17.85	96.05	3.95	gray clay
I-3	9/8/16	1.00	30.1435278	-89.7305556	3787417.03	601231.43	8.0	1.17	-6.83	15.14	219.44	117.41	99.77	17.63	97.57	2.43	gray clay
I-4	9/9/16	0.83	30.1420556	-89.7293611	3787802.02	600701.36	8.0	1.22	-6.78	14.57	189.04	93.37	121.41	17.32	96.51	3.49	gray clay
I-5	9/9/16	0.92	30.1408056	-89.7279167	3788264.91	600253.21	7.5	1.22	-6.28	14.50	189.77	99.56	106.05	19.97	93.57	6.43	gray silty clay
I-6	9/9/16	0.83	30.1393889	-89.7268056	3788623.30	599742.99	6.5	1.22	-5.28	14.44	190.50	102.67	99.55	22.07	91.35	8.65	gray silty clay w/ clams
I-7	9/9/16	1.00	30.1379722	-89.7252778	3789113.40	599234.61	6.0	1.22	-4.78	14.59	207.02	128.32	69.20	46.25	72.16	27.84	gray clay w/ sand
I-8	9/9/16	1.00	30.1365556	-89.7241111	3789489.37	598724.64	6.0	1.22	-4.78	14.57	170.44	96.12	91.13	28.16	83.34	16.66	gray silty clay w/ clams
J-1	9/8/16	1.00	30.1472778	-89.7314444	3787117.04	602591.14	7.0	1.17	-5.83	14.81	212.16	115.60	95.80	19.43	95.42	4.58	gray clay
J-2	9/8/16	0.83	30.1460278	-89.7300556	3787562.33	602142.73	12.0	1.17	-10.83	14.43	220.44	123.85	88.27	21.11	93.90	6.10	gray clay
J-3	9/8/16	1.00	30.1446667	-89.7286667	3788008.20	601653.93	10.5	1.17	-9.33	14.37	195.35	96.21	121.14	20.69	92.28	7.72	gray clay
J-4	9/9/16	0.92	30.1432500	-89.7275278	3788375.36	601143.82	8.5	1.22	-7.28	14.38	197.93	120.92	72.28	59.76	57.41	42.59	gray sandy clay w/ shells
J-5	9/9/16	0.83	30.1418611	-89.7263333	3788759.94	600644.06	7.5	1.22	-6.28	14.50	198.87	113.65	85.95	35.76	78.56	21.44	gray silty clay w/ trace shell
J-6	9/9/16	0.92	30.1404722	-89.7251389	3789144.54	600144.31	6.5	1.22	-5.28	14.43	209.05	117.88	88.13	33.64	81.43	18.57	gray silty clay
J-7	9/9/16	0.92	30.1391389	-89.7238056	3789572.75	599665.38	6.0	1.22	-4.78	14.35	190.48	107.58	88.92	26.05	87.45	12.55	gray silty clay w/ roots
J-8	9/9/16	0.92	30.1375833	-89.7225556	3789975.78	599105.28	6.0	1.22	-4.78	14.60	169.55	90.03	105.42	25.43	85.64	14.36	gray silty clay w/ clams
K-1	9/8/16	1.00	30.1485278	-89.7299167	3787593.50	603052.43	16.5	1.17	-15.33	14.56	210.37	107.31	111.12	19.12	95.08	4.92	gray clay
K-2	9/8/16	0.50	30.1471389	-89.7284167	3788074.62	602554.02	13.5	1.17	-12.33	14.63	194.73	117.49	75.09	54.50	61.24	38.76	gray clay w/ shell
K-3	9/8/16	0.92	30.1456944	-89.7272500	3788450.69	602033.93	7.5	1.17	-6.33	14.71	213.61	123.89	82.18	50.28	67.42	32.58	gray clay w/ some sand
K-4	9/9/16	0.83	30.1443056	-89.7260556	3788835.26	601534.18	7.5	1.22	-6.28	14.92	227.01	146.64	61.02	51.07	72.56	27.44	gray clay
K-5	9/9/16	0.92	30.1430000	-89.7246667	3789280.88	601065.60	6.5	1.22	-5.28	14.74	191.72	94.82	121.00	21.86	91.11	8.89	gray clay
K-6	9/9/16	1.00	30.1415278	-89.7234444	3789674.68	600535.67	6.0	1.22	-4.78	15.08	205.25	115.43	89.51	28.09	87.04	12.96	gray clay w/ clams

Figure No. 7

Borrow Area 2 (continued)

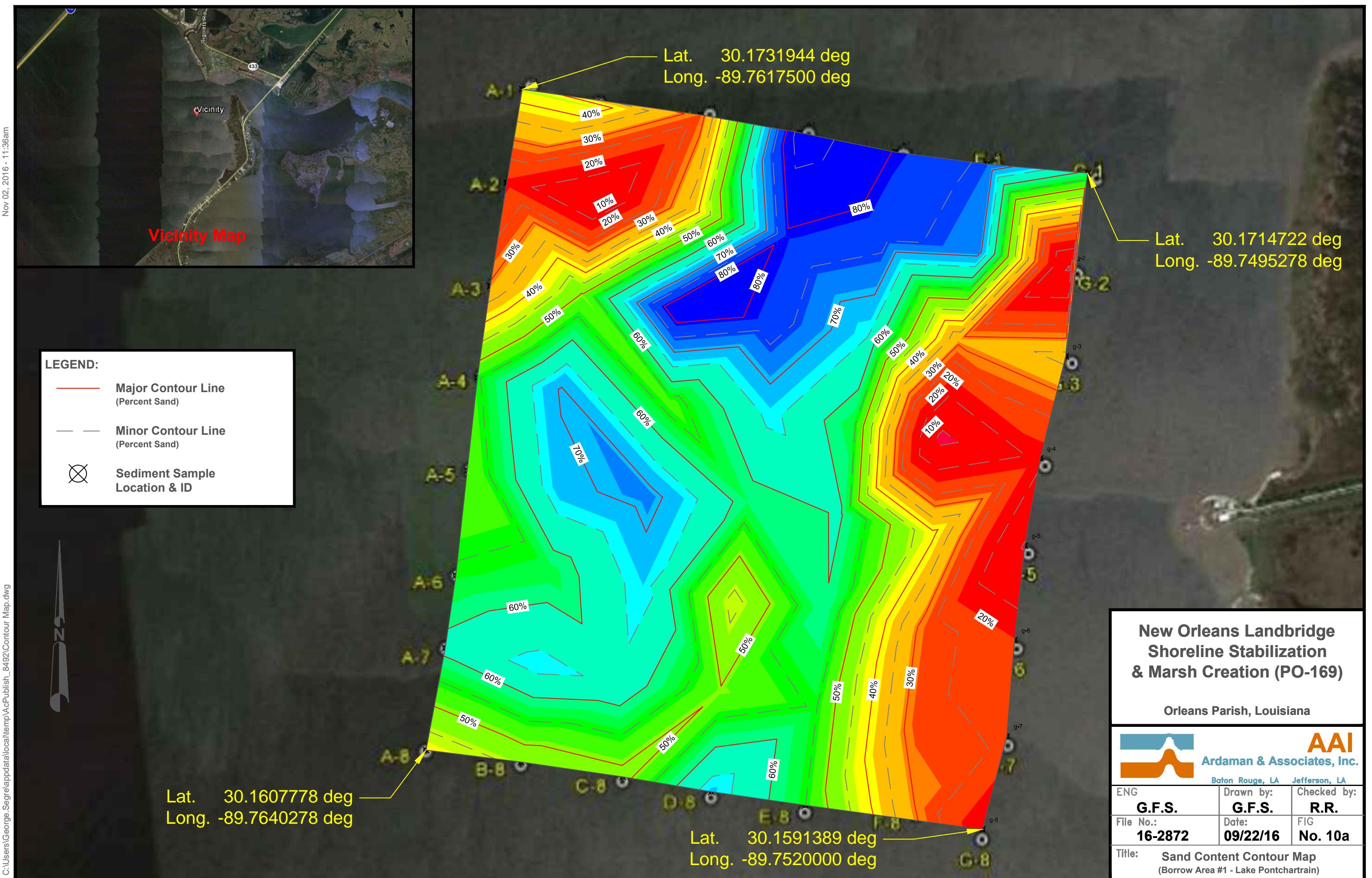
Boring Name	Date Sampled	Total Recovered Length (ft.)	Latitude (WGS84)	Longitude (WGS84)	Easting NAD83 (ft.)	Northing NAD83 (ft.)	Depth to Mudline (ft.)	Mean Water Surface Elevation, NAVD88 (ft.)	Mudline Elevation, NAVD88 (ft.)	Tare Weight (gm)	Wet Weight + Tare (gm)	Dry weight + Tare (gm)	Moisture Content (%)	Dry weight after Wash + Tare (gm)	Percent Silt & Clay (%)	Percent Sand (%)	Visual Description
K-7	9/9/16	0.83	30.1400833	-89.7222500	3790059.57	600015.72	6.0	1.22	-4.78	14.88	217.10	118.82	94.55	31.03	84.46	15.54	gray clay
K-8	9/9/16	1.00	30.1387778	-89.7209444	3790478.88	599546.79	6.0	1.22	-4.78	15.03	237.27	153.33	60.69	63.33	65.08	34.92	gray clay w/ sand
L-1	9/8/16	1.00	30.1496667	-89.7283611	3788079.30	603473.46	15.0	1.17	-13.83	14.55	204.13	113.88	90.86	22.03	92.47	7.53	gray clay w/ roots
L-2	9/8/16	0.92	30.1482500	-89.7270000	3788516.67	602964.33	7.5	1.17	-6.33	14.45	244.86	152.98	66.32	40.40	81.27	18.73	gray clay
L-3	9/8/16	0.83	30.1468889	-89.7257500	3788918.65	602474.93	5.5	1.17	-4.33	14.45	234.70	153.17	58.77	38.05	82.99	17.01	gray clay
L-4	9/9/16	0.83	30.1453611	-89.7243333	3789374.17	601925.66	6.5	1.22	-5.28	14.51	230.72	135.66	78.46	28.91	88.11	11.89	gray clay
L-5	9/9/16	0.83	30.1440556	-89.7232222	3789732.00	601455.85	6.5	1.22	-5.28	14.68	200.80	105.18	105.66	21.07	92.94	7.06	gray clay w/ clams
L-6	9/9/16	0.92	30.1426389	-89.7218333	3790178.19	600946.87	6.0	1.22	-4.78	14.48	211.47	118.44	89.49	22.53	92.26	7.74	gray clay
L-7	9/9/16	1.00	30.1413056	-89.7207500	3790527.40	600466.84	5.5	1.22	-4.28	14.80	210.03	107.47	110.67	20.67	93.67	6.33	gray clay
L-8	9/9/16	0.92	30.1399167	-89.7192500	3791008.59	599968.47	5.5	1.22	-4.28	14.41	212.91	116.09	95.22	31.06	83.63	16.37	gray clay

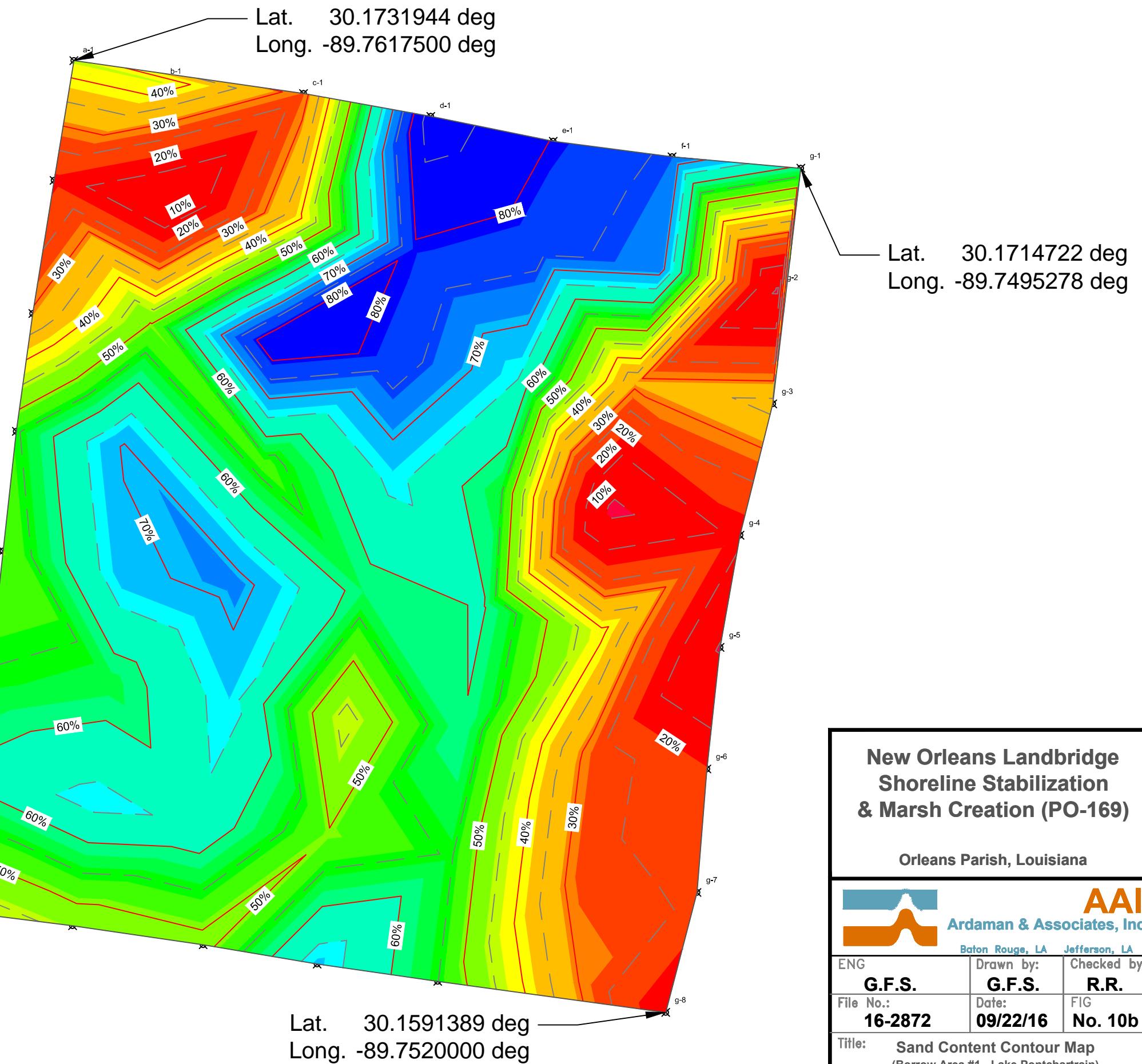
Figure No. 8

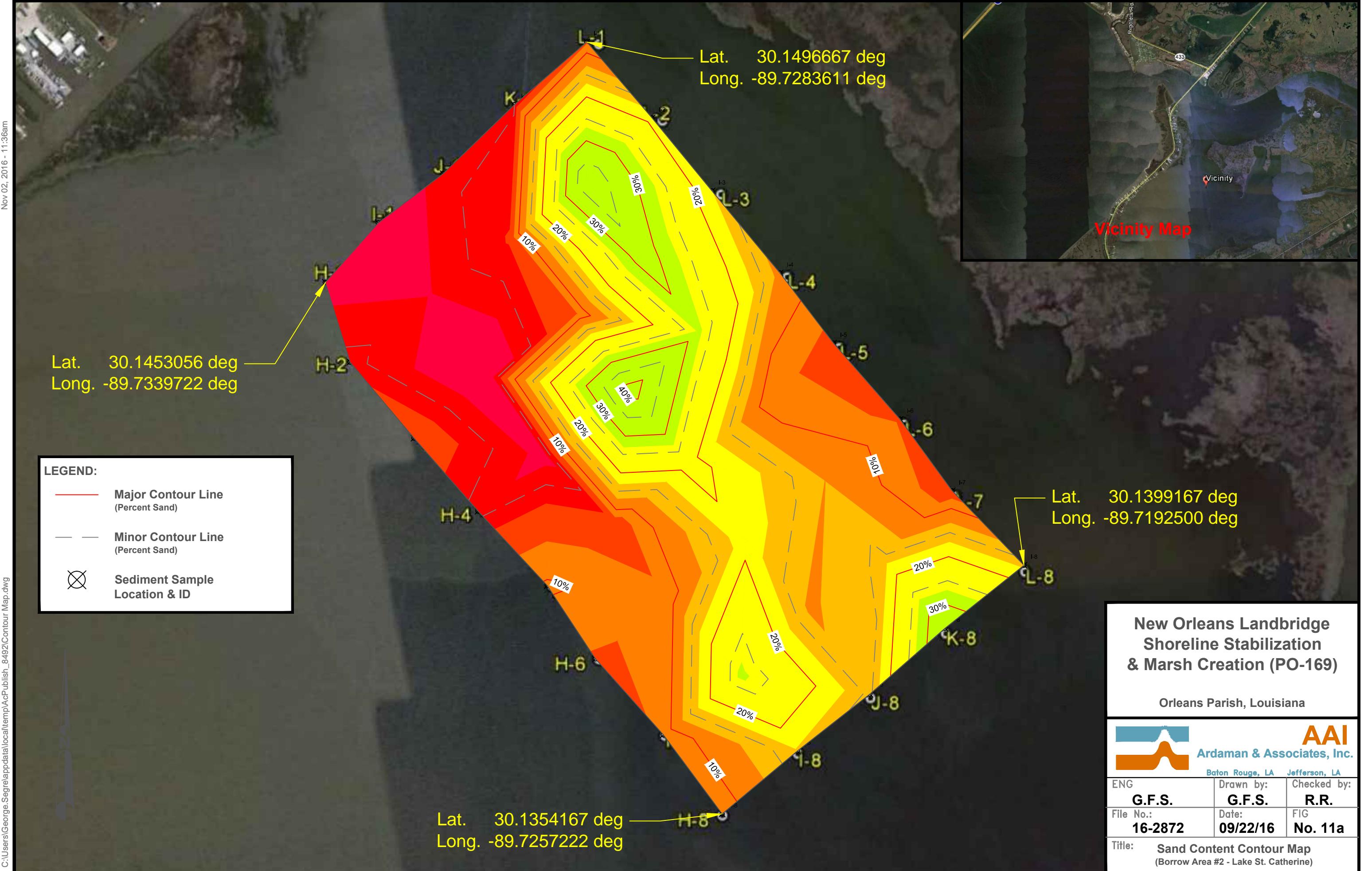
Borrow Area 3

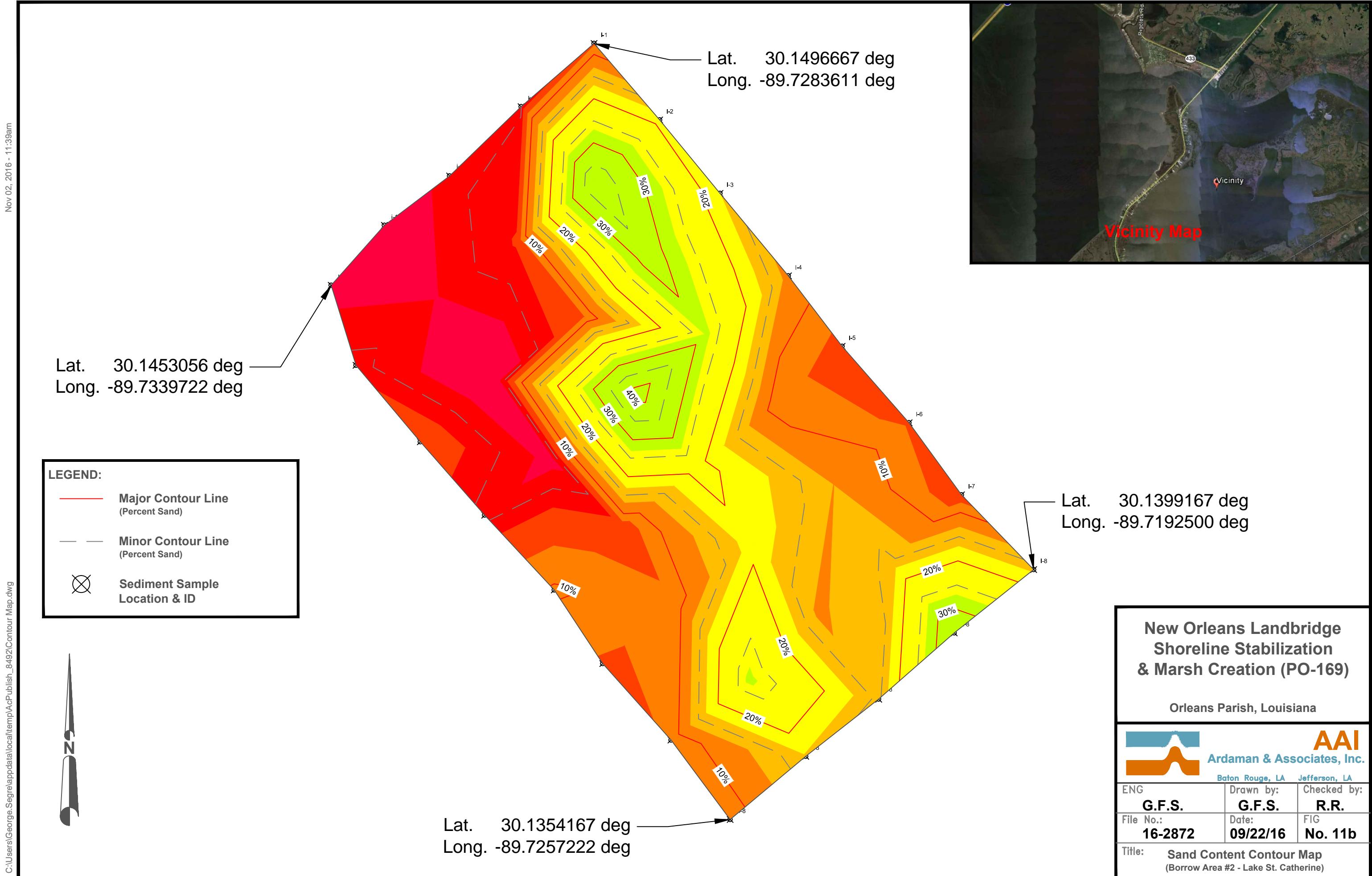
Boring Name	Date Sampled	Total Recovered Length (ft.)	Latitude (WGS84)	Longitude (WGS84)	Easting NAD83 (ft.)	Northing NAD83 (ft.)	Depth to Mudline (ft.)	Mean Water Surface Elevation, NAVD88 (ft.)	Mudline Elevation, NAVD88 (ft.)	Tare Weight (gm)	Wet Weight + Tare (gm)	Dry weight + Tare (gm)	Moisture Content (%)	Dry weight after Wash + Tare (gm)	Percent Silt & Clay (%)	Percent Sand (%)	Visual Description
M-1	9/8/16	0.83	30.1296940	-89.7573060	3779031.85	596083.70	7.0	1.17	-5.83	14.55	181.55	111.48	72.29	17.88	96.56	3.44	gray clay
M-2	9/8/16	0.75	30.1286670	-89.7570280	3779124.86	595711.46	7.0	1.17	-5.83	14.27	185.42	112.79	73.72	21.37	92.79	7.21	gray clay
M-3	9/7/16	0.92	30.1278889	-89.7570000	3779137.60	595428.63	6.5	1.22	-5.28	14.84	180.22	111.95	70.30	15.25	99.58	0.42	gray clay w/ wood & silt
M-4	9/7/16	0.92	30.1269722	-89.7571667	3779089.51	595094.58	7.0	1.22	-5.78	14.48	164.04	109.09	58.08	44.24	68.54	31.46	gray clay
M-5	9/7/16	0.75	30.1261389	-89.7570000	3779146.36	594792.27	8.0	1.22	-6.78	14.87	232.44	153.11	57.39	71.69	58.90	41.10	gray clay w/ trace silt and sand
N-1	9/8/16	0.42	30.1296410	-89.7561620	3779393.72	596069.41	12.0	1.17	-10.83	14.87	171.52	71.31	177.55	15.86	98.25	1.75	gray clay w/ trace roots
N-2	9/8/16	0.75	30.1287500	-89.7560000	3779449.39	595746.11	7.5	1.17	-6.33	14.63	175.23	82.15	137.86	18.33	94.52	5.48	dark gray to black clay w/ trace roots
N-3	9/7/16	0.83	30.1278889	-89.7561667	3779401.02	595432.26	7.5	1.22	-6.28	14.52	192.72	113.27	80.46	18.16	96.31	3.69	gray clay
N-4	9/7/16	0.75	30.1270278	-89.7559167	3779484.35	595120.22	7.5	1.22	-6.28	14.38	207.63	84.21	176.74	16.74	96.62	3.38	dark gray clay w/ trace roots
N-5	9/12/16	0.83	30.1261111	-89.7558611	3779506.50	594787.13	7.0	0.95	-6.05	14.98	197.20	82.70	169.08	16.48	97.78	2.22	gray clay w/ much wood
O-1	9/8/16	0.83	30.1296111	-89.7548889	3779796.29	596064.08	8.5	1.17	-7.33	14.51	261.13	152.96	78.13	47.54	76.14	23.86	gray clay
O-2	9/8/16	0.67	30.1286667	-89.7551667	3779713.22	595719.44	7.5	1.17	-6.33	14.60	222.67	146.53	57.71	57.59	67.41	32.59	gray clay
O-3	9/7/16	0.92	30.1278889	-89.7550556	3779752.24	595437.09	7.0	1.22	-5.78	14.85	279.71	176.57	63.78	78.06	60.91	39.09	gray clay
O-4	9/7/16	0.83	30.1268056	-89.7550278	3779766.44	595043.28	8.0	1.22	-6.78	14.43	187.84	96.16	112.17	17.36	96.42	3.58	gray clay
O-5	9/7/16	0.92	30.1260278	-89.7548333	3779831.80	594761.30	8.0	1.22	-6.78	14.40	217.51	125.09	83.49	49.24	68.52	31.48	gray clay w/ trace organics
P-1	9/8/16	0.92	30.1295833	-89.7535833	3780209.10	596059.67	7.5	1.17	-6.33	14.90	219.00	126.17	83.43	24.72	91.17	8.83	gray clay
P-2	9/7/16	0.75	30.1287222	-89.7537500	3780160.74	595745.81	7.0	1.22	-5.78	14.91	229.07	145.90	63.49	56.92	67.93	32.07	gray clay
P-3	9/7/16	1.00	30.1277500	-89.7541389	3780042.69	595390.58	7.0	1.22	-5.78	14.84	197.25	108.17	95.45	37.29	75.95	24.05	gray clay
P-4	9/7/16	0.92	30.1269722	-89.7539444	3780108.05	595108.60	8.0	1.22	-6.78	14.81	236.77	161.57	51.24	59.19	69.76	30.24	gray clay
P-5	9/7/16	0.83	30.1260556	-89.7539722	3780103.86	594775.15	8.0	1.22	-6.78	14.49	235.35	155.73	56.37	76.51	56.09	43.91	gray clay

Figure No. 9

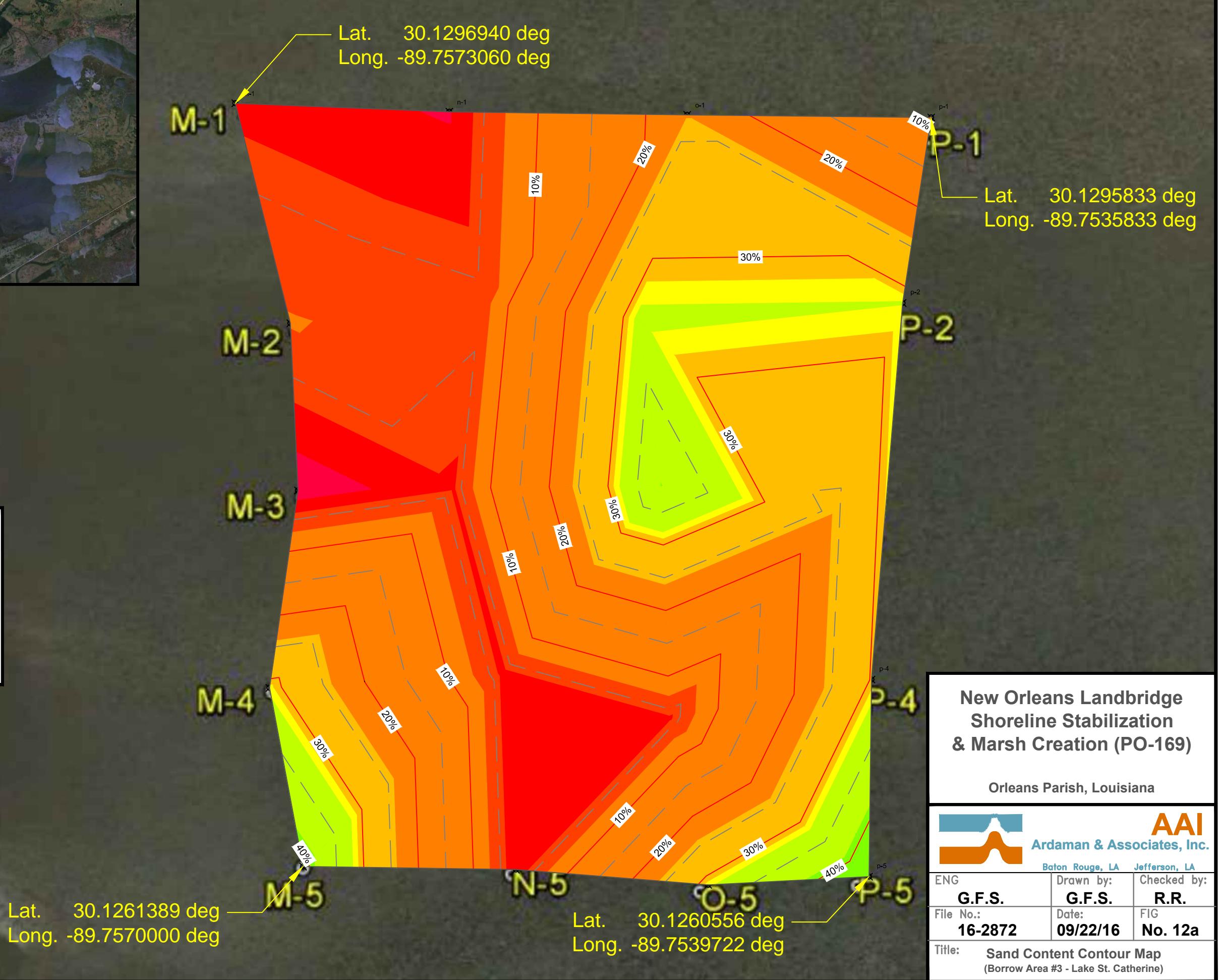
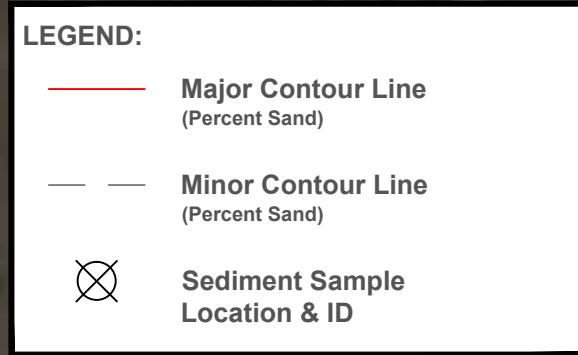


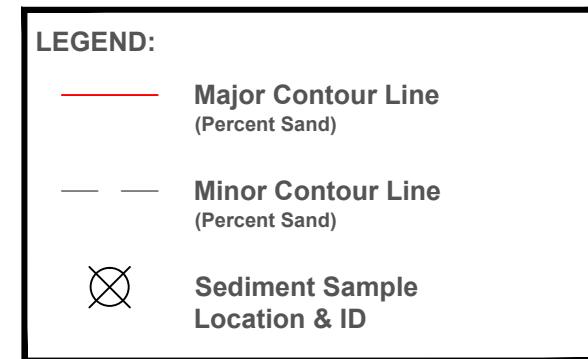






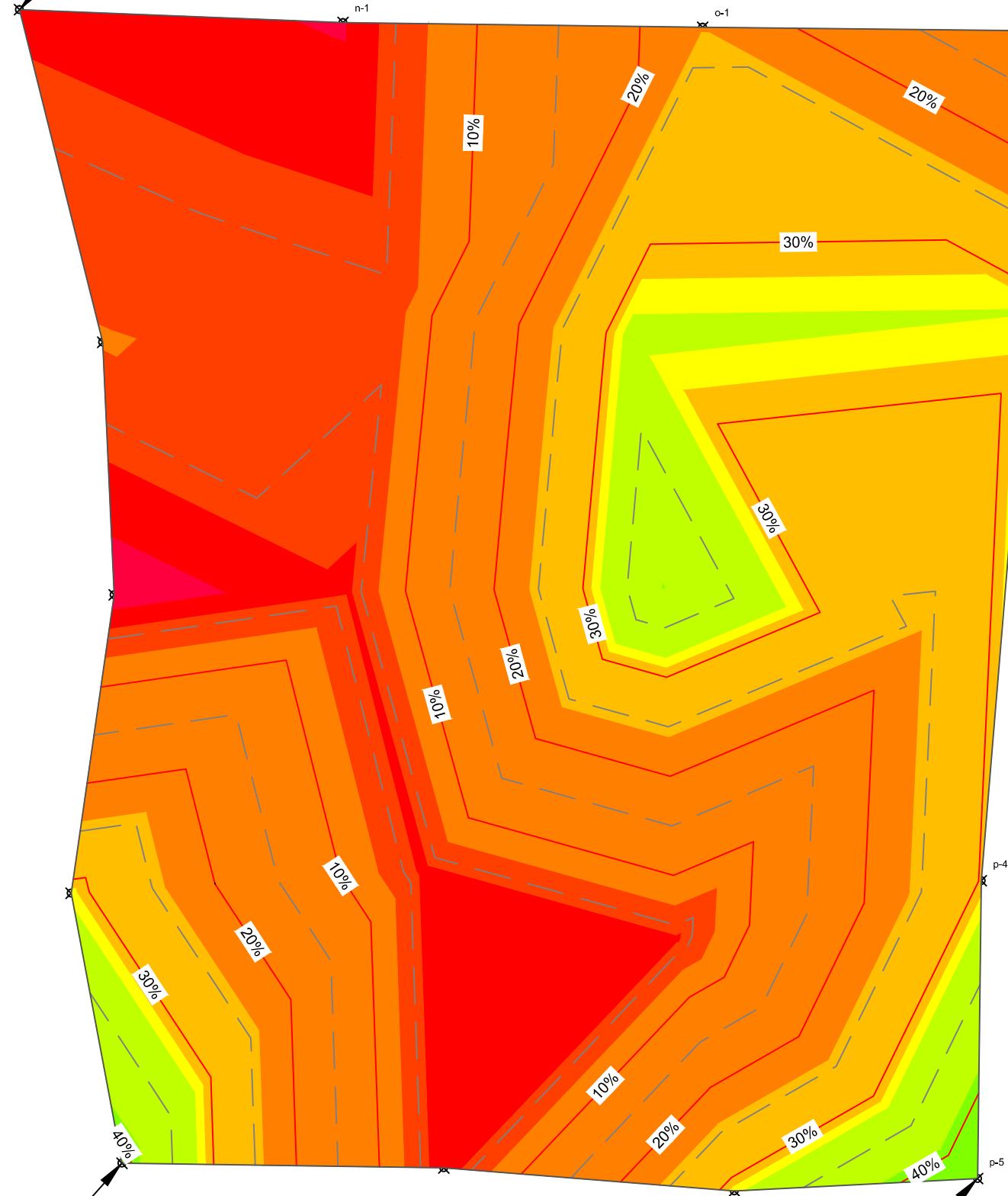
Nov 02, 2016 - 11:50am





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Lat. 30.1295833 deg
Long. -89.7535833 deg

New Orleans Landbridge Shoreline Stabilization & Marsh Creation (PO-169)

Orleans Parish, Louisiana



ENG	Drawn by:	Checked by:
G.F.S.	G.F.S.	R.R.
File No.: 16-2872	Date: 09/22/16	FIG No. 12b

Title: Sand Content Contour Map
(Borrow Area #3 - Lake St. Catherine)