ALEXANDER ISLAND
BORING SUMMARY SHEET

BORING ID:	13-P03
BORING TYPE:	Perimeter Levee
DEPTH:	60'
ELEVATION:	23.82'
X (US SURVEY FT):	3224485.02
Y (US SURVEY FT):	13828683.79
DEPTH TO WATER:	10.7'

13-P03

Contract No W912 HY-13-D0001 D46

Client: USACE-Galveston District | Boring: 13-P03 | Page 1 of 3

Date/Time Drilling Begun: 12.29.13/1230 | Date/Time Drilling Ended: 12.29.13/1735

Driller: Jason New | Logger: Eddie Ficker | Designated X (Easting): 3224485

Drill Rig: Mobile B57 | Designated Y (Northing): 13828684 | Z (Elevation): 23.8203'

Total depth: 60.0 | Initial Water Encounter (Depth, date/time): 12.0 ft / 12.29.13/1332 | Water Depth (15 min.): 10.7 ft

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
0	SM	0-2	18	ST	1B	—	—	Silty SAND (F-c) Light Orangish Brown, Moist, V. Loose, clayey from 1/6" to 1/10"
3		2-4						
5	CL	3.5-5 ~~4-6~~	13	SS 3-3-4	1B	0.75	—	Silty, Sandy CLAY, Moist, Reddish Brown to Dk Gray, SA is F-c, Med. Plast, Soft
7'	CL	5-7 ~~6-8~~	9	ST	1T	0.25	0.45	S.A.A.
	OH/CH	7.9 ~~8-10~~	15	ST	1T	0 to 0.75	0.2 to 0.45	Black to Dk Gray Silty CLAY, Moist, High Plast, V. Soft to Soft — 7'
10	SM	9-11	14	ST	2 1T 1B	~~0~~ —	0.45 —	SAA — 10'6"
								Silty, Clayey SAND (F-c), Moist, V. Loose, Light Orangish Brown
15	SM	13.5-15	13	SS 6-4-5	1B	—	—	Silty SAND (F-c), Wet, Light Gray, Loose, Common Shell Frags
17'								— 17'
	CH/OH	18.5-20	10	SS 1-1-1	1B	~~0~~	0.4	Silty CLAY, Grayish Brown to Blk, Moist, V. Soft, High Plast.
20								

1230 ↑ Dredge Spoil / Levee Material ↓

Weather: Sunny, Slight Breeze, ~65°F

Comments:

USCS Log Legend: SAA = Same as above | V. = Very | (F-c) = Fine to coarse grained | Dk = Dark | Blk = Black | Plast. = Plasticity | Frags = Fragments

GW GP GM GC SW SP SM SC ML CL OL MH CH OH PT

US Army Corps of Engineers, Southwestern Division
Galveston District
2000 Fort Point Road/P.O. Box 1229
Galveston, TX 77553-1229

Alexander Island
Houston Ship Channel
Baytown, TX

QRI Quaternary Resource Investigations, L.L.C.
Government & Industry in Harmony with the Environment
13588 Florida Boulevard, Baton Rouge, Louisiana 70819

Contract No W912 HY-13-D0001 DY06

Client: USACE-Galveston District

Boring: 13-P03

Page 2 of 3

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
20								
22	CH/OH	20-22	18	ST	1T	0.75	0.2	SAA Turning Dark Gray
23'6"	CH	22-24	18	ST	2 1T 1B	Ø	0.25	SAA to 23'6"
24'	SM					—	—	V. Silty SAND (F-M), Light Brownish Gray, Wet, Loose, Abundant Silty Clay Lams 24'
25	SH/CH	24-25.5	18	SS 2-2-3	1B	0	0.35	Silty CLAY, Brownish Gray to Blk, Moist, High Plast. Soft
	SM/SC					—	—	V. Silty SAND (F-M), Light Brown, Wet, Loose, Slightly Clayey 25'
	SM/SC							
29'	CH/OH	28.5-30	18	SS WOR-2-2	1B	0.25	0.4	SAA 29'
30								Silty CLAY, Blk to Drk Gray, Moist, Soft, High Plast.
	OH	30-32	16	ST	1T	Ø	0.4	SAA, Blk
32	SM	32-34	Ø Ø	NR ST SS	—	—	—	No Recovery in Shelby Tube from 32' to 34' Sample Falling Out 32
34								V. Light Gray Silty SAND (F-M), Wet, V. Loose 34
35	OH	33.5-35	18	1-1-1	1B	Ø	0.4	Silty CLAY, Blk to Drk Gray, Moist, High Plast Soft, Common Fine SA Lams.
	CH	35-37	17	ST	2T 1B	0.75		Gray Silty CLAY, Moist, Gray, High Plast 35
	SM					—	—	Silty SAND (F-C), Gray, Wet, Loose, Common Shell Frags 36'6"
40	SM	38.5-40	18	SS WOR-WOR-1	1B	—	—	SAA (F-M), Slightly Clayey, Common Shell Frags

Weather: Sunny, Slight Breeze, ~65°F

Comments: SAA = Same as above Blk = Black (F-M) = Fine to medium grained Plast. = Plasticity Frags = fragments lams = laminations

USCS Log Legend: GW GP GM GC SW SP SM SC ML CL OL MH CH OH PT

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Contract No W912 HY-13-D0001 DY06

Client: USACE-Galveston District | Boring: 13-P03 | Page 3 of 3

Total depth: 60.0 | Date/Time Drilling Ended: 12.29.13 / 1735

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
40								
	SC	43.5-45	18	SS 1-1-1	1 B	—	—	V. Silty, Clayey, SAND, (F-C), Gray, Wet, V. Loose Common shell frags
45								
								SAA with more silt & clay
	SC/CL	48.5-50	18	SS WOR-2-2	1 B	—	—	V. Silty, V. Clayey SAND, (F-C), Gray, Wet, V. Loose Common shell frags
50								
	SC/CL	53.5-55	18	SS WOR-WOR-2	1 B	—	—	SAA. Alternating Mixed sc & silty clay (CH) laminations
55								
	SC/CL	58.5-60	18	SS 3-1-1	1 B	—	—	SAA
60								

1735

Weather: Sunny, slight Breeze, ~65°F

Comments: (F-C) = fine to coarse grained V. = Very frags = fragments WOR = weight of rods

USCS Log Legend: GW GP GM GC SW SP SM SC ML CL OL MH CH OH PT

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2000 Fort Point Road/P.O. Box 1229
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Alexander Island
Houston Ship Channel
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13588 Florida Boulevard, Baton Rouge, Louisiana 70819

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13588 Florida Boulevard
Baton Rouge, LA 70820
Telephone: 225-292-1400
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BORING NUMBER 13-P03

CLIENT USACE-Galveston District
PROJECT NAME Alexander Island
PROJECT NUMBER W912HY-13-D-0001-DY06
PROJECT LOCATION Alexander Island, Baytown, TX
DATE STARTED 12/29/2013 12:30:00 PM **COMPLETED** 12/29/2013 5:35:00 PM **GROUND ELEVATION** 23.8203 ft **HOLE SIZE** 8.25 inches
DRILLING CONTRACTOR QRI
NORTHING 13828684 ft **EASTING** 3224485 ft
DRILLING METHOD Hollow Stem Auger
DRILLING RIG MAKE/MODEL Mobile B57 on Gemco Articulated Platform
LOGGED BY Eddie Ficker **TOTAL DEPTH** 60 ft
GROUND WATER LEVEL ▽ **AT TIME OF DRILLING** 12.00 ft / Elev 11.82 ft
WEATHER sunny, 65, slight breeze
▼ **24 HOURS AFTER DRILLING** 10.70 ft / Elev 13.12 ft

GRAPHIC LOG	USCS SYMBOL	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE	RECOVERY (in)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	FIELD TORVANE (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MINUS #200 SIEVE CONTENT (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)
	SM	Silty SAND; fine to coarse grained, light orangish brown, moist, very loose	0	ST	18					12							
		clayey		NR	0												
		not clayey	5	SS	13	3-3-4 (7)	0.75			19							
	CH	CLAY; reddish brown to dark gray, moist, medium plasticity, soft		ST	9		0.25	0.45		26	50	17	33	59			
		black to dark gray, high plasticity, very soft to soft		ST	15		0-0.75	0.2-0.45	72	52	120	35	85		0.33	6	8
			10	ST	14		0	0.45		61							
	SC	Clayey SAND; fine to coarse grained, light orangish brown, moist, very loose		NR	0												
		wet, light gray, loose, with common shell fragments	15	SS	13	6-4-5 (9)				17				17			
				NR	0												
	CH	CLAY; brownish gray to black, moist, high plasticity, very soft															
			20	SS	10	1-1-1 (2)	0	0.4		45				97			
		dark gray		ST	18		0.75	0.2	56	84	124	34	90		0.96	3	12
				ST	18		0	0.25		70							
	SM	Very silty SAND; fine to medium grained, light brownish gray, wet loose, with abundant silty clay laminations	25	SS	18	2-2-3 (5)	0	0.35		47							
	CH	Silty CLAY; brownish gray to black, moist, high plasticity, soft															
	SM	Very silty SAND; fine to medium grained, light brown, wet, loose, slightly clayey		NR	0												
	CH	CLAY; black to dark gray, moist, high plasticity, soft	30	SS	18	0-2-2 (4)	0.25	0.4		45							
		black		ST	16		0	0.4	62	64	131	34	97				
	SM	Silty SAND; fine to medium grained, very light gray, wet, very loose		NR	0												
	CH		35	SS	18	1-1-1 (2)	0	0.4		68							

(Continued Next Page)

Quaternary Resource Investigations, LLC
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Baton Rouge, LA 70820
Telephone: 225-292-1400
Fax: 225-292-1404

BORING NUMBER 13-P03

CLIENT USACE-Galveston District **PROJECT NAME** Alexander Island

PROJECT NUMBER W912HY-13-D-0001-DY06 **PROJECT LOCATION** Alexander Island, Baytown, TX

GRAPHIC LOG	USCS SYMBOL	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE	RECOVERY (in)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	FIELD TORVANE (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MINUS #200 SIEVE CONTENT (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)
	CH	CLAY; black to dark gray, moist, high plasticity, soft, with common fine sand laminations *(continued)*	35	ST	17		0.75			67							
		gray		NR	0												
	CL-ML	Silty CLAY; gray, wet, loose, with common shell fragments and fine to coarse grained sand sand is fine to medium grained, slightly clayey	40	SS	18	0-0-1 (1)				27				54			
				NR	0												
	CL	Silty CLAY; gray, wet, with common shell fragments and fine to coarse grained, very loose sand	45	SS	18	1-1-1 (2)				22							
				NR	0												
		increasing silt and clay	50	SS	18	0-2-2 (4)				23				58			
				NR	0												
		Alternating and mixed clayey SAND (SC) and silty CLAY (CL) laminations	55	SS	18	0-0-2 (2)				28							
				NR	0												
			60	SS	18	3-1-1 (2)				25							

Bottom of borehole at 60.0 feet.

SUMMARY TABLE OF LABORATORY TEST DATA

Project Name: Alexander Island | **Client: QRI** | **Terracon Project # : 92135456**

Boring	Depth	Field Tests			Atterberg Limits			Grain Size Analysis											USCS Symbol	Wc	γd	Strenght Tests																		
								% by weight passing sieve														Unconfined Compression				UU Triaxial Test				Direct Shear				CU Triaxial Test						
		PP	TV	SPTn	LL	PL	PI	3/8	4	10	40	100	200	gravel	sand	silt	clay	sieve 200				C	Wc	γd	Symbol	C	Wc	γd	Symbol	C	φ	Wc	Symbol	C	φ	c'	φ'	Wc	γd	Symbol
	ft	tsf	tsf	bl/ft	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%	pcf	ksf	%	pcf		ksf	%	pcf		ksf	°	%		ksf	°	ksf	°	%	pcf	
13-P02	0-2	0.75			34	12	22	100	99	99	96		61	1	38			61	CL	17	109																		
	2-4			20																11																		
	4-6	2.0																		18																		
	6-8	0	0.04	6	76	23	53	100	100	100	99		84	0	15			84	CH	32	84					0.35	32	84	CH**									
	8-10									100	96	89	72	0	28	31	41	72	CH*	18																		
	10-12			15																29																		
	12-14			11					100	99	81	64	61	0	39	21	40	61	CH*	25																		
	14-16			5																23																		
	16-18																			22																		
	18-20			4					100	100	97		28	0	72			28	SM*	24																		
	20-22			10																51	65					0.32	51	65	CH**									
	22-24	0.25	0.07	5																73	54																	
	24-26																			29																		
	26-28	0	0.25																	53	73																	
	28-30																			30																		
	30-32			22					100	100	97		15	0	85			15	SC*	20										0.38	30	20	SP**						
	32-34			35																20																		
	34-36			7					100	100	98		12	0	88			12	SP-SM*	17																		
	36-38	0.25	0.5	8	129	35	94												CH*	59	64													0.25	8	0.23	16	59	64	CH**
	38-40																			40	81																	
	40-42			4																24																		
	42-44			4					100	100	93		35	0	65			35	SM*	22																		
	44-46			5																21																		
	46-48			4																22																		
	48-50			4					100	100	91		36	0	64			36	SC*	22																		
	50-52			3																20																		
	52-53.5																																					
	53.5-55			4																22																		
	55-58.5																																					
	58.5-60			3																26																		
13-P03	0-2																			12																		
	2-3.5																																					
	3.5-5	0.75		7																19																		
	5-7	0.25	0.45		50	17	33		100	100	93	69	59	0	41	21	38	59	CH	26																		
	7-9	0-0.75	0.2-0.45		120	35	85												CH*	52	72					0.33	52	72	CH**									
	9-11	0	0.45																	61																		
	11-13.5																																					
	13.5-15			9				99	97	96	76		17	3	80			17	SC*	17										0.08	34	17	SP**						
	15-18.5																																					
	18.5-20	0	0.4	2							99	98	97	0	3	22	75	97	CH*	45																		
	20-22	0.75	0.2		124	34	90												CH*	84	56					0.96	84	56	CH**									
	22-24	0	0.25																	70																		
	24-25.5	0	0.35	5																47																		
	25.5-28.5																																					
	28.5-30	0.25	0.4	4																45																		
	30-32	0	0.4		131	34	97												CH*	64	62													0.34	6	0.34	12	64	62	CH**
	32-34																																					
	33.5-35	0	0.4	2																68																		
	35-37	0.75																		67																		
	37-38.5																																					
	38.5-40			1					100	100	96		54	0	46			54	CL-ML*	27																		
	40-43.5																																					
	43.5-45			2																22																		
	45-48.5																																					
	48.5-50			4					100	100	94		58	0	42			58	CL*	23																		
	50-53.5																																					
	53.5-55			2																28																		
	55-58.5																																					
	58.5			2																25																		

Complete Sieve test not assigned but it was performed with hydrometer.

POINT	EASTING (X)	NORTHING (Y)	ELEV.(Z)	BORING
1	3,224,839.86	13,829,574.96	26.07	13-B01 SURVEYED
2	3,224,468.96	13,829,647.11	27.56	13-B02 SURVEYED
3	3,224,781.02	13,829,832.05	27.42	13-B03 SURVEYED
4	3,225,085.04	13,829,951.90	28.02	13-B04 SURVEYED
5	3,224,798.15	13,830,185.96	26.71	13-B05 SURVEYED
6	3,225,137.02	13,830,319.06	27.97	13-B06 SURVEYED
7	3,225,402.24	13,830,377.84	27.40	13-B07 SURVEYED
8	3,225,137.84	13,830,656.99	27.34	13-B08 SURVEYED
9	3,225,431.15	13,830,710.11	28.02	13-B09 SURVEYED
10	3,225,763.04	13,830,892.08	27.75	13-B10 SURVEYED
11	3,225,389.99	13,831,061.05	26.37	13-B11 SURVEYED
12	3,225,579.86	13,831,378.86	26.12	13-B12 SURVEYED
13	3,225,136.04	13,831,406.95	26.39	13-B13 SURVEYED
14	3,225,382.99	13,831,732.99	28.30	13-B14 SURVEYED
15	3,225,027.98	13,831,671.05	27.36	13-B15 SURVEYED
16	3,224,743.97	13,831,628.99	25.72	13-B16 SURVEYED
17	3,224,619.87	13,832,095.98	27.15	13-B17 SURVEYED
18	3,224,819.95	13,832,313.05	29.49	13-B18 SURVEYED
19	3,225,218.97	13,832,197.96	29.61	13-B19 SURVEYED
20	3,225,789.02	13,832,191.02	24.98	13-B20 SURVEYED
21	3,225,424.06	13,832,424.86	25.99	13-B21 SURVEYED
22	3,225,960.93	13,832,420.96	23.86	13-B22 SURVEYED
23	3,226,409.90	13,832,382.04	22.95	13-B23 SURVEYED
24	3,226,641.04	13,832,554.90	23.17	13-B24 SURVEYED
25	3,226,468.10	13,832,757.96	23.39	13-B25 SURVEYED
26	3,226,192.06	13,832,587.05	23.82	13-B26 SURVEYED
27	3,225,917.94	13,832,796.84	24.65	13-B27 SURVEYED
28	3,225,689.17	13,832,584.94	24.74	13-B28 SURVEYED
29	3,225,406.03	13,832,775.88	26.23	13-B29 SURVEYED
30	3,225,210.96	13,832,605.92	27.31	13-B30 SURVEYED
31	3,224,956.08	13,832,789.07	30.03	13-B31 SURVEYED
32	3,224,892.10	13,832,575.99	29.78	13-B32 SURVEYED
33	3,224,600.87	13,832,572.04	30.06	13-B33 SURVEYED
34	3,228,153.92	13,827,285.05	25.73	13-P01 SURVEYED
35	3,225,272.89	13,827,557.13	24.82	13-P02 SURVEYED
36	3,224,485.02	13,828,683.79	23.82	13-P03 SURVEYED
37	3,224,458.15	13,829,880.09	24.00	13-P04 SURVEYED
38	3,225,186.78	13,830,885.15	27.81	13-P05 SURVEYED

3,224,655.30 13,829,970.20 Via Exxon Mobil

3,225,009.40 13,830,410.30 Via Exxon Mobil

3,225,494.19 13,830,624.52 Via Exxon Mobil

3,225,508.40 13,831,329.60 Via QRI

3,225,326.00 13,831,726.80 Via QRI

Removed from Contract
Removed from Contract
Removed from Contract
3,226,407.90 13,832,440.70 Via QRI

PROJECT BENCHMARK:

HARRIS COUNTY FLOODPLAIN REFERENCE MARK NUMBER Q70020. BRASS DISC IN THE WEST END OF THE NORTH HEADWALL PARK ROAD 1836 APPROXIMATELY 845 FEET SOUTHEAST OF HIGHWAY 134

ELEV. 3.68 FEET. NAVD 1988. 2001 ADJUSTMENT.

THE MONUMENT IS CONSTRAINED TO THE NGS PUBLISHED ELEVATION FOR THE NORTHEAST 2250 CORPS ARP ADJUSTED BY NGS IN 2001 AND AS PUBLISHED IN PID AJ6430 EPOCH DATE 1997.00

RYAN 2006 CORPS OF ENGINEERS MONUMENT BRASS DISC IN CONCRETE LOCATED AT THE NORTHWEST CORNER OF PEGGY LAKE PLACEMENT AREA.

ELEV. 4.34. NAVD 88

NOTES:

1. THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID CORRDINATES (NAD 83). AS DERIVED FROM GPS OBSERVATIONS.

   GPS OBSERVATIONS ARE BASED ON THE SMARTNET SYSTEM OPERATED BY LEICA GEOSYSTEMS UTILIZING SPIDERNET SOFTWARE TO OBTAIN CENTIMETER ACCURACIES. MEASURMENTS WERE MADE UTILIZING LEICA VIVA GS15 AND GS12 RECEIVERS.

2. ALL BORING LOCATIONS ARE AS NOTED IN THE TABLE ABOVE.

3. SMARTNET ADJUSTED STATION COORDINATES ARE TIED TO NAD83 (NA2011) DATUM AS DEFINED BY THE NGS CORS DATASHEETS OF THOSE STATIONS HELD FIXED IN THE ADJUSTMENT. FULLY CONSTRAINED ADJUSTED COORDINATES ARE REPORTED TO BE ACCURATE TO ABOUT +/-0.5 CM IN HORIZONTAL AND +/- 1. 5 CM IN VERTICAL AT 95% CONFIDENCE (2-SIGMA) LEVEL.

4. BORE HOLES WERE ADJUSTED IN THE FIELD BY ORI STAFF AND SURVEYED IN THAT LOCATION COORDINATES FOR THAT LOCATION ARE AS SHOWN IN THE TABLE ABOVE.

I. KEVEIN DREW MCRAE. A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR. HEREBY CERTIFY THAT THIS SURVEY WAS PERFORMED ON THE GROUND BY ME OR UNDER MY SUPERVISION ON THIS THE 19TH DAY OF NOVEMBER. 2013.

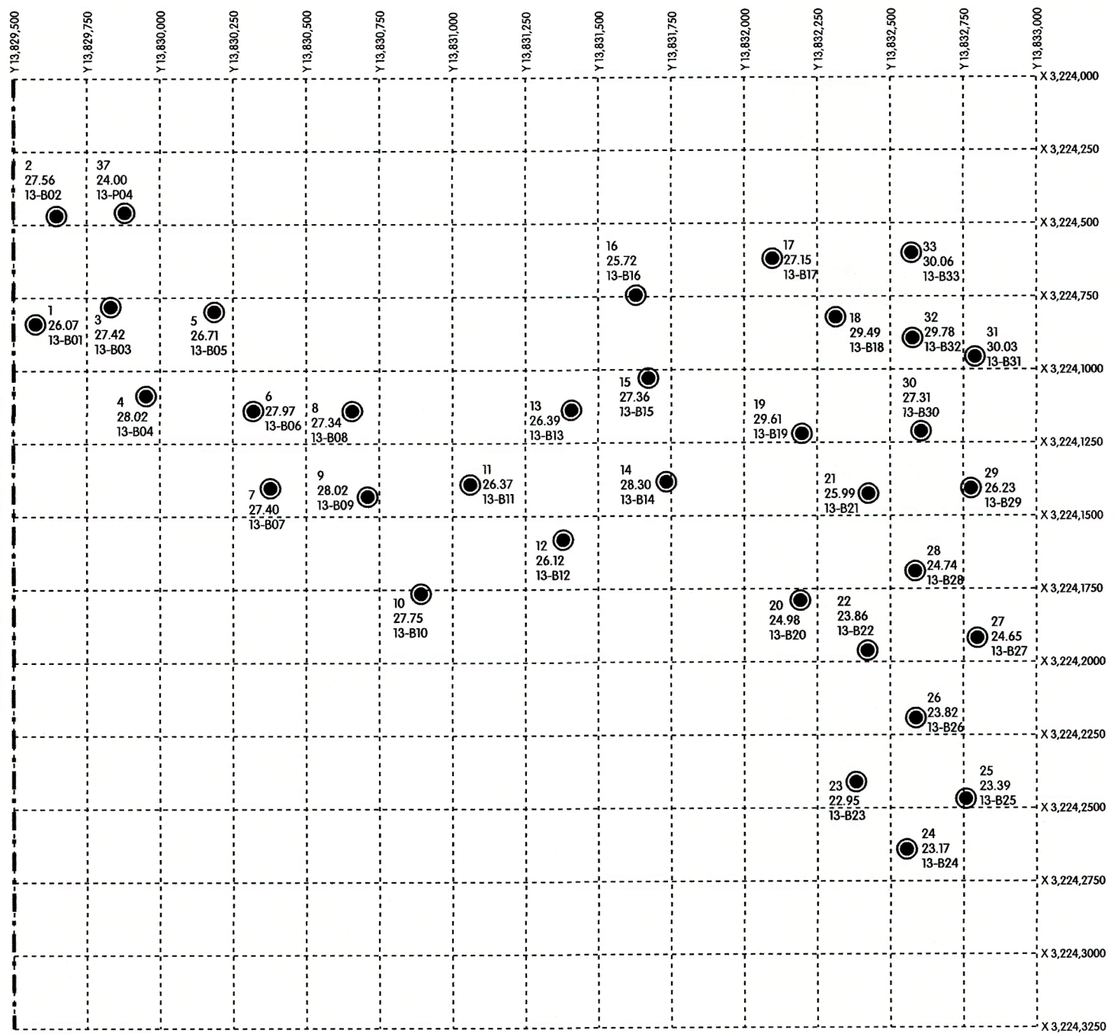
KEVIN DREW McRAE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5485

STATE OF TEXAS REGISTERED KEVIN DREW McRAE 5485 PROFESSIONAL LAND SURVEYOR

PLAN

0 500 1000 1500

SCALE IN FEET



DRAWN BY: CTC | CHECKED BY: KDM

KM Surveying, LLC
3902A REESE ROAD – SUITE 300
ROSENBERG, TEXAS 77471
713-234-6627
www.kmsurveying.com

U.S. Army Corps of Engineers
Galveston District

TIME:2:34:30 PM
DATE: 1/18/2014
BY: $USER$

Rev.	Description	Date	By

Date: X
Scale: AS SHOWN
Approval Recommended:
BOBBY BICHWELL, P.E.
Chief, Engineering Branch

Drawn by: X
Designed by: X
Checked by: X
Submitted by: DAVID B. BROWN, P.E. – Chief, General Engineering
Approved by: PETE G. PEREZ, P.E. – Chief, Engineering and Construction Division

U.S. ARMY ENGINEER DISTRICT, GALVESTON
CORPS OF ENGINEERS
GALVESTON, TEXAS

PREPARED UNDER THE DIRECTION OF
CHRISTOPHER W. SALLESE, COL, C.E.,
DISTRICT COMMANDER

BORING HOLE LOCATIONS
TASK ORDER NO. DY06
CONTRACT NO. W912HY-13-D-0001
ALEXANDER ISLAND PLACEMENT AREA

PASADENA, TEXAS
HARRIS COUNTY, TEXAS

Drawing No.:

Sheet 1 of 2

File No. xxx XXX-XXX

File: $FILE$

POINT	EASTING (X)	NORTHING (Y)	ELEV.(Z)	BORING	
1	3,224,839.86	13,829,574.96	26.07	13-B01 SURVEYED	
2	3,224,468.96	13,829,647.11	27.56	13-B02 SURVEYED	
3	3,224,781.02	13,829,832.05	27.42	13-B03 SURVEYED	3,224,655.30 13,829,970.20 Via Exxon Mobil
4	3,225,085.04	13,829,951.90	28.02	13-B04 SURVEYED	
5	3,224,798.15	13,830,185.96	26.71	13-B05 SURVEYED	
6	3,225,137.02	13,830,319.06	27.97	13-B06 SURVEYED	3,225,009.40 13,830,410.30 Via Exxon Mobil
7	3,225,402.24	13,830,377.84	27.40	13-B07 SURVEYED	
8	3,225,137.84	13,830,656.99	27.34	13-B08 SURVEYED	
9	3,225,431.15	13,830,710.11	28.02	13-B09 SURVEYED	3,225,494.19 13,830,624.52 Via Exxon Mobil
10	3,225,763.04	13,830,892.08	27.75	13-B10 SURVEYED	
11	3,225,389.99	13,831,061.05	26.37	13-B11 SURVEYED	
12	3,225,579.86	13,831,378.86	26.12	13-B12 SURVEYED	3,225,508.40 13,831,329.60 Via QRI
13	3,225,136.04	13,831,406.95	26.39	13-B13 SURVEYED	
14	3,225,382.99	13,831,732.99	28.30	13-B14 SURVEYED	3,225,326.00 13,831,726.80 Via QRI
15	3,225,027.98	13,831,671.05	27.36	13-B15 SURVEYED	
16	3,224,743.97	13,831,628.99	25.72	13-B16 SURVEYED	
17	3,224,619.87	13,832,095.98	27.15	13-B17 SURVEYED	
18	3,224,819.95	13,832,313.05	29.49	13-B18 SURVEYED	
19	3,225,218.97	13,832,197.96	29.61	13-B19 SURVEYED	
20	3,225,789.02	13,832,191.02	24.98	13-B20 SURVEYED	Removed from Contract
21	3,225,424.06	13,832,424.86	25.99	13-B21 SURVEYED	Removed from Contract
22	3,225,960.93	13,832,420.96	23.86	13-B22 SURVEYED	Removed from Contract
23	3,226,409.90	13,832,382.04	22.95	13-B23 SURVEYED	3,226,407.90 13,832,440.70 Via QRI
24	3,226,641.04	13,832,554.90	23.17	13-B24 SURVEYED	
25	3,226,468.10	13,832,757.96	23.39	13-B25 SURVEYED	
26	3,226,192.06	13,832,587.05	23.82	13-B26 SURVEYED	
27	3,225,917.94	13,832,796.84	24.65	13-B27 SURVEYED	
28	3,225,689.17	13,832,584.94	24.74	13-B28 SURVEYED	
29	3,225,406.03	13,832,775.88	26.23	13-B29 SURVEYED	
30	3,225,210.96	13,832,605.92	27.31	13-B30 SURVEYED	
31	3,224,956.08	13,832,789.07	30.03	13-B31 SURVEYED	
32	3,224,892.10	13,832,575.99	29.78	13-B32 SURVEYED	
33	3,224,600.87	13,832,572.04	30.06	13-B33 SURVEYED	
34	3,228,153.92	13,827,285.05	25.73	13-P01 SURVEYED	
35	3,225,272.89	13,827,557.13	24.82	13-P02 SURVEYED	
36	3,224,485.02	13,828,683.79	23.82	13-P03 SURVEYED	
37	3,224,458.15	13,829,880.09	24.00	13-P04 SURVEYED	
38	3,225,186.78	13,830,885.15	27.81	13-P05 SURVEYED	

PROJECT BENCHMARK:

HARRIS COUNTY FLOODPLAIN REFERENCE MARK NUMBER 070020, BRASS DISC IN THE WEST END OF THE NORTH HEADWALL PARK ROAD 1836 APPROXIMATELY 845 FEET SOUTHEAST OF HIGHWAY 134

ELEV. 3.68 FEET, NAVD 1988, 2001 ADJUSTMENT.

THE MONUMENT IS CONSTRAINED TO THE NGS PUBLISHED ELEVATION FOR THE NORTHEAST 2250 CORPS ARP ADJUSTED BY NGS IN 2001 AND AS PUBLISHED IN PID AJ6430 EPOCH DATE 1997.00

RYAN 2006 CORPS OF ENGINEERS MONUMENT BRASS DISC IN CONCRETE LOCATED AT THE NORTHEWEST CORNER OF PEGGY LAKE PLACEMENT AREA.

ELEV. 4.34, NAVD 88

NOTES:

1. THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID CORRDINATES (NAD 83), AS DERIVED FROM GPS OBSERVATIONS.

   GPS OBSERVATIONS ARE BASED ON THE SMARTNET SYSTEM OPERATED BY LEICA GEOSYSTEMS UTILIZING SPIDERNET SOFTWARE TO OBTAIN CENTIMETER ACCURACIES. MEASURMENTS WERE MADE UTILIZING LEICA VIVA GS15 AND GS12 RECEIVERS.

2. ALL BORING LOCATIONS ARE AS NOTED IN THE TABLE ABOVE.

3. SMARTNET ADJUSTED STATION COORDINATES ARE TIED TO NAD83 (NA2011) DATUM AS DEFINED BY THE NGS CORS DATASHEETS OF THOSE STATIONS HELD FIXED IN THE ADJUSTMENT. FULLY CONSTRAINED ADJUSTED COORDINATES ARE REPORTED TO BE ACCURATE TO ABOUT +/-0.5 CM IN HORIZONTAL AND +/- 1. 5 CM IN VERTICAL AT 95% CONFIDENCE (2-SIGMA) LEVEL.

4. BORE HOLES WERE ADJUSTED IN THE FIELD BY ORI STAFF AND SURVEYED IN THAT LOCATION COORDINATES FOR THAT LOCATION ARE AS SHOWN IN THE TABLE ABOVE.

I, KEVEIN DREW MCRAE, A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFY THAT THIS SURVEY WAS PERFORMED ON THE GROUND BY ME OR UNDER MY SUPERVISION ON THIS THE 19TH DAY OF NOVEMBER, 2013.

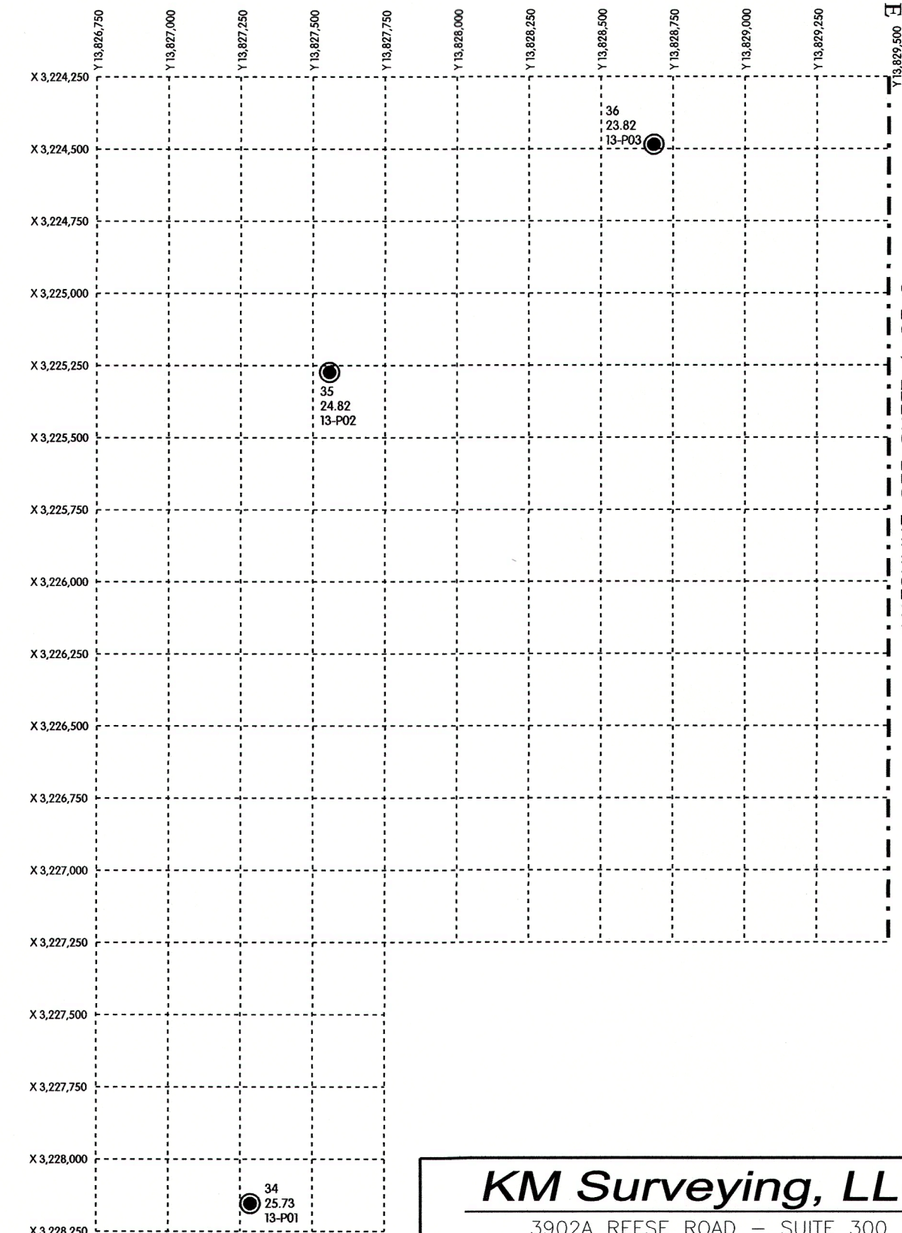
KEVIN DREW McRAE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5485

STATE OF TEXAS REGISTERED KEVIN DREW McRAE 5485 PROFESSIONAL LAND SURVEYOR

PLAN

0 500 1000 1500

SCALE IN FEET



DRAWN BY: CTC | CHECKED BY: KDM

KM Surveying, LLC
3902A REESE ROAD – SUITE 300
ROSENBERG, TEXAS 77471
713-234-6627
www.kmsurveying.com

U.S. Army Corps of Engineers
Galveston District

TIME:2:56:39 PM
DATE:1/19/2014
BY:$USER$

Rev.	Description	Date	By

Date: X
Drawn by: X
Designed by: X
Checked by: X
Submitted by: DAVID A. BROWN, P.E. - Chief, Engineering Division
Approved by: PETE G. PEREZ, P.E. - Deputy Chief, Engineering and Construction Division
Scale: AS SHOWN
Approval Recommended: ROBERT SCHNELL, P.E. - Chief, Engineering Branch
Rev. X

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GALVESTON, TEXAS

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CHRISTOPHER W. SALLESE, Col., C.E.,
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