

APPENDIX H: BORING LOGS

The complete geotechnical report can be found on our FTP site:

<ftp://ftp.coastal.la.gov/BA-68%20Grand%20Liard%20Marsh%20and%20Ridge%20Restoration/Plans%20and%20Specifications/Appendicies/Appendix%20H%20-%20Boring%20Logs/>

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS <small>(LITTLE OR NO FINES)</small>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SW	WELL-GRADED SANDS, GRAVELLY SANDS
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SM	SILTY SANDS, SAND - SILT MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50	SILTS AND CLAYS		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
		SILTS AND CLAYS		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		SILTS AND CLAYS		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50	SILTS AND CLAYS		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
		SILTS AND CLAYS		CH	INORGANIC CLAYS OF HIGH PLASTICITY
		SILTS AND CLAYS		OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod



Measured groundwater level in exploration, well, or piezometer



Groundwater observed at time of exploration



Perched water observed at time of exploration

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

- %F Percent fines
- AL Atterberg limits
- CA Chemical analysis
- CP Laboratory compaction test
- CS Consolidation test
- DS Direct shear
- HA Hydrometer analysis
- MC Moisture content
- MD Moisture content and dry density
- OC Organic content
- PM Permeability or hydraulic conductivity
- PP Pocket penetrometer
- SA Sieve analysis
- TX Triaxial compression
- UC Unconfined compression
- VS Vane shear

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

Start Drilled	8/10/2010	End	8/10/2010	Total Depth (ft)	35.5	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	4.9			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment		Marsh Buggy			
Latitude	N29° 18' 18.90"			System Datum	Geographic NAVD88			Groundwater		Date Measured		Depth to Water (ft)	Elevation (ft)
Longitude	W89° 28' 38.17"			Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5																		
5.56																		
6.11																		
6.67																		
7.22																		
7.78																		
8.33																		
8.89																		
9.44																		
10.00																		
10.56																		
11.11																		
11.67																		
12.22																		
12.78																		
13.33																		
13.89																		
14.44																		
15.00																		
15.56																		
16.11																		
16.67																		
17.22																		
17.78																		
18.33																		
18.89																		
19.44																		
20.00																		
20.56																		
21.11																		
21.67																		
22.22																		
22.78																		
23.33																		
23.89																		
24.44																		
25.00																		
25.56																		
26.11																		
26.67																		
27.22																		
27.78																		
28.33																		
28.89																		
29.44																		
30.00																		
30.56																		
31.11																		
31.67																		
32.22																		
32.78																		
33.33																		
33.89																		
34.44																		
35.00																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-1



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B2
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 11/5/11 Path: P:\16715\16715\16715\LOGS\GP_L_DBT\template\LD\template\GEOENGINEERS\GDT\GEIB_GEO TECH_LLAB

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\161715018\GINT1\671501800_LOGS.GPJ_DBT\template\LbT\template.GEOENGINEERS.GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35																	
36																	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-1 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Start Drilled	8/17/2010	End	8/17/2010	Total Depth (ft)	35	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	4.0			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment		Marsh Buggy			
Latitude	N29° 17' 43.25"			System Datum	Geographic NAVD88			Groundwater		Date Measured		Depth to Water (ft)	Elevation (ft)
Longitude	W89° 28' 19.04"			Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5																		
5																		
5																		
10		16																
10		9																
15		15																
15		10																
15		13																
20		10																
20		7																
20		16																
25		9																
25		17																
25		2																
30		10																
30		7																
35																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-2



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B3
 Sheet 1 of 1

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\LOGS\GP1_DBT\template\LD\template\GEOENGINEERS\GDT\GEIB_GEO TECH_LLAB

Start Drilled 8/17/2010	End 8/17/2010	Total Depth (ft) 36	Logged By Checked By DAS VT	Driller Specialized Environmental Resources, LLC	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 4.9	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Marsh Buggy			
Latitude Longitude N29° 16' 56.53" W89° 28' 07.76"	System Datum Geographic NAVD88	Groundwater Date Measured _____ Depth to Water (ft) _____ Elevation (ft) _____			
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5																		
6																		
10		18																
18																		
15		17																
15		8																
13.5																		
20		13																
16																		
21																		
25		16																
22																		
30																		
17																		
15																		
17																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-3



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B4
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\BGIN\1671501800_LOGS.GPJ_DBT\template\GEOENGINEERS\GDT\GEI_B_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35						◇											
35						◇											

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-3 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Start Drilled	8/10/2010	End	8/10/2010	Total Depth (ft)	65.5	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	6.9			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment		Marsh Buggy			
Latitude	N29° 18' 32.19"			System Datum	Geographic NAVD88			Groundwater		Date Measured		Depth to Water (ft)	Elevation (ft)
Longitude	W89° 28' 39.09"			Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Min/Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5		2.5			1		CH	Mudline @ El. +1.4 feet Gray clay with silt	44					60	36	0.09	74	
10		4			2			Very soft gray clay with organic matter	54							0.07		
15		10			3			Very soft gray clay with organic matter and 3" silt traces (organic content = 8.4%)	56	73	0.23	0.58	15	66	40	0.14		
20		8.5			4		CL	Very soft gray slightly silty clay with organic matter and 3/4" and 1/2" silt layers (organic content = 6.2%)	76					45	21			
25		15			5		CH	Very soft gray clay with 2" sand layer (organic content = 11.5%)	65	61.1	0.18	0.81	14	81	50			
30		2			6		SM	Gray silty fine sand with clay traces (FVS* = 0.144 KSF @ 15.5')									27	
35		9			7			Gray silty fine sand with clay traces									31	
40		11			8			Gray silty fine sand with clay traces									38	
45								No sample recovered										
50		17			9		SM	Gray silty fine sand with 1" clay layer								0.09	36	
55		21.5			10			Gray silty fine sand with 9" clay layer (FVS* = 0.057 KSF @ 25.5')							0.18	40		
60		23			11		CH	Very soft gray clay with sand streaks and 10" sand layer	46	69	0.09		15	73	46			
65		15			12		ML	Gray sandy silt with clay traces									52	
70		14			13		SP	Gray sand with two 1" clay layer and traces	37									
75		5			14			Gray sand with 2" clay layer	61						0.19			

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-4



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B5
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\LOGS.GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEIGR_GEO TECH_LLAB

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA										
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name		Water Level	Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35	20				15		CH	Soft gray clay with sand streaks and 3" sand layer (specific gravity = 2.64)	59					71	45		
36	16				16		CL	Soft gray slightly sandy clay with 4" sand layer and streaks	32					45	24		81
40	17				17			Very soft gray silty clay with sand pockets and 3" sand layer	64	61.7	0.16		15				90
35	19				18			Very soft gray very sandy clay with 5" sand layer	37	86.4	0.23	2.42	15	34	14		
45	14				19		ML	Gray sandy silt with clay streaks									61
40	20				20		CH	Soft gray clay with fine sand and silt streaks	49	68.8	0.43		11				
	18				21			Soft gray clay with sand streaks and lenses	41					67	41		94
50	20				22		SM	Gray silty fine sand with clay streaks								0.21	25
45	5				23		CH	Soft gray clay	63					62	35	0.17	
55	8				24		SM	Gray silty fine sand with clay and shell traces	65								22
50	21				25		CH	Soft gray clay with fine sand streaks	64	61.4	0.41		13	87	56	0.39	
	19				26			Soft gray clay with sand streaks and pockets	63	60.6	0.15		2	99	62	0.36	
60	22				27			Gray clay with silt and sand streaks	56					80	51		
55	16				28			Very soft gray clay with 1" sand layer and pockets	46	68.3	0.16		15				
65	21				29			Medium gray clay with sand pockets and streaks	58								

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-4 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B5
 Sheet 2 of 2

Start Drilled	8/14/2010	End	8/14/2010	Total Depth (ft)	65	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	6.8			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment		Marsh Buggy			
Latitude	N29° 17' 30.50"			System Datum	Geographic NAVD88			Groundwater		Date Measured		Depth to Water (ft)	Elevation (ft)
Longitude	W89° 28' 12.55"			Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA											
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %	
0																			
5	7						OH	Mudline @ El. +1.8 feet	106	40				129	91	0.1			
6	4						OH	Very soft gray organic clay with organic matter (specific gravity = 2.50) (organic content = 11.3%)	94					137	98				
10	10						OH	Gray organic clay (organic content = 13.3%)	82	55.2	0.06	0.58	15	91	61	0.1			
15	8						CL	Very soft gray slightly organic clay (FVS* = 0.027 KSF @ 10')	36	72.5	0.08	0.69	15	47	25				
20	10						CL	Very soft gray silty clay	43	78.2	0.13	0.81	15						
25	10						CL	Very soft gray silty clay with 4" sandy silt layer	41	73.4	0.10	0.92	15	41	21				
30	7						ML	Gray sandy silt with organic matter (FVS* = 0.057 KSF @ 18')	37	81.5	0.55	1.04	13					53	
35	5						ML	Gray sandy silt with clay streaks	40										54
40	13						ML	Gray sandy silt with clay streaks and organic matter	41	77.7	0.38	1.27	15						
45	8						ML	Gray sandy silt with clay streaks	50	74.5	0.08	1.38	15						52
50	16						ML	Gray sandy silt with 6" clay layer at top	77										
55	14						ML	Gray sandy silt with clay traces	40	85.2	0.47	1.61	15	24	2				78
60	9.5						CL-ML	Gray clayey silt	40										92
65	11						CH	Very soft gray clay	66	56.1	0.08	1.84	14	81	57	0.13			
70	9.5						ML	Firm gray sandy silt with 4" clay layer	37	76.5	0.13	1.90	15						55

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-5



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B6
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\INT\1671501800_LOGS.GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEI\GEO TECH_LAB

Elevation (feet)	Depth (feet)	FIELD DATA					Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level			Graphic Log	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)
35		9			16		CH	Very soft gray clay with sand streaks	62					82	55	0.18	
30		5			17			Gray clay with sand pockets	59							0.2	
		9			18			Soft gray clay	50	65.9	0.20	2.30	15			0.34	
40		4			19			Gray clay	57							0.23	
		8			20			Very soft gray clay	62	62.5	0.13	2.53	13			0.2	
45		10.5			21			Soft gray clay	70							0.27	
40		14			22			Soft gray clay with fine sandy silt lenses and streaks	49	68.4	0.41		6			0.32	
		12			23			Soft gray clay with 2" clayey sand layer at bottom and sand pockets	55	64.7	0.17		11			0.24	
45		8			24			Soft gray clay	70								
					25			No sample recovered									
55		11			26		CH	Soft gray clay with 2½" fine sand layer	70	63.1	0.13		15				99
50		16			27			Soft gray clay with silt streaks and lenses	68							0.47	
		12			28			Soft gray clay with silt lenses	60	64.7	0.23		15				
60		17			29			Soft gray clay with silt traces	60	64.4	0.17		15				
55		6			30			Soft gray clay with silt streaks	63								
65																	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-5 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B6
 Sheet 2 of 2

Start Drilled	8/16/2010	End	8/16/2010	Total Depth (ft)	65	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	7.0			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment		Marsh Buggy			
Latitude	N29° 16' 46.16"			System Datum	Geographic NAVD88			Groundwater		Date Measured		Depth to Water (ft)	Elevation (ft)
Longitude	W89° 28' 02.83"			Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.									

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA											
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %	
0																			
5																			
6																			
10		11						CH	109	42.5				93	58	0.12			
13								ML	36	80.7	0.66	0.69	15					73	
15		5							27										86
15		12							31	91	0.39	0.92	14						84
20		11							32										98
20		11							35	86.9	0.16	1.15	15				0.12		67
25		11						SC	70										41
25		11						CH	77	56.5	0.13	1.38	15	98	68				
25		23							89					85	55				
30		19							88	54.2	0.11	1.61	14						
30		14						ML	31	87.8	0.26		10						88
35		12						SM	25	92.2	0.93	1.84	6						18
35		19							26										30

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-6



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B7
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\BGIN\1671501800_LOGS.GPJ_DB\template\LD\template\GEOENGINEERS\GDT\GEIB_GEO TECH_LAB

Elevation (feet)	FIELD DATA						LABORATORY DATA											
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		10.5			16			CH	Soft gray clay with sand streaks and 1" fine sand layer	40	73.3	0.18		15	68	46	0.35	
30		18			17				Soft gray clay with sand streaks and 5" sand layer	60					70	41	0.3	
		16			18				Very soft gray clay with silt streaks	51								
40		20			19				Very soft gray clay with sand streaks	52	69.3	0.15		15			0.17	
		21			20				Very soft gray clay with sand streaks	43								
45		20			21				Very soft gray clay with sand streaks and 3" sand layer at top and 2" sand layer at bottom	36	79.1	0.10		14				
40		18			22				Soft gray clay with sand streaks	47								
		21			23			CL	Soft gray slightly sandy clay with 3" sandy silt layer	29	92.5	0.36		15				90
50		5			24			SM	Firm gray silty sand	26								
45		18			25			CL	Medium gray sandy clay with 3" clayey sand layer	26	94.3	0.58		14				63
55		18			26			ML	Firm gray sandy silt with 6" clay layer	24								
50		14			27			CL	Soft gray sandy clay with fine sand streaks and 4½" sandy silt layer	32								59
		11			28				Soft gray slightly sandy clay with 3" silt layer	47							0.27	
60		9			29			CH	Soft gray clay with sand streaks	43	76.1	0.23		15			0.37	
55		21			30				Soft gray clay with sand streaks	52							0.43	
65																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-6 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B7
 Sheet 2 of 2

Start Drilled 8/14/2010	End 8/14/2010	Total Depth (ft) 46.5	Logged By Checked By DAS VT	Driller Specialized Environmental Resources, LLC	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum	7.6	Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment	Marsh Buggy
Latitude Longitude	N29° 18' 22.81" W89° 28' 25.89"	System Datum	Geographic NAVD88	Groundwater Date Measured	Depth to Water (ft) Elevation (ft)
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
0								Zero (0) feet top of marsh buggy deck										
5								Mudline @ El. +1.06 feet										
5								Dark gray organic clay (organic content = 11.1%)	164					129	89			
10								Dark gray organic clay	206									
10		17						Very soft dark gray peat (FVS* = 0.021 KSF @ 11.5') (organic content = 16%)	302	19.8	0.04	0.63	14	320	192	0.12		
15		18						Very soft dark gray peat (specific gravity = 2.08) (organic content = 43%)	429	12.8				288	192			
15		7						Gray sandy silt with organic matter	29					24	2			83
20		2						Gray silt with clay	26									
20		10						Gray sandy silt with 3" sand layer	28	87.9	0.23	1.12	15					73
25		10						Very soft gray clay with 3" silt pockets (FVS* = 0.058 KSF @ 21.5')	27	78	0.11	1.24	13	88	56	0.15		
25		12						Very soft gray clay with sand streaks	37	70.3	0.12	1.35	15	85	52	0.19		
30		13						Very soft gray clay with silt streaks and trace organics	89	49.7	0.14	1.47	15			0.16		
30		7						Gray clay with trace organics	78							0.05		
35		13						Soft gray clay with 4" sandy silt layer and trace organics	74	54	0.09	1.70	15	98	62			
35		8						Gray silt with 3" sandy silt layer	29									65
35		11						Gray sandy silt	26									60
35		16						Gray sandy silt with organic matter	42									59

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-7



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B8
 Sheet 1 of 2

Elevation (feet)	FIELD DATA						LABORATORY DATA											
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35																		
32		6.5			16				Gray sandy silt with 1" clay layer	49								62
		10			17		◇	SM	Gray silty fine sand with clay streaks	40	74.3	0.11	2.30	2				48
40		13			18		◇	CH	Soft gray clay with silt traces and streaks	63								
35		15			19		▨		Very soft gray clay with sand streaks	52	68	0.10		15	80	54	0.2	
45		16			20		▨		Very soft gray clay with silt streaks	52								0.23

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-7 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\GINT1\671501800_LOGS.GPJ_DBT\template\LD\template.GEOENGINEERS.GDT\GEIB_GEOTECH_LAB

Start Drilled	8/15/2010	End	8/15/2010	Total Depth (ft)	47	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	4.3			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment	Marsh Buggy				
Latitude	N29° 17' 23.49"			System Datum	Geographic NAVD88			Groundwater					
Longitude	W89° 27' 58.30"							Date Measured	Depth to Water (ft)		Elevation (ft)		
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.													

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)
0								Zero (0) feet top of marsh buggy deck									
5								Mudline @ El. -2.74 feet									
								Gray peat (organic content = 12.8%)	385					153	115		
								Gray peat	536								
								Gray peat	115					158	120	0.06	
								Gray silt with organic matter and 1" clay layer and fine sand traces (FVS* = 0.047KSF @ 14')	55	64.6	0.14	0.81	15				93
								Gray silt with clay traces	32								
								Gray sandy silt	30								76
								Gray silty sand	37	84.7	0.40	1.15	15				30
								Gray silty sand with organic matter	24								
								Very soft gray silty clay (organic content = 7.0%) (specific gravity = 2.62)	47	80.2				40	19	0.07	
								Very soft gray clay	67	60.2	0.44	1.50	2	78	46	0.22	
								Very soft gray clay with silt streaks and shell (FVS* = 0.101 KSF @ 27')	75								97
								Very soft gray clay with silt streaks and trace organics	70	59.2	0.10	1.73	15			0.13	
								Gray clay								0.12	
								Very soft gray clay with organic matter and trace silt	71	57.9	0.18	1.96	15			0.11	100

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-8



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B9
 Sheet 1 of 2

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\LOGS\GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEI_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35	21				15			Very soft gray clay with trace organics	74								0.15
	18.5							Very soft gray clay with trace organics	71	58.9	0.06		15				0.19
35	23							Very soft gray clay with trace organics	83								0.16
40	18.5							Very soft gray clay with trace organics	83	54	0.03		15	85	53		0.21
	23							Very soft gray clay with trace organics	87								
40	10							Soft gray clay with trace organics	77	57.8	0.10		15				0.27

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-8 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\GINT1\671501800_LOGS.GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Start Drilled	8/16/2010	End	8/16/2010	Total Depth (ft)	47	Logged By	DAS	Checked By	VT	Driller	Specialized Environmental Resources, LLC	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	6.1			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment	Marsh Buggy				
Latitude	N29° 16' 44.59"			System Datum	Geographic NAVD88			Groundwater					
Longitude	W89° 27' 56.26"							Date Measured	Depth to Water (ft)	Elevation (ft)			
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.													

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA									
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)
0							Zero (0) feet top of marsh buggy deck										
5							Mudline @ El. -0.9 feet										
							Gray organic clay (organic content 33.1%)	122									
							Gray organic clay	109									
							Gray organic clay (auger cuttings) (FVS* = 0.022 KSF @ 12')									0.05	
							Gray silt with sand and clay traces and organic matter	71								0.06	90
							Gray silt with fine sand and clay traces	29	89.5	0.37	0.92	8					88
							Gray silt with fine sand and clay traces	31	86	0.67	1.04	15					87
							Gray silt with fine sand and clay traces	33									88
							Gray silt with fine sand and 2" clay layer (FVS* = 0.124 KSF @ 22')	34	87.8	0.17	1.27	15			0.1		86
							Very soft gray clay with organic matter (specific gravity = 2.55) (organic content = 11.2%)	96	46.7				80	53	0.13		
							Very soft gray clay with silt traces and organic matter	89	46.5	0.12	1.50	15			0.14		98
							Very soft gray clay with trace silt	85							0.17		99
							Gray silty fine sand	27									31
							Very soft gray clay with 8" sandy silt layer	87	48.6	0.12	1.84	15					
							Very soft gray clay with 7" sandy silt layer	56	62.6	0.11	1.96	15					

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-9



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B10
 Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA					Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level			Graphic Log	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35	9			15		◇	SM	Gray silty fine sand	24								38
36	7			16		◇	SP	Gray fine sand with silt traces	27								10
37	12			17		◇		Gray fine sand with silt and clay traces	32	87.8	2.30	2.30	15				24
38	7			18		◇		Gray fine sand with silt traces	26								9
39	22			19		◇		Gray fine sand with silt pockets and clay layer	39	82.5	0.56	2.53	15			0.1	32
40	21			20		◇		Gray silty fine sand with 6" clay layer	34							0.22	

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-9 (continued)




Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Baton Rouge, Louisiana: Date: 1/5/11 Path: P:\16715\16715018\GINT1\671501800_LOGS.GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Start Drilled 8/16/2010	End 8/16/2010	Total Depth (ft) 46	Logged By Checked By DAS VT	Driller Specialized Environmental Resources, LLC	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 5.9		Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Marsh Buggy	
Latitude Longitude N29° 16' 14.25" W89° 27' 58.11"		System Datum Geographic NAVD88		Groundwater Date Measured Depth to Water (ft) Elevation (ft)	
Notes: See Figure I-B1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	MiniVane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5																		

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-10		
	Project: Grand Liard Marsh and Ridge Restoration (BA-68)	Figure I-B11
	Project Location: Plaquemines Parish, Louisiana	Sheet 1 of 2
	Project Number: 16715-018-00	

Baton Rouge, Louisiana: Date: 11/5/11 Path: P:\16715\16715018\IN11671501800_LOGS.GPJ_DBT\template\LD\template\GEOENGINEERS\GDT\GEIB_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35					16													
		11			17		CH	Very soft gray clay	68	60.5	0.16	2.25	14			0.16		
		15			18			Very soft gray clay	68					75	43	0.17		
		14			19			Very soft gray clay	66	61.2	0.21	2.48	15			0.18		
		15			20			Very soft gray clay	56	65.3	0.18	2.59	15	70	39			

NOTE: When no PI available, field vane reading corrected as 1.0 times field reading for CL/ML/SM, 0.75 for CH and 0.65 for OH with moisture content less than 120%. For moisture content greater than 120%, reading corrected as 0.58 times field reading. *FVS - Shear strength from field vane test.

Log of Boring B-10 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68)
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-00

Figure I-B11
 Sheet 2 of 2



Coastal Planning & Engineering, Inc.
2481 N.W. Boca Raton Blvd.
Boca Raton, Florida 33431
Phone # 1-561-391-8102

Legend for Geotechnical Data

(SP), (SM), etc.

Refers to the Army Corps of Engineers Unified Soils Classification System. Class types are defined primarily by grain size, sorting and percent of material passing the 200 sieve. Classification of materials on the core logs based on visual field examinations are identified on the core logs under the Classification of Materials Description. Classifications based on laboratory sieve analyses are identified on the core logs in the Legend and under Remarks.

Grain Size Terms

Cobble – retained on the 3.0” sieve
Gravel – greater than the #4 sieve and less than the 3.0” sieve
 Coarse: greater than the ¾” sieve and less than the 3.0” sieve
 Fine – greater than the #4 sieve and less than the ¾” sieve
Sand - greater than the #200 sieve and less than the #4 sieve
 Coarse - greater than the #10 sieve and less than the #4 sieve
 Medium - greater than the #40 sieve and less than the #10 sieve
 Fine - greater than the #230 sieve and less than the #40 sieve
Fines – (silt or clay) passing the #230 sieve

Proportional definition of descriptive terms

<u>Descriptive Term</u>	<u>Range of Proportions</u>
Sandy, gravelly, etc.	35 % to 50 %
Some	20 % to 35 %
Little	10 % to 20 %
Trace	1 % to 10 %

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*



Coastal Planning & Engineering, Inc.

2481 N.W. Boca Raton Blvd.

Boca Raton, Florida 33431

Phone # 1-561-391-8102

Legend for Geotechnical Data

GW		Well graded gravels or gravel-sand mixtures, little or no fines	ML		Inorganic silts and very fine sands, rock flour, sandy silts or clayey silts with slight plasticity
GP		Poorly graded gravels or gravel-sand mixtures, w/ little or no fines	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soil, elastic silts
GM		Silty gravels, gravel-sand-silt mixtures	OL		Organic silts and organic silt-clays of low plasticity
GC		Clayey gravels, gravel-sand-clay mixtures	OH		Organic clays of medium to high plasticity, organic silts
SW		Well graded sands or gravelly sands, little or no fines	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
SP		Poorly graded sands or gravelly sands, little or no fines	CH		Inorganic clays of high plasticity, fat clays
SM		Silty sands, sand-silt mixtures	PT		Peat and other highly organic soils
SC		Clayey sands, sand-clay mixtures	SP-SM		Poorly-graded silty sand
SW-SM		Well-graded silty sand	SM-SC		Silty clayey sand
GW-GM		Well-graded silty gravel	ML-CL		Inorganic silty lean clay
GM-GC		Clayey silty gravel			

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*



Coastal Planning & Engineering, Inc.
2481 N.W. Boca Raton Blvd.
Boca Raton, Florida 33431
Phone # 1-561-391-8102

Legend for Geotechnical Data

The naming convention used by Coastal Planning and Engineering incorporates key information about the item in the title. The naming format uses the following information:


- **Abbreviated area name (two letters that will be used throughout the project)**
- **Abbreviated data type: jet probe (JP), vibrocore (VC) or surface sample (SS)**
- **Collection year (YY)**
- **Identification number**
- **Sample or composite identification in the case of jet probes or vibrocores. Composite samples are indicated by COMP following the identification number. COMP represents a composite developed to characterize beach compatible material.**






Format examples:

- A) **GLVC-10-07**
- B) **GLVC-10-13 S#1**


Example A is vibrocore number 07, collected in the Grand Liard area in the year 2010.







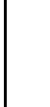
Example B refers to sample number 1 taken from vibrocore number 13, which was collected in the Grand Liard area in 2010.

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-01		LOCATION COORDINATES X = 3,874,865 Y = 246,486		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		12. TOTAL SAMPLES		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING STARTED COMPLETED 01-29-10 10:20 01-29-10 10:22
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -20.2 Ft.		17. TOTAL RECOVERY FOR BORING 14.5 Ft.
8. TOTAL DEPTH OF BORING 20.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-20.2	0.0					
-21.1	0.9		CLAY, very soft clay, olive gray (5Y-4/2), (CL).		1	Sample #1, Depth = 0.7' Ave. Field Vane (tsf): 0.01
			CLAY, trace shell hash, very soft clay, (1.0"x0.25") sandy pockets @ 4.2', 4.4', 5.0', 5.1' and 7.8', dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 4.4' Ave. Field Vane (tsf): 0.01
-28.3	8.1		CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to 1.0", (1.5"x1.0") silty pockets @ 10.2' and 10.4', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 9.5' Ave. Field Vane (tsf): 0.04
-31.0	10.8		Sandy SILT, trace clay, soft clay distributed in pockets up to 1.5", very dark gray (5Y-3/1), (ML).		4	Sample #4, Depth = 12.2' Mean (mm): 0.08, Phi Sorting: 0.31 Fines (230): 59.28% (ML)
-32.9	12.7		CLAY, very soft clay, sandy laminae @ 12.8', 12.9' and 13.1', bit sample from 14.0' to 14.5', very dark gray (5Y-3/1), (CL).		5	Sample #5, Depth = 13.3' Ave. Field Vane (tsf): 0.04
			No Recovery.			
-40.2	20.0		End of Boring			




LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-02				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,872,694 Y = 253,924		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -14.6 Ft.		STARTED 01-30-10 10:30
		17. TOTAL RECOVERY FOR BORING 11.8 Ft.		COMPLETED 01-30-10 10:31
		18. SIGNATURE AND TITLE OF INSPECTOR PB		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.6	0.0					
-17.6	3.0		CLAY, very soft clay, sandy lamina @ 0.3', 1.0" sandy pockets with trace shell hash @ 0.7', 1.1' and 1.6', dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 1.8' Ave. Field Vane (tsf): 0.01
-18.3	3.7		Silty SAND, fine grained, quartz, trace shell hash, 0.5" shell fragment @ 3.1', shell hash decreases with depth, dark gray (5Y-4/1), (ML).		2	Sample #2, Depth = 3.4' Mean (mm): 0.09, Phi Sorting: 0.33 Fines (230): 36.59% (ML) Sample #3, Depth = 4.6' Ave. Field Vane (tsf): 0.05
-19.6	5.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to (1.5"x1.0"), dark gray (2.5Y-4/1), (CL).		3	
			CLAY, trace shell hash, very soft clay, dark gray (2.5Y-4/1), (CL).		4	Sample #4, Depth = 7.0' Ave. Field Vane (tsf): 0.05
-25.1	10.5		Sandy SILT, trace clay, dark gray (5Y-4/1), (ML).		5	Sample #5, Depth = 10.7' Mean (mm): 0.08, Phi Sorting: 0.30 Fines (230): 73.63% (ML) Sample #6, Depth = 11.3' Ave. Field Vane (tsf): 0.08
-25.5	10.9		CLAY, very soft clay, dark gray (2.5Y-4/1), (CL).		6	
-26.4	11.8					
			No Recovery.			
-34.6	20.0					
			End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-02A		LOCATION COORDINATES X = 3,872,688 Y = 253,891		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		12. TOTAL SAMPLES		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING STARTED COMPLETED 01-30-10 11:20 01-30-10 11:24
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -14.6 Ft.		17. TOTAL RECOVERY FOR BORING 8.3 Ft.
8. TOTAL DEPTH OF BORING 20.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR PB		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.6	0.0					
			Jetted to 9.7'			
-24.3	9.7					
-25.3	10.7		CLAY, very soft clay, dark grayish brown (2.5Y-4/2), (CL).		1	Sample #1, Depth = 10.3' Ave. Field Vane (tsf): 0.09
			CLAY, very soft clay, (1.0"x3.0") sandy pockets @ 13.4' and 16.2', 0.5" light olive gray (5Y-6/2) clay pocket @ 14.6', (1.0"x1.5") sandy pockets @ 16.9' and 17.3', dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 15.0' Ave. Field Vane (tsf): 0.09
-32.3	17.7					
-32.6	18.0		Sandy CLAY, some silt, soft clay, bit sample from 17.7' to 18.0', dark gray (5Y-4/1), (SM-SC). No Recovery.			
-34.6	20.0					
			End of Boring			



LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-03		LOCATION COORDINATES X = 3,871,620 Y = 255,547		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		12. TOTAL SAMPLES		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		7. DEPTH DRILLED INTO ROCK 0.0 Ft.		14. ELEVATION GROUND WATER
8. TOTAL DEPTH OF BORING 20.0 Ft.		15. DATE BORING		15. DATE BORING STARTED 01-30-10 12:14 COMPLETED 01-30-10 12:16
		16. ELEVATION TOP OF BORING -14.0 Ft.		17. TOTAL RECOVERY FOR BORING 12.6 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.0	0.0					
-15.0	1.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.00
-17.0	3.0		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0" and laminae, 2.0" shell hash pocket @ 1.2', very dark grayish brown (2.5Y-3/2), (CL).		2	Sample #2, Depth = 2.5' Ave. Field Vane (tsf): 0.02 Sample #3, Depth = 3.3' Mean (mm): 0.13, Phi Sorting: 0.99 Fines (230): 31.81% (SC)
-17.6	3.6		Clayey SAND, trace shell hash, very dark gray (5Y-3/1), (SC).		3	
-18.4	4.4		CLAY, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (CL).		2	
-19.0	5.0		Clayey SAND, trace shell hash, very dark gray (5Y-3/1), (SC).		3	
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.5" and laminae, very dark grayish brown (2.5Y-3/2), (CL).		4	Sample #4, Depth = 6.8' Ave. Field Vane (tsf): 0.10
-26.6	12.6		No Recovery.			
-34.0	20.0		End of Boring			



LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-03A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,871,640 Y = 255,554		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -13.9 Ft.		STARTED 01-30-10 12:45
		17. TOTAL RECOVERY FOR BORING 6.7 Ft.		COMPLETED 01-30-10 12:46
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.9	0.0					
			Jetted to 10.0'.			
-23.9	10.0					
-29.5	15.6		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0" and laminae, 1.0" rock fragment @ 11.8', 0.5" organic pockets @ 14.6' and 14.9', 2.0" sandy pocket @ 15.4', very dark grayish brown (2.5Y-3/2), (CL).		VC-03 #4	
-30.6	16.7		Sandy CLAY, soft clay, sand distributed in pockets up to 1.0" and laminae, bit sample from 16.4' to 16.7', dark olive gray (5Y-3/2), (SC).			Sample #1, Depth = 16.0'
			No Recovery.			
-33.9	20.0		End of Boring			







LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-04				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,863,768 Y = 262,663		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -12.8 Ft.		STARTED 01-30-10 14:30
		17. TOTAL RECOVERY FOR BORING 7.3 Ft.		COMPLETED 01-30-10 14:32
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-12.8	0.0					
-17.9	5.1		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", color is mottled olive brown (2.5Y-4/3) and, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 2.5' Ave. Field Vane (tsf): 0.03
-19.5	6.7		Sandy CLAY, trace shell hash, soft clay, sand distributed in pockets up to 2.0", 0.5" organic pocket @ 6.4', very dark grayish brown (2.5Y-3/2), (SC).			
-20.1	7.3		CLAY, soft clay, (0.75"x0.25") rock fragment in bit sample, bit sample from 6.7' to 7.3', dark olive gray (5Y-3/2), (CL).			
			No Recovery.			
-32.8	20.0		End of Boring			








LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-05				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,858,757 Y = 262,459		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Brian McCord		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
				STARTED 01-30-10 15:46
				COMPLETED 01-30-10 15:48
		16. ELEVATION TOP OF BORING -16.5 Ft.		17. TOTAL RECOVERY FOR BORING 13.5 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR KD		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-16.5	0.0					
-17.4	0.9		CLAY, very soft clay, olive gray (5Y-4/2), (CL).		1	Sample #1, Depth = 0.6' Ave. Field Vane (tsf): 0.01
			CLAY, trace organics, trace shell hash, very soft clay, (1.0"x0.5") organic pocket @ 2.3', dark gray (5Y-4/1), (CL).		2	Sample #2, Depth = 3.8' Ave. Field Vane (tsf): 0.04
-22.2	5.7		CLAY, soft clay, trace very soft clay pockets up to 1.5", 1.0" light gray (5Y-7/1) clay pocket @ 6.2', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 5.9' Ave. Field Vane (tsf): 0.20
-23.0	6.5		SAND, fine grained, quartz, some clay, some silt, clay distributed in pockets up to 2.0" and laminae, olive gray (5Y-4/2), (SM-SC).		4	Sample #4, Depth = 8.8' Mean (mm): 0.09, Phi Sorting: 0.32 Fines (230): 29.65% (SM-SC)
-26.7	10.2		CLAY, trace sand, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 10.5' Ave. Field Vane (tsf): 0.12
-27.3	10.8		CLAY, very soft clay, trace soft clay distributed in laminae, 1.0" wood fragment @ 12.1', dark olive gray (5Y-3/2), (CL).		6	Sample #6, Depth = 12.2' Ave. Field Vane (tsf): 0.16
-30.0	13.5					
			No Recovery.			
-36.5	20.0					
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-05A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,858,770 Y = 262,500		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -16.5 Ft.		STARTED 01-31-10 09:00
		17. TOTAL RECOVERY FOR BORING 9.7 Ft.		COMPLETED 01-31-10 09:10
		18. SIGNATURE AND TITLE OF INSPECTOR KD		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-16.5	0.0					
			Jetted to 10.0'			
-26.5	10.0					
-27.7	11.2		CLAY, trace organics, very soft clay, dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 10.5' Ave. Field Vane (tsf): 0.02
-28.8	12.3		CLAY, some sand, very soft clay, 0.5" light gray (5Y-7/1) lithified clay pocket @ 11.3', very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 11.8' Ave. Field Vane (tsf): 0.10
-30.0	13.5		CLAY, some sand, soft clay, olive gray (5Y-4/2), (CL).		3	Sample #3, Depth = 12.8' Mean (mm): 0.10, Phi Sorting: 0.45 Fines (230): 75.31% (CL)
-31.2	14.7		SAND, fine grained, quartz, some silt, (2.0"x2.5") clay pocket @ 14.3', olive gray (5Y-4/2), (SM).		4	Sample #4, Depth = 13.9' Mean (mm): 0.09, Phi Sorting: 0.29 Fines (230): 30.51% (SM)
-32.8	16.3		CLAY, some sand, trace organics, soft clay, olive gray (5Y-4/2), (CL).		3	
-35.2	18.7		CLAY, little sand, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 17.8' Ave. Field Vane (tsf): 0.18
-36.2	19.7		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		6	Sample #6, Depth = 19.1' Ave. Field Vane (tsf): 0.10
-36.5	20.0		No Recovery.			
			End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10


DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana		9. SIZE AND TYPE OF BIT 3.0 In.		OF 1 SHEETS
2. BORING DESIGNATION GLVC-10-06		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		<input type="checkbox"/> DISTURBED <input type="checkbox"/> UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -17.0 Ft.		STARTED 01-31-10 09:26 COMPLETED 01-31-10 09:29
8. TOTAL DEPTH OF BORING 20.0 Ft.		17. TOTAL RECOVERY FOR BORING 17 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR BF




ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-17.0	0.0					
			CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 1.0", organics distributed in pockets up to 0.5", (1.0"x0.5") rock fragment @ 5.4', sand increases with depth, very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 3.1' Ave. Field Vane (tsf): 0.04
					2	Sample #2, Depth = 6.0' Ave. Field Vane (tsf): 0.06
-26.0	9.0					
-27.6	10.6		CLAY, little sand, trace shell hash, soft clay, very dark grayish brown (2.5Y-3/2), (CL).		3	Sample #3, Depth = 9.9' Mean (mm): 0.09, Phi Sorting: 0.38 Fines (230): 86.82% (CL)
					4	Sample #4, Depth = 10.8' Ave. Field Vane (tsf): 0.09
-30.0	13.0					
-31.0	14.0		CLAY, some sand, very soft clay, sand distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (SC).		5	Sample #5, Depth = 13.4' Ave. Field Vane (tsf): 0.02
					6	Sample #6, Depth = 15.0' Mean (mm): 0.11, Phi Sorting: 0.48 Fines (230): 43.45% (CL)
-34.0	17.0		Clayey SAND, fine grained, quartz, trace silt, clay distributed in pockets up to 1.0", bit sample from 16.6' to 17.0', very dark grayish brown (2.5Y-3/2), (CL).			
			No Recovery.			
-37.0	20.0					
			End of Boring			








LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-07				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,848,259 Y = 269,305		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
				STARTED 01-31-10 10:04
				COMPLETED 01-31-10 10:05
		16. ELEVATION TOP OF BORING -14.7 Ft.		17. TOTAL RECOVERY FOR BORING 14.3 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR		
				BF


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.7	0.0						
-15.9	1.2		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 0.5", 1.0" sand pocket @ 0.5", very dark grayish brown (2.5Y-3/2), (CL).		1	Sample #1, Depth = 0.9' Ave. Field Vane (tsf): 0.03	
-18.4	3.7		CLAY, little sand, trace organics, trace shell hash, very soft clay, sand distributed in pockets up to 0.5", organics distributed in laminae, very dark gray (2.5Y-3/1), (CL).		2	Sample #2, Depth = 2.6' Ave. Field Vane (tsf): 0.03	
			CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.25", organics distributed in laminae, very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 5.0' Ave. Field Vane (tsf): 0.04	
-23.7	9.0						
-24.3	9.6			CLAY, soft clay, 2.0" sand pocket @ 9.4', very dark gray (2.5Y-3/1), (CL).		4	Sample #4, Depth = 9.3' Ave. Field Vane (tsf): 0.19
				CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (CL).		5	Sample #5, Depth = 11.0' Ave. Field Vane (tsf): 0.05
-27.6	12.9						
-28.4	13.7		Clayey SAND, trace shell hash, trace silt, olive brown (2.5Y-4/3), (CL).		6	Sample #6, Depth = 13.4' Mean (mm): 0.09, Phi Sorting: 0.29 Fines (230): 45.30% (CL)	
-29.0	14.3		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (CL).		5		
			No Recovery.				
-34.7	20.0		End of Boring				

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-07A				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,848,211 Y = 269,338		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 21.9 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -14.7 Ft.		STARTED 01-31-10 10:40
		17. TOTAL RECOVERY FOR BORING 11.9 Ft.		COMPLETED 01-31-10 10:41
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.7	0.0					
			Jetted to 10.0'			
-24.7	10.0					
					1	Sample #1, Depth = 12.5' Ave. Field Vane (tsf): 0.03
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 0.5", (1.0"x0.5") shell fragment @ 13.5', 2.0" sandy pocket @ 16.6', 1.0" sand pocket @ 17.6', dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 15.5' Ave. Field Vane (tsf): 0.03
-32.5	17.8				3	Sample #3, Depth = 18.3' Mean (mm): 0.10, Phi Sorting: 1.22 Fines (230): 96.62% (ML-CL)
-33.2	18.5		SILT, some clay, trace sand, clay distributed in pockets up to 1.0", very dark gray (5Y-3/1), (ML-CL).		1	
-34.3	19.6		CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		4	Sample #4, Depth = 20.3' Mean (mm): 0.08, Phi Sorting: 0.27 Fines (230): 42.83% (ML-CL)
-36.0	21.3		SAND, fine grained, quartz, some clay, some silt, 1.0" clay pocket @ 20.5', very dark gray (5Y-3/1), (ML-CL).		5	Sample #5, Depth = 21.5' Ave. Field Vane (tsf): 0.04
-36.6	21.9		CLAY, little sand, very soft clay, sand distributed in pockets up to 0.25", bit sample from 21.6' to 21.9', dark gray (2.5Y-4/1), (CL).			
			End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-08				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,851,180 Y = 260,146		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -22.4 Ft.		STARTED 01-31-10 10:55
		17. TOTAL RECOVERY FOR BORING 18.7 Ft.		COMPLETED 01-31-10 10:56
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-22.4	0.0					
			CLAY, trace shell hash, very soft clay, 1.0" pocket of wood fragments @ 0.7', 0.25" whole shell @ 0.1', dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 2.3' Ave. Field Vane (tsf): 0.04
-27.0	4.6		CLAY, little sand, very soft clay, sand distributed in pockets up to 1.0", dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 5.4' Ave. Field Vane (tsf): 0.08
-29.4	7.0		Clayey SAND, fine grained, quartz, soft clay, dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 7.3' Mean (mm): 0.09, Phi Sorting: 0.36 Fines (230): 44.54% (CL)
-30.0	7.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		4	Sample #4, Depth = 8.0' Ave. Field Vane (tsf): 0.08
-31.6	9.2		CLAY, little sand, very soft clay, sand distributed in pockets up to 1.0", 1.0" pocket of gray (2.5Y-6/1) lithified clay @ 10.6', dark gray (2.5Y-4/1), (CL).		2	
-34.0	11.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		5	Sample #5, Depth = 13.2' Ave. Field Vane (tsf): 0.06
-39.2	16.8		CLAY, very soft clay, bit sample from 18.3' to 18.7', dark gray (2.5Y-4/1), (CL).		6	Sample #6, Depth = 17.5' Ave. Field Vane (tsf): 0.06
-41.1	18.7		No Recovery.			
-42.4	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-09		LOCATION COORDINATES X = 3,852,999 Y = 268,102		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		HORIZONTAL NAD 1983
4. NAME OF DRILLER Sean Kemnuir		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		VERTICAL NAVD 88
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
				STARTED 02-10-10 08:58
				COMPLETED 02-10-10 08:59
		16. ELEVATION TOP OF BORING -13.6 Ft.		17. TOTAL RECOVERY FOR BORING 10 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.6	0.0					
-13.8	0.2		CLAY, trace organics, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 0.1'
-14.8	1.2		CLAY, little organics, very soft clay, organics distributed in pockets up to 0.5", 0.5" wood fragment @ 0.7", dark olive gray (5Y-3/2), (CL).		2	Ave. Field Vane (tsf): 0.00 Sample #2, Depth = 1.0'
			CLAY, some organics, very soft clay, organics distributed in pockets typically up to 1.0", (2.0"x1.0") organic pocket @ 2.3', (3.0"x2.0") organic pocket @ 3.8', dark olive gray (5Y-3/2), (CL).		3	Ave. Field Vane (tsf): 0.03 Sample #3, Depth = 4.0'
-17.9	4.3		CLAY, trace organics, very soft clay, organics distributed in pockets typically up to 0.5", 1.0" organic pocket @ 4.3', dark olive gray (5Y-3/2), (CL).		4	Ave. Field Vane (tsf): 0.05 Sample #4, Depth = 5.4'
-20.2	6.6		Clayey SILT, very soft clay, very dark grayish brown (2.5Y-3/2), (ML-CL).		5	Ave. Field Vane (tsf): 0.07 Sample #5, Depth = 7.0'
-21.1	7.5		SAND, fine grained, quartz, some clay, (1.0"x2.0") clay pocket @ 7.6', (3.0"x0.5") clay pocket @ 7.8', very dark grayish brown (2.5Y-3/2), (SC).		6	Ave. Field Vane (tsf): 0.03 Sample #6, Depth = 9.0'
-23.6	10.0					Mean (mm): 0.12, Phi Sorting: 0.42 Fines (230): 32.32% (SC)
			No Recovery.			
-33.6	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-09A		LOCATION COORDINATES X = 3,852,984 Y = 268,152		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER Alpine Pneumatic Vibracore <input type="checkbox"/> MANUAL HAMMER
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		13. TOTAL NUMBER CORE BOXES
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL DEG. FROM VERTICAL BEARING <input type="checkbox"/> INCLINED		14. ELEVATION GROUND WATER		15. DATE BORING STARTED COMPLETED 02-10-10 09:54 02-10-10 09:57
6. THICKNESS OF OVERBURDEN 0.0 Ft.		16. ELEVATION TOP OF BORING -13.5 Ft.		17. TOTAL RECOVERY FOR BORING 10.8 Ft.
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD		
8. TOTAL DEPTH OF BORING 20.0 Ft.				


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.5	0.0		Jetted to 4.0'.			
-17.5	4.0					
-20.2	6.7		CLAY, very soft clay, 1.5" sandy pocket @ 4.1', dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 5.7' Ave. Field Vane (tsf): 0.05
-20.6	7.1		Sandy CLAY, very soft clay, 1.0" light gray (5Y-7/1) clay pocket @ 4.1', very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 6.8' Ave. Field Vane (tsf): 0.02
-21.4	7.9		Clayey SILT, dark olive gray (5Y-3/2), (ML-CL).		2	
-23.8	10.3		Sandy CLAY, very soft clay, very dark gray (5Y-3/1), (CL).		3	Sample #3, Depth = 9.4' Mean (mm): 0.09, Phi Sorting: 0.42
-24.3	10.8		CLAY, some sand, soft clay, 1.0" organic pocket @ 9.6', dark olive gray (5Y-3/2), (CL).		4	Fines (230): 69.91% (CL)
-25.2	11.7		Clayey SAND, fine grained, quartz, dark olive gray (5Y-3/2), (SC).		3	Sample #4, Depth = 10.6' Mean (mm): 0.11, Phi Sorting: 0.42
-25.8	12.3		CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).		2	Fines (230): 41.08% (SC)
-26.5	13.0		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		3	
-27.0	13.5		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		2	
-28.3	14.8		CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).		3	
			Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).			
			CLAY, some sand, soft clay, dark olive gray (5Y-3/2), (CL).			
			No Recovery.			
-33.5	20.0					
			End of Boring			

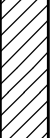



LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL_GDT_9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-10		LOCATION COORDINATES X = 3,853,230 Y = 266,978		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		7. DEPTH DRILLED INTO ROCK 0.0 Ft.		14. ELEVATION GROUND WATER
8. TOTAL DEPTH OF BORING 20.0 Ft.		15. DATE BORING		15. DATE BORING STARTED 02-10-10 10:11 COMPLETED 02-10-10 10:12
		16. ELEVATION TOP OF BORING -14.9 Ft.		17. TOTAL RECOVERY FOR BORING 15.6 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.9	0.0					
-15.8	0.9		CLAY, trace sand, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (CL).			
-19.1	4.2		CLAY, trace sand, trace shell hash, trace wood, very soft clay, wood fragments typically up to 0.5", sand distributed in pockets up to 1.0", 1.0" organic pocket @ 0.9', 1.0" wood fragment @ 1.2', dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 2.4' Ave. Field Vane (tsf): 0.07
-19.7	4.8		SILT, some clay, clay distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (ML-CL).		2	Sample #2, Depth = 4.5' Mean (mm): 0.09, Phi Sorting: 0.34 Fines (230): 70.99% (ML-CL)
			CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", (1.0"x0.5") whole shell @ 6.3', 1.0" sand pocket @ 9.2', sand increases with depth, dark gray (2.5Y-4/1), (CL).		3	Sample #3, Depth = 8.4' Ave. Field Vane (tsf): 0.05
-26.8	11.9					
-27.3	12.4		SAND, fine grained, quartz, some clay, some silt, very dark gray (2.5Y-3/1), (ML-CL).		4	Sample #4, Depth = 12.1' Mean (mm): 0.12, Phi Sorting: 0.39 Fines (230): 47.21% (ML-CL)
-28.1	13.2		CLAY, trace sand, soft clay, very dark gray (5Y-3/1), (CL).			
-29.9	15.0		CLAY, some sand, trace shell hash, soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 14.0' Mean (mm): 0.09, Phi Sorting: 0.60 Fines (230): 75.15% (CL)
-30.5	15.6		CLAY, trace sand, very soft clay, sand distributed in pockets up to 0.5", bit sample from 15.2' to 15.6', dark olive gray (5Y-3/2), (CL).			
			No Recovery.			
-34.9	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-10A		LOCATION COORDINATES X = 3,853,238 Y = 266,959		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		7. DEPTH DRILLED INTO ROCK 0.0 Ft.		14. ELEVATION GROUND WATER
8. TOTAL DEPTH OF BORING 20.0 Ft.		15. DATE BORING		15. DATE BORING STARTED 02-10-10 10:31 COMPLETED 02-10-10 10:33
		16. ELEVATION TOP OF BORING -14.9 Ft.		17. TOTAL RECOVERY FOR BORING 7.1 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.9	0.0					
			Jetted to 10.0'			
-24.9	10.0					
-27.9	13.0		CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", (2.0"x3.0") sand pocket @ 12.4', (1.0"x0.5") wood fragment @ 12.6', dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 11.1' Ave. Field Vane (tsf): 0.01
-28.6	13.7		Sandy SILT, very dark gray (2.5Y-3/1), (ML).		2	Sample #2, Depth = 13.4' Mean (mm): 0.10, Phi Sorting: 0.43 Fines (230): 52.91% (ML)
-29.0	14.1		CLAY, little sand, trace shell hash, soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (SC).			
-32.0	17.1		CLAY, trace sand, very soft clay, sand distributed in pockets up to 1.0", very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 14.2' Ave. Field Vane (tsf): 0.02
			No Recovery.			
-34.9	20.0		End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana		9. SIZE AND TYPE OF BIT 3.0 In.		OF 1 SHEETS
2. BORING DESIGNATION GLVC-10-11		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983		VERTICAL NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore		<input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		<input type="checkbox"/> DISTURBED <input type="checkbox"/> UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -13.5 Ft.		STARTED 02-10-10 11:05 COMPLETED 02-10-10 11:06
8. TOTAL DEPTH OF BORING 20.0 Ft.		17. TOTAL RECOVERY FOR BORING 15 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR BF




ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.5	0.0					
-13.8	0.3		CLAY, little sand, trace shell hash, very soft clay, very dark gray (2.5Y-3/1), (CL).		1	Sample #1, Depth = 0.2' Ave. Field Vane (tsf): 0.03
			CLAY, trace organics, very soft clay, organics distributed in pockets up to 1.0", dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 1.2' Ave. Field Vane (tsf): 0.02
-15.9	2.4		CLAY, little organics, very soft clay, organics distributed in pockets typically up to 1.0", 2 (2.0"x1.0") pockets of organics @ 3.2', very dark gray (2.5Y-3/1), (CL).		3	Sample #3, Depth = 3.0' Ave. Field Vane (tsf): 0.03
-17.5	4.0		CLAY, trace organics, very soft clay, organics distributed in pockets up to 0.5", 0.5" rock fragment @ 5.6', very dark gray (2.5Y-3/1), (CL).		4	Sample #4, Depth = 6.0' Ave. Field Vane (tsf): 0.03
-22.0	8.5		CLAY, some sand, very soft clay, very dark grayish brown (2.5Y-3/2), (SC).		5	Sample #5, Depth = 8.9' Ave. Field Vane (tsf): 0.05
-22.5	9.0		Sandy CLAY, very soft clay, sand distributed in pockets up to 3.0", (0.5"x1.0") rock fragment @ 9.6', very dark grayish brown (2.5Y-3/2), (SC).		6	Sample #6, Depth = 12.0' Ave. Field Vane (tsf): 0.05
-27.5	14.0		SILT, trace clay, trace sand, trace shell hash, clay distributed in pockets up to 1.0", 1.0" wood fragment @ 14.4', dark olive gray (5Y-3/2), (ML-CL).		7	Sample #7, Depth = 14.4' Mean (mm): 0.08, Phi Sorting: 0.35 Fines (230): 85.06% (ML-CL)
-28.3	14.8		SILT, some clay, trace shell hash, dark olive gray (5Y-3/2), (ML-CL).		8	Sample #8, Depth = 15.0' Mean (mm): 0.10, Phi Sorting: 0.78 Fines (230): 93.06% (ML-CL)
-28.5	15.0		No Recovery.			
-33.5	20.0		End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-12				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,854,618 Y = 267,714		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -13.5 Ft.		STARTED 02-10-10 11:10
		17. TOTAL RECOVERY FOR BORING 16.9 Ft.		COMPLETED 02-10-10 11:11
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.5	0.0					
-13.9	0.4		CLAY, very soft clay, dark olive brown (2.5Y-3/3), (CL).		1	Sample #1, Depth = 0.2'
-14.3	0.8				2	Ave. Field Vane (tsf): 0.02
-15.4	1.9		CLAY, some sand, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (SC).		3	Sample #2, Depth = 0.6'
			Clayey SILT, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		4	Ave. Field Vane (tsf): 0.05
-17.0	3.5		SILT, little clay, trace organics, trace shell hash, organics distributed in pockets up to 0.5", very dark gray (2.5Y-3/1), (ML-CL).		5	Sample #3, Depth = 1.5'
-17.6	4.1				6	Ave. Field Vane (tsf): 0.05
-18.4	4.9		CLAY, little organics, trace sand, very soft clay, sand distributed in pockets up to 0.5", (2.0"x0.5") wood fragment @ 3.6', dark olive gray (5Y-3/2), (CL).		3	Sample #4, Depth = 2.5'
			Clayey SILT, trace shell hash, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		7	Mean (mm): 0.09, Phi Sorting: 0.82
			CLAY, little organics, very soft clay, organics distributed in pockets up to 0.5" and laminae, (0.5"x0.25") rock fragment @ 6.9', 2.0" sandy pocket @ 8.0', very dark gray (5Y-3/1), (CL).		8	Fines (230): 93.30% (ML-CL)
-22.6	9.1				6	Sample #5, Depth = 3.9'
			Sandy CLAY, trace organics, very soft clay, very dark gray (2.5Y-3/1), (SC).		7	Ave. Field Vane (tsf): 0.02
-24.4	10.9				7	Sample #6, Depth = 7.5'
			Clayey SILT, trace shell hash, very soft clay, very dark grayish brown (2.5Y-3/2), (ML-CL).		8	Ave. Field Vane (tsf): 0.08
-27.5	14.0				8	Sample #7, Depth = 10.5'
			CLAY, some sand, soft clay, sand distributed in pockets up to 2.0", (1.0"x0.5") rock fragment @ 13.9', very dark grayish brown (2.5Y-3/2), (SC).			Ave. Field Vane (tsf): 0.01
-30.0	16.5					
-30.4	16.9		SAND, fine grained, quartz, little clay, very dark grayish brown (2.5Y-3/2), (SC).			
			No Recovery.			
-33.5	20.0					
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-13				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,854,137 Y = 266,949		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
				STARTED 02-10-10 11:32
				COMPLETED 02-10-10 11:33
		16. ELEVATION TOP OF BORING -14.7 Ft.		17. TOTAL RECOVERY FOR BORING 17.8 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-14.7	0.0						
-15.6	0.9		CLAY, trace shell hash, very soft clay, (1.0"x2.0") sand pocket @ 0.2', (2.0"x1.0") organic pocket @ 0.7', black (2.5Y-2.5/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.00	
			CLAY, trace organics, trace sand, trace shell hash, very soft clay, sand distributed in pockets typically up to 1.0", 3.0" sand pocket @ 1.1', organics distributed in pockets up to 0.5" and laminae, 0.25" rock fragment @ 3.4', (0.5"x1.0") wood fragment @ 7.5', 0.25" shell fragment @ 7.6', sand and organics increase with depth, very dark gray (2.5Y-3/1), (CL).		2	Sample #2, Depth = 3.0' Ave. Field Vane (tsf): 0.05	
-23.5	8.8			Sandy CLAY, very soft clay, very dark grayish brown (2.5Y-3/2), (SC).		3	Sample #3, Depth = 6.0' Ave. Field Vane (tsf): 0.05
-24.3	9.6			CLAY, very soft clay, (2.0"x1.0") rock fragment @ 10.7', very dark gray (2.5Y-3/1), (CL).		4	Sample #4, Depth = 9.0' Ave. Field Vane (tsf): 0.03
-24.9	10.2			Clayey SAND, fine grained, quartz, very dark grayish brown (2.5Y-3/2), (SC).		2	
-25.6	10.9			CLAY, little sand, very soft clay, sand distributed in pockets up to 2.0", (0.25"x0.5") wood fragment @ 12.6', very dark grayish brown (2.5Y-3/2), (CL).		5	Sample #5, Depth = 12.0' Ave. Field Vane (tsf): 0.03
-32.0	17.3		Sandy CLAY, very soft clay, 0.5" wood fragment @ 17.8', very dark grayish brown (2.5Y-3/2), (SC).		6	Sample #6, Depth = 15.0' Ave. Field Vane (tsf): 0.05	
-32.5	17.8		No Recovery.				
-34.7	20.0		End of Boring				




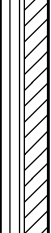






LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-14		LOCATION COORDINATES X = 3,855,103 Y = 267,103		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		12. TOTAL SAMPLES <input type="checkbox"/> DISTURBED <input type="checkbox"/> UNDISTURBED (UD)
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -14.0 Ft.		STARTED 02-10-10 12:09 COMPLETED 02-10-10 12:10
8. TOTAL DEPTH OF BORING 20.0 Ft.		17. TOTAL RECOVERY FOR BORING 15.3 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-14.0	0.0					
			CLAY, trace organics, trace sand, very soft clay, sand distributed in sandy pockets up to 0.5", very dark gray (5Y-3/1), (CL).		1	Sample #1, Depth = 3.2' Ave. Field Vane (tsf): 0.05
					2	Sample #2, Depth = 6.2' Ave. Field Vane (tsf): 0.08
-23.5	9.5		Clayey SILT, very soft clay, 0.5" pocket of lithified light gray (5Y-7/1) clay @ 12.7', very dark gray (5Y-3/1), (ML-CL).		3	Sample #3, Depth = 12.2' Ave. Field Vane (tsf): 0.03
-29.3	15.3					
			No Recovery.			
-34.0	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-15				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,855,919 Y = 266,837		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -13.9 Ft.		STARTED 02-10-10 12:28
		17. TOTAL RECOVERY FOR BORING 17 Ft.		COMPLETED 02-10-10 12:30
		18. SIGNATURE AND TITLE OF INSPECTOR KD		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-13.9	0.0					
-16.9	3.0		CLAY, trace shell hash, very soft clay, color is mottled olive gray (5Y-4/2) and, black (5Y-2.5/1), (CL).		1	Sample #1, Depth = 2.0' Ave. Field Vane (tsf): 0.02
-18.1	4.2		Sandy CLAY, trace shell hash, soft clay, dark olive gray (5Y-3/2), (CL).			
-19.3	5.4		CLAY, very soft clay, 2.5" sandy pocket @ 5.0', color is mottled olive gray (5Y-4/2) and, black (5Y-2.5/1), (CL).		1	
-24.6	10.7		Clayey SILT, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		2	Sample #2, Depth = 8.0' Ave. Field Vane (tsf): 0.05
-25.5	11.6		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		3	Sample #3, Depth = 11.0' Ave. Field Vane (tsf): 0.05
-26.4	12.5		Clayey SILT, very soft clay, dark olive gray (5Y-3/2), (ML-CL).		2	
-27.7	13.8		Sandy CLAY, dark olive gray (5Y-3/2), (CL).		4	Sample #4, Depth = 13.2' Mean (mm): 0.09, Phi Sorting: 0.31 Fines (230): 63.36% (CL)
-28.6	14.7		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		5	Sample #5, Depth = 14.0' Ave. Field Vane (tsf): 0.05
-29.3	15.4		Sandy CLAY, dark olive gray (5Y-3/2), (CL).		4	
-30.9	17.0		Sandy CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		5	
-33.9	20.0		No Recovery.			
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-16		LOCATION COORDINATES X = 3,848,463 Y = 266,592		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		12. TOTAL SAMPLES		<input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	13. TOTAL NUMBER CORE BOXES
6. THICKNESS OF OVERBURDEN 0.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -17.6 Ft.		STARTED 02-10-10 12:55 COMPLETED 02-10-10 12:56
8. TOTAL DEPTH OF BORING 20.0 Ft.		17. TOTAL RECOVERY FOR BORING 20.3 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR KD


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-17.6	0.0					
					1	Sample #1, Depth = 5.0' Ave. Field Vane (tsf): 0.05
			CLAY, trace sand, trace shell hash, very soft clay, (1.25"x0.25") wood fragment @ 0.7', 0.25" pocket of light gray (5Y-7/2) lithified clay @ 11.7', sand distributed in sandy pockets up to (2.0"x0.25"), bit sample from 20.0' to 20.3', expansion from 20.0' to 20.3', color is mottled olive gray (5Y-4/1) and, very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 17.0' Ave. Field Vane (tsf): 0.10
-37.9	20.3					
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-17				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,848,476 Y = 264,798		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -19.6 Ft.		STARTED 02-10-10 13:15
		17. TOTAL RECOVERY FOR BORING 19.9 Ft.		COMPLETED 02-10-10 13:16
		18. SIGNATURE AND TITLE OF INSPECTOR ML		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-19.6	0.0					
			CLAY, trace organics, very soft clay, 2.0" sandy pocket @ 3.8', dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 5.0' Ave. Field Vane (tsf): 0.02
-27.4	7.8					
			CLAY, very soft clay, color alternating with dark grayish brown (10YR-4/2) and, dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 11.0' Ave. Field Vane (tsf): 0.05
-33.9	14.3					
			CLAY, very soft clay, bit sample from 19.7' to 19.9', dark olive gray (5Y-3/2), (CL).		3	Sample #3, Depth = 17.0' Ave. Field Vane (tsf): 0.07
-39.5	19.9					
-39.6	20.0		No Recovery.			
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-18				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,848,849 Y = 265,732		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -18.4 Ft.		STARTED 02-10-10 13:41
		17. TOTAL RECOVERY FOR BORING 19 Ft.		COMPLETED 02-10-10 13:42
		18. SIGNATURE AND TITLE OF INSPECTOR KD		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-18.4	0.0					
-19.1	0.7		CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).			
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in sandy pockets up to (2.0"x0.5"), 0.5" shell fragment @ 8.9', (1.0"x0.5") light gray (5Y-7/1) clay pocket @ 10.5', bit sample from 17.4' to 17.8', color is mottled dark gray (5Y-4/1) and, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 6.8' Ave. Field Vane (tsf): 0.03
					2	Sample #2, Depth = 15.8' Ave. Field Vane (tsf): 0.04
-37.4	19.0					
-38.4	20.0		No Recovery.			
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-19				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,847,954 Y = 265,731		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -18.8 Ft.		STARTED 02-10-10 14:02
		17. TOTAL RECOVERY FOR BORING 17.8 Ft.		COMPLETED 02-10-10 14:03
		18. SIGNATURE AND TITLE OF INSPECTOR KD		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-18.8	0.0					
-19.2	0.4		CLAY, little sand, trace shell hash, soft clay, very dark gray (5Y-3/1), (CL).			
					1	Sample #1, Depth = 5.3' Ave. Field Vane (tsf): 0.05
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed sandy in pockets up to (2.5"x1.0"), (1.0"x0.5") whole shell @ 0.7', 0.75" shell fragment @ 3.6', colors alternating with dark grayish brown (10YR-4/2) from 9.2' to 14.0', color is mottled dark gray (5Y-4/1) and, black (5Y-2.5/1), (CL).		2	Sample #2, Depth = 14.3' Ave. Field Vane (tsf): 0.04
-36.6	17.8		No Recovery.			
-38.8	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-20				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,847,466 Y = 264,860		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -19.8 Ft.		STARTED 02-10-10 14:16
		17. TOTAL RECOVERY FOR BORING 16.7 Ft.		COMPLETED 02-10-10 14:17
		18. SIGNATURE AND TITLE OF INSPECTOR KD		


ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-19.8	0.0					
			CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to (1.0"x0.25"), colors alternating with dark grayish brown (10YR-4/2) from 7.4' to 15.0', color is mottled dark gray (5Y-4/1) and, dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 4.7' Ave. Field Vane (tsf): 0.02
					2	Sample #2, Depth = 13.7' Ave. Field Vane (tsf): 0.05
-36.5	16.7		No Recovery.			
-39.8	20.0		End of Boring			


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-21				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,847,116 Y = 265,722		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -19.3 Ft.		STARTED 02-10-10 14:35
		17. TOTAL RECOVERY FOR BORING 16.9 Ft.		COMPLETED 02-10-10 14:36
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-19.3	0.0					
-20.3	1.0		CLAY, trace organics, trace shell hash, very soft clay, organics distributed in pockets up to 0.5", dark gray (2.5Y-4/1), (CL).		1	Sample #1, Depth = 0.5' Ave. Field Vane (tsf): 0.03
			CLAY, very soft clay, 0.5" whole shell @ 2.6', dark gray (2.5Y-4/1), (CL).		2	Sample #2, Depth = 1.5' Ave. Field Vane (tsf): 0.05
					3	Sample #3, Depth = 7.5' Ave. Field Vane (tsf): 0.06
-27.3	8.0			CLAY, very soft clay, (2.5"x1.0") sand pocket @ 8.0', very dark gray (5Y-3/1), (CL).		4
-28.3	9.0					
			CLAY, trace shell hash, very soft clay, (2.0"x1.0") sand pocket @ 12.0', bit sample from 16.5' to 16.9', dark gray (2.5Y-4/1), (CL).		2	
-36.2	16.9					
			No Recovery.			
-39.3	20.0					
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-22		LOCATION COORDINATES X = 3,847,544 Y = 266,529		10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		HORIZONTAL NAD 1983
4. NAME OF DRILLER Sean Kemnuir				VERTICAL NAVD 88
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
6. THICKNESS OF OVERBURDEN 0.0 Ft.				<input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				12. TOTAL SAMPLES
8. TOTAL DEPTH OF BORING 20.0 Ft.				DISTURBED
				UNDISTURBED (UD)
				13. TOTAL NUMBER CORE BOXES
				14. ELEVATION GROUND WATER
				15. DATE BORING
				STARTED 02-10-10 14:51
				COMPLETED 02-10-10 14:52
				16. ELEVATION TOP OF BORING -18.1 Ft.
				17. TOTAL RECOVERY FOR BORING 16.1 Ft.
				18. SIGNATURE AND TITLE OF INSPECTOR BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS	
-18.1	0.0						
-18.8	0.7		CLAY, very soft clay, very dark gray (5Y-3/1), (CL).		1	Sample #1, Depth = 0.4' Ave. Field Vane (tsf): 0.03	
						2	Sample #2, Depth = 3.8' Ave. Field Vane (tsf): 0.02
				CLAY, trace sand, very soft clay, sand distributed in pockets typically up to 0.5", 2.0" sand pocket @ 5.5', 0.25" whole shell @ 5.6', 1.0" sand pockets @ 9.7' and 9.9', 2.0" pocket of slightly firmer clay @ 13.1', bit sample from 15.8' to 16.1', very dark gray (5Y-3/1), (CL).		3	Sample #3, Depth = 6.8' Ave. Field Vane (tsf): 0.02
						4	Sample #4, Depth = 12.8' Ave. Field Vane (tsf): 0.05
-34.2	16.1		No Recovery.				
-38.1	20.0		End of Boring				


LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana			9. SIZE AND TYPE OF BIT 3.0 In.	
2. BORING DESIGNATION GLVC-10-23			10. COORDINATE SYSTEM/DATUM Louisiana South State Plane NAD 1983 NAVD 88	
3. DRILLING AGENCY American Vibracore Services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Sean Kemnuir			11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER Alpine Pneumatic Vibracore	
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED			12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)	
6. THICKNESS OF OVERBURDEN 0.0 Ft.			13. TOTAL NUMBER CORE BOXES	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.			14. ELEVATION GROUND WATER	
8. TOTAL DEPTH OF BORING 20.0 Ft.			15. DATE BORING STARTED COMPLETED 02-10-10 15:10 02-10-10 15:11	
			16. ELEVATION TOP OF BORING -20.3 Ft.	
			17. TOTAL RECOVERY FOR BORING 18.8 Ft.	
			18. SIGNATURE AND TITLE OF INSPECTOR KD	




ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-20.3	0.0					
			CLAY, trace sand, very soft clay, sand distributed in sandy pockets up to 2.0", 1.0" light gray (5Y-7/2) clay pocket @ 5.2', bit sample from 18.5' to 18.8', color is mottled dark grayish brown (10YR-4/2) and, dark gray (5Y-4/1), (CL).		1	Sample #1, Depth = 6.7' Ave. Field Vane (tsf): 0.02
					2	Sample #2, Depth = 15.7' Ave. Field Vane (tsf): 0.07
-39.1	18.8					
-40.3	20.0		No Recovery.			
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-24				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,846,174 Y = 265,733		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
				STARTED 02-10-10 15:28
				COMPLETED 02-10-10 15:29
		16. ELEVATION TOP OF BORING -19.8 Ft.		17. TOTAL RECOVERY FOR BORING 19.2 Ft.
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-19.8	0.0					
					1	Sample #1, Depth = 3.6' Ave. Field Vane (tsf): 0.03
			CLAY, trace shell hash, very soft clay, 0.25" whole shell @ 1.8', 1.0" sand pocket @ 6.3', (0.25"x1.0") sand pocket @ 9.1', (1.0"x2.0") sand pocket @ 9.6', very dark gray (5Y-3/1), (CL).		2	Sample #2, Depth = 8.5' Ave. Field Vane (tsf): 0.02
-32.8	13.0				3	Sample #3, Depth = 15.6' Ave. Field Vane (tsf): 0.07
			CLAY, very soft clay, (1.0"x0.25") sand pocket @ 14.1', very dark gray (5Y-3/1), (CL).			
-36.8	17.0					
			CLAY, soft clay, bit sample from 18.8' to 19.2', very dark gray (5Y-3/1), (CL).			
-39.0	19.2					
-39.8	20.0		No Recovery.			
			End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Grand Liard Restoration Grand Liard, Louisiana				9. SIZE AND TYPE OF BIT 3.0 In.
2. BORING DESIGNATION GLVC-10-25				10. COORDINATE SYSTEM/DATUM Louisiana South State Plane
3. DRILLING AGENCY American Vibracore Services, Inc.		LOCATION COORDINATES X = 3,846,609 Y = 266,533		11. MANUFACTURER'S DESIGNATION OF DRILL Alpine Pneumatic Vibracore
4. NAME OF DRILLER Sean Kemnuir		CONTRACTOR FILE NO.		<input type="checkbox"/> AUTO HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL	BEARING	<input type="checkbox"/> MANUAL HAMMER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		12. TOTAL SAMPLES		DISTURBED
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD)
8. TOTAL DEPTH OF BORING 20.0 Ft.		14. ELEVATION GROUND WATER		15. DATE BORING
		16. ELEVATION TOP OF BORING -18.7 Ft.		STARTED 02-10-10 15:44
		17. TOTAL RECOVERY FOR BORING 16.5 Ft.		COMPLETED 02-10-10 15:45
		18. SIGNATURE AND TITLE OF INSPECTOR BF		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-18.7	0.0					
			CLAY, trace sand, trace shell hash, very soft clay, sand distributed in pockets up to 0.25", dark olive gray (5Y-3/2), (CL).		1	Sample #1, Depth = 1.0' Ave. Field Vane (tsf): 0.02
			CLAY, very soft clay, dark olive gray (5Y-3/2), (CL).		2	Sample #2, Depth = 7.0' Ave. Field Vane (tsf): 0.03
-26.5	7.8		CLAY, some sand, soft clay, sand distributed in pockets up to 2.0", dark olive gray (5Y-3/2), (SC).			
-27.7	9.0		CLAY, trace shell hash, very soft clay, (0.5"x3.0") sand pocket @ 11.6', dark gray (5Y-4/1), (CL).		3	Sample #3, Depth = 13.0' Ave. Field Vane (tsf): 0.07
-28.3	9.6		CLAY, soft clay, bit sample from 16.2' to 16.5', very dark grayish brown (2.5Y-3/2), (CL).			
-33.5	14.8		No Recovery.			
-35.2	16.5					
-38.7	20.0		End of Boring			

LOUISIANA GRAND LIARD_2010_VIBRACORES.GPJ JPBRAZIL.GDT 9/21/10

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS <small>(LITTLE OR NO FINES)</small>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		SAND AND SANDY SOILS		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SW	WELL-GRADED SANDS, GRAVELLY SANDS
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SM	SILTY SANDS, SAND - SILT MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
		LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		LIQUID LIMIT LESS THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
		LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
		LIQUID LIMIT GREATER THAN 50		OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod



Measured groundwater level at time noted on log



Initial groundwater level observed at time of exploration



Perched water observed at time of exploration

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

- %F Percent fines
- AL Atterberg limits
- CA Chemical analysis
- CP Laboratory compaction test
- CS Consolidation test
- DS Direct shear
- HA Hydrometer analysis
- MC Moisture content
- MD Moisture content and dry density
- OC Organic content
- PM Permeability or hydraulic conductivity
- PP Pocket penetrometer
- SA Sieve analysis
- UU Triaxial compression
- UC Unconfined compression
- VS Vane shear

KEY TO EXPLORATION LOGS

Start Drilled	8/18/2011	End	8/18/2011	Total Depth (ft)	80	Logged By	DAS	Checked By	VT	Driller	Geoengineers, Inc.	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	1.0			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment	Marsh Buggy-Mounted Drill Rig				
Latitude	N29° 18' 35.8"			System Datum	Geographic NAD83 (feet)			Groundwater	Depth to Water (ft)	Elevation (ft)			
Longitude	W89° 28' 30.2"							Date Measured	8/18/2011	0.0	1.0		
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.													

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name					Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0									Zero (feet) at water surface									
									Mudline at EL. -1 foot									
		21			1		PT		Very soft dark gray peat	374	15.4	0.16	0.06	14	195	136	0.056	
		22			2		CH		Very soft gray clay with organic matter	63	60.4	0.15	0.17	11	56	31	0.074	
		22			3		OH		Very soft gray organic clay	104	50.7	0.10	0.29	14	86	56	0.113	
		17			4		CL		Very soft gray silty clay	36	86.7	0.11	0.40	10	38	18	0.128	
		14			5				Very soft gray very silty clay*	41					30	10	0.104	
		15			6				Very soft gray very silty clay with organic matter and 1" sand layer	36	84.6	0.15	0.81	13	33	12	0.237	
		20			7				Soft gray very silty clay	38	91.4	0.25	1.09	15	32	12	0.097	
		20			8		OH		Very soft gray organic clay	89	53.6	0.17	1.38	10	91	58	0.11	
		23			9		CH		Very soft gray clay with 2" fine sand layer	75	70.3	0.14	1.67	13	56	30		77
							CL-ML											

¹Sample disturbed during extrusion.

Log of Boring B-11



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ - DBF Template\LD Template\GEOENGINEERS\GDT\GEB_GEO TECH_LAB

Start Drilled 8/18/2011	End 8/18/2011	Total Depth (ft)	80	Logged By Checked By	DAS VT	Driller	Geoengineers, Inc.	Drilling Method	Wet Rotary		
Surface Elevation (ft) Vertical Datum		1.0		Hammer Data		Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment		Marsh Buggy-Mounted Drill Rig	
Latitude Longitude		N29° 18' 21.4" W89° 28' 14.9"		System Datum		Geographic NAD83 (feet)		Groundwater Date Measured		Depth to Water (ft)	Elevation (ft)
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.								8/18/2011	0.0	1.0	

Elevation (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA							
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name				Water Level	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %
0								Zero (feet) at water surface								
								Mudline at EL. -1 foot								
	17				1		PT	Very soft dark gray peat	599	10.3	0.11	0.06	15	270	193	0.068
	20				2		OH	Very soft gray organic clay	182	30.8	0.13	0.17	14	148	122	0.101
	9				3		CH	Very soft gray clay	47	74	0.10	0.29	14	53	33	0.09
	22				4		CL	Very soft gray clay with silt, organic matter and ferrous nodules	54	73.8	0.11	0.40	11	42	19	0.079
	20				5		CL-ML	Medium gray clayey silt	34	89.8	0.78	0.52	10	26	6	0.156
	20				6		CH	Very soft gray clay with silt streaks and shell fragments	63	62	0.16	0.81	11	86	62	0.201
	9				7			Very soft gray clay	64	61.7	0.23	1.09	9			0.18
	10				8			Very soft gray clay	63	60.6	0.23	1.38	9			0.21
	19				9			Very soft gray clay with silt lenses	60	61.4	0.14	1.67	14	72	41	0.192

¹Sample disturbed during extrusion.

Log of Boring B-12



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16715-018\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEO TECH_LAB

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA								
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name					Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35		14			10				Very soft gray clay with silt and 2" silt layer	41	77.3	0.14	1.96	15	44	21	0.165	
40		24			11		CH		Very soft gray clay with 3" clayey silt layer at bottom	65					74	44	0.156	
45		24			12		CL		Very soft gray clay with silt and 2½" silt layer	44	75.8	0.14	2.53	15	48	24	0.077	
		24			13		CL-ML		Firm gray clayey silt	26					25	5		
50		24			14		CL		Very soft gray silty clay with silt pockets, silt lenses and silt streaks	29					40	17	0.365	
		24			15		CL-ML		Firm gray clayey silt	29					25	4	0.261	
55		22			16		CH		Soft gray clay with silt streaks and 3" silt layer	44	76.9	0.26	3.11	13	64	36	0.327	
60		21			17		CL		Very soft gray clay with silt and 3" clayey silt layer	39	84.7	0.21	3.40	15	45	22		
					18		SM		Firm tan sandy silt with two 1" clay layers and 3½" clay layer									69
65		22			19		CH		Soft gray clay with silt pockets	43	83.3	0.26	3.80	13	53	30	145	
70		19			20				Very soft gray clay with 4" fine sand layer at bottom	58	65.6	0.18	3.97	13	66	36		
75		18			21				Very soft gray clay with 1½" clayey silt layer and 4½" fine sand layer at bottom	48					64	37		

¹Sample disturbed during extrusion.

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEB_GEO TECH_LAB


Log of Boring B-12 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-3
 Sheet 2 of 3

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA											
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %	
80		23			22			CL	44	80.9	0.19	4.55	15	40	19				

¹Sample disturbed during extrusion.

Log of Boring B-12 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Start Drilled 8/23/2011	End 8/24/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Pontoon-Mounted Drill Rig			
Latitude Longitude N29° 18' 10.4" W89° 28' 10.8"	System Datum Geographic NAD83 (feet)	Groundwater Date Measured 8/23/2011	Depth to Water (ft) 0.0	Elevation (ft) 1.0	
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
0								Zero (feet) at water surface										
10		18		1			OH	Mudline at EL. -9 feet Very soft gray organic clay	181	27.8	0.10	0.06	13	148	114	0.088		
15				2				Very soft gray organic clay	173	29.2	0.10	0.17	13	131	97	0.059		
15		14		3			CL	Very soft gray clay with silt and 1" organic matter layer	70	62.4	0.05	0.29	15	49	23	0.128		
15		11		4				Very soft gray silty clay with organic matter	65	66.4	0.18	0.40	15	40	18			
20		9		5				Very soft gray very silty clay with organic matter traces	40	85.6	0.42	0.52	15	33	14	0.119		
25		16		6			CH	Very soft gray clay	86	51.8	0.18	0.81	12	71	42	0.174		
30		13		7				Very soft gray clay	90	56.1	0.12	1.09	15	76	46	0.119		
35		15		8				Very soft gray clay with silt lenses	45	77.8	0.21	1.38	3	85	57	0.124		

¹Sample disturbed during extrusion.

Log of Boring B-13



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEO TECH_LAB

Baton Rouge: Date: 10/4/11 Path: P:\16150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\17 Template\GEOENGINEERS\GDT\GEB_GEOTECH_LAB

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name					Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %		
35																				
38	36	16			9				Soft gray clay with silt lenses and pockets	49	70.2	0.28	1.67	9	64	38				
40																				
43	41	14			10				Soft gray clay	44	77.1	0.47	1.96	13	58	34	0.318			
45																				
48	46	22			11			CL	Soft gray clay with silt and 4" very silty clay layer	49	78	0.37	2.25	14	49	24				
50																				
53	51	14			12			CH	Soft gray clay with silt trace	39					52	28	0.277			
55																				
58	56	15			13			CL	Soft gray clay with silt	39	80.9	0.39	2.82	14	49	25	0.498			
60																				
63	61	15			14			CH	Soft gray clay with silt lenses	65	61.2	0.31	3.11	3	87	63				
65																				
68	66	15			15				Soft gray clay	60							0.32			
70																				
73	71	13			16				Medium gray clay with silt lenses	62	62.9	0.78	3.69	7	88	56				
75																				

¹Sample disturbed during extrusion.

Log of Boring B-13 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Start Drilled	8/19/2011	End	8/19/2011	Total Depth (ft)	80	Logged By	DAS	Checked By	VT	Driller	Geoengineers, Inc.	Drilling Method	Wet Rotary
Surface Elevation (ft) Vertical Datum	1.0			Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop			Drilling Equipment	Marsh Buggy-Mounted Drill Rig				
Latitude	N29° 18' 03.3"			System Datum	Geographic NAD83 (feet)			Groundwater	Depth to Water (ft)	Elevation (ft)			
Longitude	W89° 28' 05.9"							Date Measured	8/19/2011	0.0	1.0		
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.													

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
0								Zero (feet) at water surface										
								Mudline at EL. -1 foot										
	23				1		OH	Very soft gray organic clay	294	16.1	0.10	0.06	12	141	109	0.074		
	24				2			Very soft gray organic clay	175	27.4	0.05	0.17	12	142	111	0.072		
5																		
	17				3		CH	Very soft gray clay	44	69.1	0.11	0.17	15			0.124		
	24				4		CL	Very soft gray silty clay with organic matter	44	77.8	0.12	0.40	14	37	16	0.115		
10																		
	22				5			Very soft gray silty clay with 2" silt layer at bottom	51	75.6	0.15	0.52	15	36	14			
15																		
	23				6			Very soft gray clay with silt, organic matter and 3" silt layer at bottom	43	83.2	0.13	0.81	15	44	20			
20																		
	22				7		CH	Very soft gray clay with 5" silt layer at bottom	44					50	28			
25																		
	20				8			Very soft gray clay with shell fragments	88	51.4	0.13	1.38	15	78	51	0.293		
30																		
	21				9			Very soft gray clay with shell traces and organic matter	87	54.1	0.16	1.67	15	70	45	0.128		
35																		

¹Sample disturbed during extrusion.

Log of Boring B-14



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16715\16715018\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
35	35	23			10				43	72.7	0.19	1.96	5	82	56	0.117	
40	40	23			11				85	53.3	0.16	2.25	13			0.142	
45	45	22			12				88	51.4	0.12	2.53	14	92	65	0.171	
50	50	22			13				65	60.7	0.15	2.82	12	74	50	0.153	
55	55	23			14				66	59.5	0.13	3.11	15	77	50	0.149	
60	60	22			15				85	52	0.21	3.40	13			0.119	
65	65	22			16				68	60.7	0.39	3.69	8			0.214	
70	70	23			17				68					74	47	0.205	
75	75	22			18				76					93	60		

¹Sample disturbed during extrusion.


Baton Rouge: Date: 10/4/11 Path: P:\16167150\16167150\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Log of Boring B-14 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
80		20			19				54	66.2	0.17	4.44	15			0.201	

¹Sample disturbed during extrusion.

Log of Boring B-14 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-5
 Sheet 3 of 3

Start Drilled 8/23/2011	End 8/24/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data	Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Pontoon-Mounted Drill Rig		
Latitude Longitude N29° 18' 10.4" W89° 28' 24.1"	System Datum	Geographic NAD83 (feet)	Groundwater Date Measured 8/23/2011		
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.			Depth to Water (ft) 0.0	Elevation (ft) 1.0	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
0								Zero (feet) at water surface										
5																		
10																		
15								Mudline at EL. -15 feet										
15	9						CL-ML	Firm gray clayey silt with 2½" fine sand layer	41	89.3	0.42	0.06	12	26	7	0.043		
19.5	9.5						CL	Very soft gray clay with silt	35	83	0.16	0.17	12	44	23	0.196		
20	19							Very soft gray silty clay	33	85.2	0.23	0.29	15	35	15	0.077		
24	8						CH	Very soft gray clay with silt lenses and 2" clayey silt layer	44	70	0.18	0.40	11	77	47	0.201		
25	13							Soft gray clay with shell fragments						81	52	0.169		
30	15							Very soft gray clay	69	59.2	0.23	0.75	15	78	53	0.133		
35	15						CL	Very soft gray silty clay with two 1" clay layers	32	85.7	0.25	1.04	15	41	21			

¹Sample disturbed during extrusion.

Log of Boring B-15



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16715\16715-018\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DB Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA											
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %	
35																			
35	35.0	10.5								39	84.6	0.31	1.32	14	32	12			
40	40.0																		
40	40.0	18						CH		76	60	0.39	1.61	8	74	46	0.383		
45	45.0																		
45	45.0	17								59	60.9	0.29	1.90	13	74	40	0.273		
50	50.0																		
50	50.0	9.5								57	68.1	0.35	2.19	15	74	45	0.455		
55	55.0																		
55	55.0	9								56					78	51	0.334		
60	60.0																		
60	60.0	20								53	68	0.34	2.76	15	76	52	0.352		
65	65.0																		
65	65.0	10.5								50	69.1	0.63	3.05	11	80	52	0.536		
70	70.0																		
70	70.0	20								56					81	57			
75	75.0																		

¹Sample disturbed during extrusion.


Baton Rouge: Date: 10/4/11 Path: P:\16167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Log of Boring B-15 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEO TECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
80	10													76	46		

¹Sample disturbed during extrusion.

Log of Boring B-15 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Start Drilled 8/23/2011	End 8/23/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Pontoon-Mounted Drill Rig			
Latitude Longitude N29° 17' 41.6" W89° 28' 15.5"	System Datum Geographic NAD83 (feet)	Groundwater Date Measured 8/23/2011	Depth to Water (ft) 0.0	Elevation (ft) 1.0	
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
0								Zero (feet) at water surface										
5																		
10		16						Mudline at EL. -9 feet										
10							CH	Very soft gray clay with silt lenses and organic matter	65	61.9	0.20	0.06	14	62	40	0.183		
15		15						Very soft gray clay with organic matter	65	60.6	0.12	0.17	15	72	46	0.133		
15		9.5					CL	Very soft gray very silty clay with 2" silt layer and organic matter	37	85.9	0.22	0.29	12	32	12	0.068		
15		10.5						Very soft gray silty clay with 1" silt layer and organic matter	40	88.3	0.21	0.40	15	37	16	0.092		
20		10						Very soft gray very silty clay with organic matter	46	87.7	0.20	0.52	15	30	11	0.054		
25		8						Very soft gray silty clay with 1" and 1/2" clay layers	36	79.4	0.19	0.81	14	40	23			
30		12					CH	Soft gray clay with silt lenses and organic matter	69	60.7	0.36	0.92	13	79	53	0.205		
35		16						Soft gray clay with silt lenses	66	60.8	0.27	1.39	14	82	51	0.201		

¹Sample disturbed during extrusion.

Log of Boring B-16



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-7
 Sheet 1 of 3

Baton Rouge: Date: 10/4/11 Path: P:\16715\16715018\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ - DBF Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA																
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %						
35																								
	36	10						Very soft gray clay with silt lenses	71	63.1	0.20	1.67	15	79	53	0.261								
	40																							
	44	11						Soft gray clay	58	68.7	0.38	1.96	12	82	52									
	48																							
	52	15						Soft gray clay	44	74.1	0.31	2.25	15	79	55	0.288								
	56																							
	60	18						Soft gray clay	53	68.4	0.37	2.53	14	79	56	0.214								
	64																							
	68	18						Soft gray clay	59	64.8	0.31	2.82	15	79	51	0.198								
	72																							
	76	17						Soft gray clay with silt lenses	66	61.7	0.31	3.11	15			0.291								
	80																							
	84	18						Soft gray clay	65					85	53	0.527								
	88																							
	92	15						Soft gray clay with silt lenses	60					82	52	0.433								
	96																							

¹Sample disturbed during extrusion.


Baton Rouge: Date: 10/4/11 Path: P:\16167150\1801\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Log of Boring B-16 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA									
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)
80	10							Soft gray clay	53	67.8	0.44	3.97	11			0.435	

¹Sample disturbed during extrusion.

Log of Boring B-16 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-7
 Sheet 3 of 3

Start Drilled 8/22/2011	End 8/22/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Pontoon-Mounted Drill Rig			
Latitude Longitude N29° 17' 19.7" W89° 28' 08.1"	System Datum Geographic NAD83 (feet)	Groundwater Date Measured 8/22/2011			
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.		Depth to Water (ft) 0.0	Elevation (ft) 1.0		

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																		
5																		
10																		
15																		
20		10			1		OH	Mudline at -19 feet Very soft gray organic clay with shell fragments	83	51.8	0.23	0.06	13	101	73	0.185		
25		18			2		OH	Very soft gray organic clay with silt and shell fragments	85	51.1	1.20	0.16	12	97	69	0.176		
30		18			3		OH	Very soft gray clay with shell fragments and organic matter	79	55.3	0.18	0.29	15	86	60	0.169		
35		20			4		OH	Very soft gray clay with organic matter and shell fragments	78	53.5	0.12	0.40	8	82	54	0.117		
40		13			5		CH	Very soft gray clay with silt streaks and pockets	67	60.2	0.11	0.52	13	68	44	0.131		
45		14			6		CH	Very soft gray clay	77	55.5	0.14	0.81	15	82	51	0.124		

¹Sample disturbed during extrusion.

Log of Boring B-17



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16715\16715018\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
35																		
38	36.5 - 39.5	11			7			Very soft gray clay with silt lenses	70	62.2	0.23	1.10	11	64	40	0.119		
40																		
42	41 - 44	13			8			Soft gray clay with silt lenses	59	63.8	0.30	1.39	12	73	45	0.221		
45																		
48	47 - 50	11			9			Soft gray clay with silt lenses and pockets	61	65.4	0.27	1.67	14	59	34	0.288		
50																		
53	52 - 55	15			10			Soft gray clay with silt lenses	60					77	49	0.297		
55																		
58	57 - 60	15			11			Soft gray clay with silt lenses	65	64	0.33	2.25	12	83	59	0.331		
60																		
63	62 - 65	13			12			Medium gray clay with silt lenses	59	69.2	0.55	2.53	14	76	51	0.401		
65																		
68	67 - 70	17			13			Soft gray clay with silt lenses	52					67	41	0.352		
70																		
73	72 - 75	13			14			Medium gray clay	59	65.2	0.60	3.11	7	87	56			
75																		

¹Sample disturbed during extrusion.

Baton Rouge: Date: 10/4/11 Path: P:\167150\180\1\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEB_GEOTECH_LAB

Log of Boring B-17 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Start Drilled 8/23/2011	End 8/23/2011	Total Depth (ft) 80	Logged By Checked By DAS VT	Driller Geoengineers, Inc.	Drilling Method Wet Rotary
Surface Elevation (ft) Vertical Datum 1.0	Hammer Data Safety Hammer/Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment Pontoon-Mounted Drill Rig			
Latitude Longitude N29° 17' 34.2" W89° 28' 12.2"	System Datum Geographic NAD83 (feet)	Groundwater Date Measured 8/23/2011 Depth to Water (ft) 0.0 Elevation (ft) 1.0			
Notes: See Figure A-1 for explanation of symbols. Cement-bentonite grout backfill top 25 feet.					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	LABORATORY DATA										
	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level		Graphic Log	Group Classification	Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %
0																	
5																	
10																	
15																	
16	12						CH	Very soft gray clay with organic matter and silt lenses	60	63.6	0.18	0.58	11	75	52	0.178	
15	15						2	Very soft gray clay with organic matter and silt streaks	76	57.9	0.21	0.17	7	74	44	0.284	
20	16						3	Very soft gray clay with organic matter, silt streaks and shell fragments	70	58.9	0.16	0.29	13	75	50	0.207	
17	17						4	Very soft gray clay with 5" sand layer	74	57.9	0.17	0.40	15	76	51		
25	10						5	Very soft gray clay	80	56.9	0.20	0.52	15	70	43		
25	20						CL-ML	Firm gray clayey silt with 2½" clay layer	31	93.9	0.49	0.75	6	23	5	0.459	
30	22						OH	Very soft gray organic clay with silt lenses	96	47.2	0.13	1.04	13	91	69	0.21	
35																	

¹Sample disturbed during extrusion.

Log of Boring B-18



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Baton Rouge: Date: 10/4/11 Path: P:\16715-018\01\GINT\GRAND LIARD MARSH RIDGE RESTORATION BORING LOGS.GPJ DBT Template\LD Template\GEOENGINEERS\GDT\GEIB_GEOTECH_LAB

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	LABORATORY DATA										
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name					Water Content, %	Dry Density, (pcf)	Compressive Strength (TSF) ¹	Confining Pressure (KSF)	Strain, %	Liquid Limit (LL), %	Plasticity Index (PI), %	Mini Vane Shear Strength (KSF)	Passing No. 200 Sieve, %		
35								CH												
38	35-40	17			8				Soft gray clay with silt pockets	61	61.1	0.27	1.32	13	82	51	0.238			
42	40-45	22			9				Soft gray clay	60	61.9	0.27	1.61	15	83	56	0.318			
48	45-50	19			10				Soft gray clay	50	72.2	0.40	1.90	15	72	48	0.428			
53	50-55	23			11				Soft gray clay	49	70.1	0.49	2.19	15			0.354			
58	55-60	22			12				Soft gray clay	48					73	48	0.385			
63	60-65	22			13				Soft gray clay	51					69	44	0.444			
68	65-70	19			14				Soft gray clay	65	63.5	0.31	3.05	15	67	40	0.282			
73	70-75	23			15				Medium gray clay	55	67.1	0.64	3.34	10	73	43	0.778			

¹Sample disturbed during extrusion.

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Log of Boring B-18 (continued)



Project: Grand Liard Marsh and Ridge Restoration (BA-68) - Structures
 Project Location: Plaquemines Parish, Louisiana
 Project Number: 16715-018-01

Figure B-9
 Sheet 2 of 3

