

1.0 Introduction

Task Order DY08, Core Drilling, Soil Sampling, and Laboratory Testing for the Port Arthur Resident Office Shoreline Stabilization project, Port Arthur, Texas, was awarded to Quaternary Resource Investigations, LLC (QRI) on November 19, 2013 (Notice to Proceed (NTP) received on November 29, 2013). The primary purpose of this Task Order was to obtain geotechnical information for shoreline stabilization at the Port Arthur Resident Office, Jefferson County, Texas. A total of 5 borings, numbered 13-1001 through 13-1005, were drilled to depths of 80 and 100 feet as shown on [Table 1](#) below.

2.0 Borings

Below is a table summarizing the 5 borings drilled under Task Order DY08. The table includes Boring Number, Investigation Feature, Depth (ft), and a description of unusual subsurface conditions or difficulties in drilling that were encountered (if any). Boring Summary Sheets and Field boring logs ([Appendix A](#)) should be referenced for information concerning each boring.

Table 1			
Boring	Investigation Feature	Depth (ft)	Conditions / Difficulties Encountered
13-1001	East Bank SNWW PARO	100	<i>See boring log</i>
13-1002	East Bank SNWW PARO	80	<i>See boring log</i>
13-1003	East Bank SNWW PARO	100	<i>See boring log</i>
13-1004	East Bank SNWW PARO	80	<i>See boring log</i>
13-1005	East Bank SNWW PARO	100	<i>See boring log</i>

Final gINT Boring Logs are included in ([Appendix B](#)).

3.0 Test data

As per the Table of Required Services, test assignments were provided by the USACE POC as listed in Table 2. All tests were performed by QRI's contract laboratory, Terracon Consultants, Inc., on portions of the samples that were considered representative of the predominant material composition of the overall sample. The laboratory recorded on the final summary sheets the results of unit dry weight tests, moisture content tests, and visual classifications incidental to performing unconfined compression tests, triaxial tests (including UU and CU tests), and other tests. Results of moisture content testing and visual classifications incidental to performing moisture content, unit dry weight, Atterberg limits, and sieve analyses, were also included on the final test summary sheets provided by the laboratory. A complete set of

PORT ARTHUR RESIDENT OFFICE
BORING SUMMARY SHEET

BORING ID:	<u>13-1003</u>
BORING TYPE:	<u>Continuous Sampling</u>
DEPTH:	<u>100'</u>
ELEVATION:	<u>6.49'</u>
X (US SURVEY FT):	<u>3574742.03</u>
Y (US SURVEY FT):	<u>13897973.59</u>
DEPTH TO WATER:	<u>7.9'</u>

Client: USACE-Galveston District W912HY-13-D-0001-DY08 Boring: 13-1003 Page 1 of 5
 Date/Time Drilling Begun: 12/20/13 6:30 Date/Time Drilling Ended: 12/20/13 07:15
 Driller: Tom Logger: Pete Designated X (Easting): 3574742.033
 Drill Rig: B-57 Designated Y (Northing): 13897973.59 Designated Z (Elevation):
 Total depth: 100 Initial Water Encounter (Depth, date/time): 10.4' 12/20/13 7:55 Water Depth (15 min.): 7.9' 16.4911

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
0	CI	0-2	13	ST	1	2.25	-	Slightly sandy clay, light brown, moderately moist, moderately plastic, with trace roots.
	CI	2-4	9	ST	1	1.75	-	Slightly sandy clay, light brown, moderately moist, moderately plastic.
5	CI	4-6	16	ST	1	2.3	-	Slightly sandy clay, light brown and greenish gray modelling, moderately moist, moderately plastic, sand seems, cracks.
	CI	6-8	16	ST	1	2.0	-	Sandy clay, light brown and greenish gray modelling, moderately moist, moderately plastic, sand seems.
	CI	8-10	14	ST	1	1.9	-	SAA ↑
10	CI	10-12	19	ST	1	2.7	-	Slightly sandy clay, greenish gray and light brown modelling, moderately moist, moderately plastic, sand seems, cracks.
	CI	12-14	16	ST	1	2.6	-	Slightly sandy clay, greenish gray and light brown modelling, moderately moist, moderately plastic, with shell fragments.
15	CI	14-16	19	ST	2	2.75	-	SAA ↑
	CI	16-18	19	ST	1	3.1	-	SAA ↑ trace shell fragments
20	CI	18-20	14	ST	1	1.9	-	Sandy clay, light brown, moderately moist, moderately plastic, with shell fragments, sand seems.

Weather: Cloudy, Windy, 60's
 Comments: SAA = Same as above

USCS Log Legend:



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

Port Arthur Resident Office
 Sabine Neches Waterway (SNWW)
 Port Arthur, TX



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 13588 Florida Boulevard, Baton Rouge, Louisiana 70819

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
20	SP	20-22	12	ST	1 bag	-	-	fine sand, light brown, wet, no plasticity
23.5	SP	22-24	18	SS	1 bag	-	-	↑ dense, fine sand, light brown, wet, no plasticity
25	SP	24-26						
		26-28						
30	CI	28-30	18	SS	1 bag	2.5	-	stiff, sandy clay, greenish gray and light brown mottling, moderately wet, moderately plastic
	CI	30-32	18	ST	1	1.6	-	sandy clay, light brown and greenish gray mottling, moderately wet, moderately plastic, sand seams, cracks
	CI	32-34	17	ST	1	2.2	-	SAA ↑
35	CI	34-36	19	ST	1	3.2	-	slightly sandy clay, greenish gray, moderately moist, moderately plastic, sand seams, cracks
	CI	36-38	19	ST	1	1.4	-	SAA ↑
40	CI	38-40	19	ST	1	1.5	-	SAA ↑

Weather: cloudy, foggy, 60's, light breeze
Comments:

USCS Log Legend:



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W912HY-13-D-0001-DY08

Boring: 13-1003
12/20/13

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Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
40	CI	40-42	20	ST	1	1.5	-	Slightly sandy clay, Dark gray, moderately moist, moderately plastic, sand seems, cracks
	CI	42-44	17	ST	1	1.6	-	SAA ↑
45	CI	44-46	19	ST	1	2.0	-	SAA ↑
	CH	46-48	19	ST	2	1.75	-	Clay, greenish gray, moderately moist, moderately to highly plastic
	CH	48-50	19	ST	1	1.9	-	SAA ↑
50	CH	50-52	19	ST	1	1.9	-	SAA ↑
	CH	52-54	19	ST	1	1.6	-	SAA ↑
55	CH	54-56	20	ST	2	1.75	-	SAA ↑
	CH	56-58	19	ST	1	1.7	-	SAA ↑
60	CH	58-60	19	ST	1	1.9	-	SAA ↑

Weather: Cloudy, lite wind, 60's

Comments: SAA = same as above

USCS Log Legend:



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Boring: 13-1003

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12/20/13, 12/21/13

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
60	CI	60-62	19	ST	1	1.6	-	slightly sandy clay, greenish gray, moderately moist, moderately plastic, sand seems, crack
	CI	62-64	19	ST	2	1.75	-	slightly sandy clay, greenish gray, moderately moist, moderately plastic, sand seems
65	CI	64-66	18	ST	1	1.6	-	SAA ↑
	CI	66-68	18	ST	1	1.8	-	SAA ↑
	CI	68-70	19	ST	1	1.5	-	SAA ↑
70	CI	70-72	18	ST	1	1.9	-	SAA ↑ with crack
	CI	72-74	18	ST	2	1.4	-	SAA ↑ no crack
75	CI	74-76	18	ST	1	1.9	-	clay, greenish gray, moderately moist, moderately plastic
	CI	76-78	18	ST	1	1.75	-	SAA ↑
80	CI	78-80	12	ST	1	1.0	-	slightly sandy clay, greenish gray, moderately moist, moderately plastic, sand seems, trace organics

Weather: Cloudy, windy 60's / cloudy / foggy, light wind, 60's like rain

Comments:

USCS Log Legend:



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12/21/13

12/22/13
0715

TD 100

Feet	USCS Log	Sample Interval (ft)	Amount Material Obtained (in)	Sample Type Blow Counts	Number of Tubes	Pocket Pene. (tsf)	Shear Strength (tsf)	Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.)
80	CI	80-82	18	ST	1	1.4	-	Slightly sandy clay, greenish gray, moderately moist, moderately plastic, w trace of pebbles
	CI	82-84	19	ST	1	1.5	-	SAA ↑
85	CI	84-86	18	ST	1	2.3	-	SAA ↑
	CI	86-88	18	ST	1	2.25	-	SAA ↑
	CI	88-90	19	ST	1	3.1	-	Sandy clay, greenish gray, moderately moist, moderately to low plasticity, sand seems
90	SP	90-92	18	SS 4/3/6	1/5	-	-	loose, fine sand, greenish gray, wet, no plasticity, trace shells fragments
		92-94		SS 4/3/6				No recovery
		94-96						
		96-98						
100	SP	98-100	18	SS 4/3/6	1/5	-	-	very dense, fine sand, greenish gray, wet no plasticity, trace shell fragments

Weather: Cloudy, like rain, 60's, like breeze
Comments:

USCS Log Legend:



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BORING NUMBER 13-1003

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CLIENT USACE-Galveston District PROJECT NAME Port Arthur Resident Office (PARO)
PROJECT NUMBER W912HY-13-D-0001, Task Order No.0008 PROJECT LOCATION Port Arthur, TX
DATE STARTED 12/20/2013 6:30:00 AM COMPLETED 12/22/2013 7:15:00 AM GROUND ELEVATION 6.4911 ft HOLE SIZE 8.25 inches
DRILLING CONTRACTOR QRI NORTHING 13897973.59 ft EASTING 3574742.03 ft
DRILLING METHOD Hollow Stem Auger DRILLING RIG MAKE/MODEL Mobile B57 on Gemco Articulated Platform
LOGGED BY Pete Herold TOTAL DEPTH 100 ft GROUND WATER LEVEL AT TIME OF DRILLING 10.40 ft / Elev -3.91 ft
WEATHER cloudy, 60s, windy to light breeze, some fog, some light rain AFTER 15 MINUTES 7.90 ft / Elev -1.41 ft

GRAPHIC LOG	USCS SYMBOL	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE	RECOVERY (in)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	FIELD TORVANE (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MINUS #200 SIEVE CONTENT (%)	COMPRESSION STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)
	CH	CLAY, light brown, moderately moist, moderately plastic, with trace roots to 2'	0	ST	13		2.25			22							
				ST	9		1.75			28	51	19	32				
		light brown and greenish gray mottled, with sand seams and cracks	5	ST	16		2.3		91	38							
		more sand		ST	16		2.0			25							
				ST	14		1.4		97	24	60	18	42	74	0.47	15	0
		less sand	10	ST	19		2.7			27							
				ST	16		2.6		106	28	42	16	26				
		Silty CLAY, light brown and greenish gray mottled, with sand seams and cracks and shell fragments	15	ST	19		2.75			24							
		only a trace of shell fragments		ST	19		3.1			23	49	19	30	92			
		light brown, with sand and shell fragments	20	ST	14		1.9		105	23					1.12	14	0
	SM	Silty SAND, fine grained sand, light brown, wet, no plasticity		ST	12		-			24							
		dense			0												
			25	SS	18	10-13-25 (38)	-			24				35			
	CH	CLAY, greenish gray and light brown mottled, moderately wet, moderately plastic, stiff	30	SS	18	2-4-5 (9)	2.5			32							
		with sand seams and cracks		ST	18		1.6		86	37	57	22	35	98	0.98	6	0
				ST	17		2.2		90	31							
		less sand, greenish gray, moderately moist	35														

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BORING NUMBER 13-1003

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CLIENT USACE-Galveston District

PROJECT NAME Port Arthur Resident Office (PARO)

PROJECT NUMBER W912HY-13-D-0001, Task Order No.0008

PROJECT LOCATION Port Arthur, TX

GRAPHIC LOG	USCS SYMBOL	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE	RECOVERY (in)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	FIELD TORVANE (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS	MINUS #200 SIEVE	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)
			35												
	CH	CLAY, greenish gray and light brown mottled, moderately wet, moderately plastic, stiff (continued)		ST	19		3.2			32	58	20	38		
				ST	19		1.4			33					
	CL	Sandy CLAY, greenish gray and light brown mottled, moderately wet, moderately plastic, stiff	40	ST	19		1.5		87	34	44	19	25	98	0.64
				ST	19										
	CH	CLAY, greenish gray and light brown mottled, moderately wet, moderately plastic, stiff dark gray		ST	20		1.5			56					
				ST	17		1.6		85	37	62	22	40	99	1.06
			45	ST	19		2.0			39					
		greenish gray, moderate to high plasticity		ST	19		1.75			47	72	28	44		
				ST	19		1.9		74	50					
			50	ST	19		1.4		73	46	92	29	63		
				ST	19		1.6		75	50					
			55	ST	20		1.75		66	56	109	31	78	0.73	3
				ST	19		1.7			44					
	CL	Slightly sandy CLAY, greenish gray, moderately moist, moderate to high plasticity, with sand seams and cracks	60	ST	19		1.4		89	32	48	19	29	1.01	12
				ST	19		1.6			45					
		CLAY, greenish gray, moderately moist, moderately plastic, with sand seams and cracks no cracks		ST	19		1.75			52	90	29	61	99	
			65	ST	18		1.6		76	47					
				ST	18		1.8			46					
			70	ST	19		1.5		70	53	95	28	67	99	0.87
		with cracks		ST	18		1.9			51					
		no cracks		ST	18		1.4			55					
			75												

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BORING NUMBER 13-1003

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CLIENT USACE-Galveston District

PROJECT NAME Port Arthur Resident Office (PARO)

PROJECT NUMBER W912HY-13-D-0001, Task Order No.0008

PROJECT LOCATION Port Arthur, TX

GRAPHIC LOG	USCS SYMBOL	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE	RECOVERY (in)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	FIELD TORVANE (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MINUS #200 SIEVE CONTENT (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)
	CH	CLAY, greenish gray, moderately moist, moderately plastic, with sand seams and cracks (continued) slightly sandy, with a trace of organics	75	ST	18		1.9		73	50							
				ST	18		1.75		68	54	87	30	57		0.89	6	0
				ST	12		1.0			50							
			80	ST	18		1.4		63	62	105	33	72	92	0.68	4	33
				ST	19		1.5		71	49							
				ST	18		2.3			30							
				ST	18		2.25			30	57	19	38				
			85	ST	18		3.1			23							
	CL	Sandy CLAY, greenish gray, moderately moist, low plasticity, more sand seams	90	ST	19												
	SP-SM	SAND, fine grained, greenish gray, wet, no plasticity, loose, with trace of shell fragments very dense		SS	18	4-3-6 (9)	-			26				11			
					0												
			95	SS	0	9-30-50 (80)											
					0												
				SS	18	9-50				18							
			100														

Bottom of borehole at 100.0 feet.

SUMMARY TABLE OF LABORATORY TEST DATA																																								
Project Name: Port Arthur Resident Office																	Client: QRI							Terracon Project # : 92135321																
Boring	Depth	Field Tests			Atterberg Limits			Grain Size Analysis										USCS Symbol	Wc	γd	Strenght Tests																			
		PP	TV	SPTn	LL	PL	PI	% by weight passing sieve						Soil Particle Content							Unconfined Compression				UU Triaxial Test				Direct Shear				CU Triaxial Test							
								3/8	4	10	40	100	200	gravel	sand	silt	clay				sieve 200	C	Wc	γd	Symbol	C	Wc	γd	Symbol	C	φ	Wc	Symbol	C	φ	c'	φ'	Wc	γd	Symbol
								%	%	%	%	%	%	%	%	%	%				%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
ft	tsf	tsf	bl/ft	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	pcf	ksf	%	pcf	Symbol	ksf	%	pcf	Symbol	ksf	°	%	Symbol	ksf	°	ksf	°	%	pcf	Symbol		
13-B1003	0-2	2.25																	22																					
	2-4	1.75			51	19	32											CH*	28																					
	4-6	2.3																38	91																					
	6-8	2.0																25																						
	8-10	1.4			60	18	42			100	100		74	0	26			74	CH	24	97	0.47	24	97	CH**															
	10-12	2.7																	27																					
	12-14	2.6			42	16	26												28	106																				
	14-16	2.75																	24																					
	16-18	3.1			49	19	30	100	98	98	97		92	2	6			92	CL	23																				
	18-20	1.9																	23	105	1.12	23	105	CL**																
	20-22	-																	24																					
	22-24			38						100	100		35	0	65			35	SM*	24								0.26	33	24	SM**									
	24-26	-																																						
	26-28																																							
	28-30	2.5		9															32																					
	30-32	1.6			57	22	35			100	100		98	0	2			98	CH	37	86	0.98	37	86	CH**															
	32-34	2.2																	31	90																				
	34-36	3.2			58	20	38												32																					
	36-38	1.4																	33																					
	38-40	1.5			44	19	25			100	100		99	0	1			99	CL	34	87					0.64	34	87	CH**											
	40-42	1.5																	56																					
	42-44	1.6			62	22	40				100		99	0	1			99	CH	37	85	1.06	37	85	CH**															
	44-46	2.0																	39																					
	46-48	1.75			72	28	44												47																					
	48-50	1.9																	50	73																				
	50-52	1.4			92	29	63												46	73																				
	52-54	1.6																	50	75																				
	54-56	1.75			109	31	78												56	66	0.73	56	66	CH**																
	56-58	1.7																	44																					
	58-60	1.4			48	19	29												32	89						1.01	32	89	CH**											
	60-62	1.6																	45																					
	62-64	1.75			90	29	61		100	100	100		99	0	1			99	CH	52																				
	64-66	1.6																	47	76																				
	66-68	1.8																	46																					
	68-70	1.5			95	28	67			100	100		99	0	1			99	CH	53	70	0.87	53	70	CH**															
	70-72	1.9																	51																					
72-74	1.4																	55																						
74-76	1.9																	50	73																					
76-78	1.75			87	30	57												54	68	0.89	54	68	CH**																	
78-80	1.0																	50																						
80-82	1.4			105	33	72	100	100	99	95		92	0	8			92	CH	62	63					0.68	62	63	CH**												
82-84	1.5																	49	71																					
84-86	2.3																	30																						
86-88	2.25			57	19	38												CH*	30																					
88-90	3.1																	23																						
90-92	-		9						100	93		11	0	89			11	SP-SM*	26																					
92-94																																								
94-96			80																																					
96-98																																								
98-100																		18																						

Sample labeled 23'-25'

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13 B1003 8-10 Contract No.: W912HY-13-D-0001, DY08

Description: Fine L.T.G. Silty CL-LS (poor)

Pan No. & Weight: E10 49.43 Wet Sample + Pan Weight: 158.29

Dry Sample + Pan Weight: 137.61 Dry Sample Weight: 88.18

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0.05		
No. 200	22.60		

Prepared By: CH Date: 01-23-14 Tested By: RG Date: 1-27-14
 Computed By: Date: Checked By: 2 Date: 1/28

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - 15 - 2014

Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13-B1003/16-18 Contract No: W912HY-13-D-0001, DY08

Description: LIT Sandstone w/calc

Pan No. & Weight: N15/41.60 Wet Sample + Pan Weight: 152.11

Dry Sample + Pan Weight: 131.40 Dry Sample Weight: 89.80

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	1.53		
No. 10	2.06		
No. 40	2.43		
No. 200	7.38		

Prepared By: Rodrigo Date: 1/15

Tested By: RG Date: 1-18-14

Computed By: Date:

Checked By: J Date: 1/28

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - 30-2014

Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13-B1003/23-25 Contract No: W912HY-13-D-0001, DY08

Description:

Pan No. & Weight : 45 / 50.61 Wet Sample + Pan Weight : 202.90

Dry Sample + Pan Weight: 174.67 Dry Sample Weight: 128.06

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch	0		
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0.02		
No. 200	83.04		

Prepared By: Rodrigo Date: 1/30

Tested By: RG

Date: 2-19-14

Computed By:

Date:

Checked By:

✓

Date: 2/19

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13 B 1003 30-32 Contract No.: W912HY-13-D-0001, DY08

Description: G Fine clay w/ silt, & fr

Pan No. & Weight: 122 / 49.44 Wet Sample + Pan Weight: 147.55

Dry Sample + Pan Weight: 120.97 Dry Sample Weight: 71.53

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0.08		
No. 200	1.24		

Prepared By: ch Date: 01-23-14 Tested By: RG Date: 1-29-14
 Computed By: Date: Checked By: [Signature] Date: 1/29

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13-B 1003 38'40' Contract No: W912HY-13-D-0001, DY08

Description: G Fat clay w/ silt CH

Pan No. & Weight: 2T / 49.97 Wet Sample + Pan Weight: 138.85

Dry Sample + Pan Weight: 116.55 Dry Sample Weight: 66.58

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch	0		
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0.01		
No. 200	1.01		

Prepared By: ch Date: 2-14-14 Tested By: NG Date: 2-18

Computed By: Date: Checked By: BP Date: 2/21

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13B1003 42-44 Contract No.: W912HY-13-D-0001, DY08

Description: G Fat clay

Pan No. & Weight : 912 / 50.55 Wet Sample + Pan Weight : 161.68

Dry Sample + Pan Weight: 131.61 Dry Sample Weight: 81.06

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0		
No. 200	0.54		

Prepared By: W Date: 01-23-14 Tested By: RC Date: 1-22-14
Computed By: _____ Date: _____ Checked By: JS Date: 1/28

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - 15 -2014

Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13-B1003/62-64 Contract No: W912HY-13-D-0001, DY08

Description: G fat clay w/FE w/odor

Pan No. & Weight : S11/42.79 Wet Sample + Pan Weight : 140.00

Dry Sample + Pan Weight: 106.57 Dry Sample Weight: 63.78

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0.04		
No. 40	0.18		
No. 200	0.60		

Prepared By: Rodrigo

Date: 1/15

Tested By: RG

Date: 1-18-14

Computed By:

Date:

Checked By: Y

Date: 1/28

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13B1003 68-70 Contract No.: W912HY-13-D-0001, DY08

Description: G Fat Clay CH

Pan No. & Weight: C19 150.13 Wet Sample + Pan Weight: 153.47

Dry Sample + Pan Weight: 117.89 Dry Sample Weight: 67.76

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	0.04		
No. 200	0.40		

Prepared By: ch Date: 1-24-14 Tested By: CG Date: 1-27-14
 Computed By: Date: Checked By: [Signature] Date: 1/28

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - -2014 Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: B-B 1003 80'-82' Contract No: W912HY-13-D-0001, DY08

Description: G Fat Clay w/ Few org.

Pan No. & Weight : 9T/ 51.15 Wet Sample + Pan Weight : 114.36

Dry Sample + Pan Weight: 90.25 Dry Sample Weight: 39.10

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch	0		
3/8 inch	0		
No. 4	0.11		
No. 10	0.41		
No. 40	1.78		
No. 200	3.07		

Prepared By: ch Date: 2-14-14 Tested By: RG Date: 2-17
 Computed By: Date: Checked By: RP Date: 2/21

Abbreviated Sieve Analysis Worksheet (ASTM D422)

Date: 01 - 15 - 2014

Project No.: 92145005

Project Name.: Port Arthur resident Office - USACE

Boring No.: 13-B1003/90-92 Contract No: W912HY-13-D-0001, DY08

Description: GB Silty Sand

Pan No. & Weight: 1F / 41.37 Wet Sample + Pan Weight: 174.70

Dry Sample + Pan Weight: 146.98 Dry Sample Weight: 105.61

Sieve Size	Accum. Wt. of Sample	Percent of Retained	Percent Passing
1/2 inch			
3/8 inch	0		
No. 4	0		
No. 10	0		
No. 40	7.61		
No. 200	98.87		

Prepared By: Rodrigo Date: 1/15 Tested By: RG Date: 1-18-14

Computed By: Date: Checked By: J Date: 1/28

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 **Depth** 2-4

Date: 1-17-2014

Material Description: (Fill) Fat clay w/ lean clay PKTS CH/CL

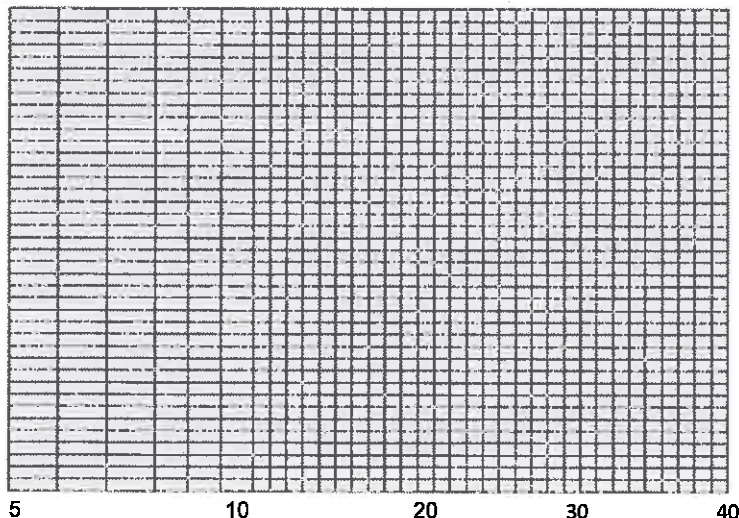
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	706	827	903			
Weight in grams	Tare + Wet Soil	31.97	30.34	30.97		
	Tare + Dry Soil	26.45	25.30	25.38		
	Water W _w					
	Tare	15.13	15.05	15.12		
	Dry Soil W _d					
Water Content	W					
No. of Blows	35	26	16			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 6-26105
 Scale MTE No. B2894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	102	101				
Weight in grams	Tare + Wet Soil	38.10	37.96			
	Tare + Dry Soil	36.74	36.63			
	Water W _w					
	Tare	29.53	29.60			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks _____

Technician ch JC

Computed by _____

Checked by _____

Date: 1-16-14

Date: _____

Che Date: _____

11-27

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 Depth 12 - 14

Date: 1-17-2014

Material Description: lean clay w/ cal & cl fls

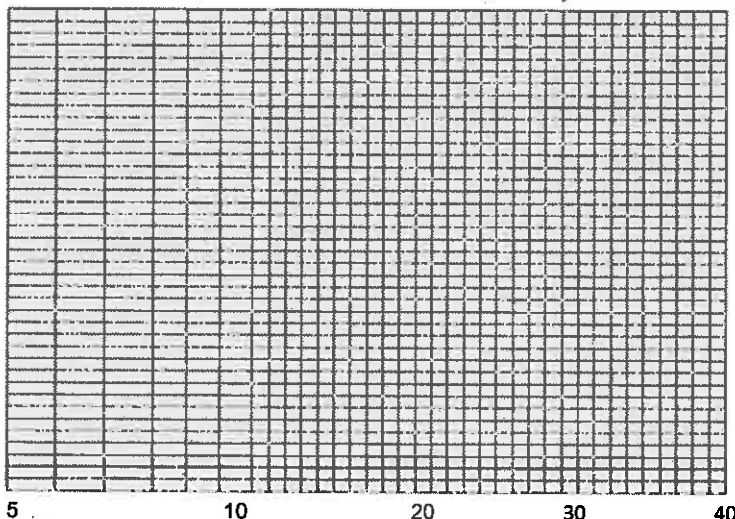
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	414	715	23			
Weight in grams	Tare + Wet Soil	31.88	32.75	31.25		
	Tare + Dry Soil	27.09	27.51	26.26		
	Water W _w					
	Tare	15.16	15.19	15.03		
	Dry Soil W _d					
Water Content	W					
No. of Blows	34	25	17			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. G26105
Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	109	106				
Weight in grams	Tare + Wet Soil	37.45	37.37			
	Tare + Dry Soil	36.34	36.24			
	Water W _w					
	Tare	29.25	29.22			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician th/jc

Computed by _____

Checked by _____

Date: 1-16-14

Date: _____

Che Date: _____

1/27

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 Depth 16-18

Date: 1-17-2014

Material Description: CH Tan Sat clay

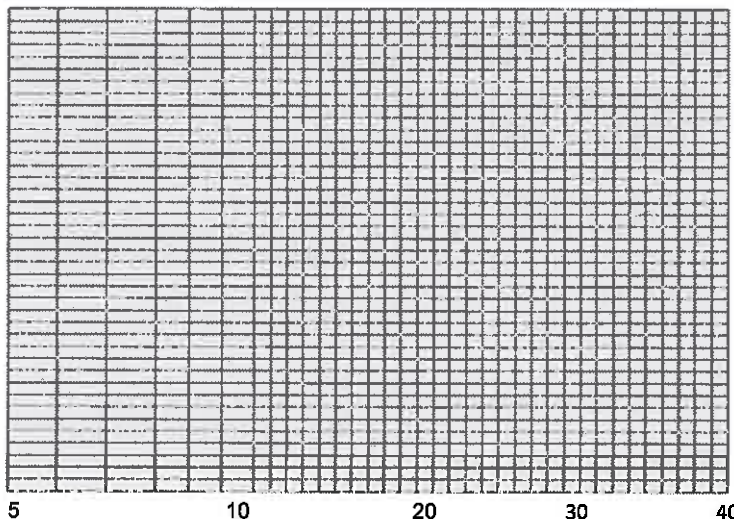
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	814	817	4P			
Weight in grams	Tare + Wet Soil	31.29	31.24	31.90		
	Tare + Dry Soil	26.05	25.86	26.12		
	Water W _w					
	Tare	14.99	15.1498	14.82		
	Dry Soil W _d					
Water Content	W					
No. of Blows	35	25	17			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 626105
Scale MTE No. B7884

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	115	111				
Weight in grams	Tare + Wet Soil	37.69	37.15			
	Tare + Dry Soil	36.33	35.86			
	Water W _w					
	Tare	29.15	29.31			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician CH/JO Computed by _____

Checked by _____

Date: 1-16-14 Date: _____

Che Date: 1-17-14

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-B1003 Depth 34 - 36

Date: 1-17-2014

Material Description: CH

Gray Sat clay

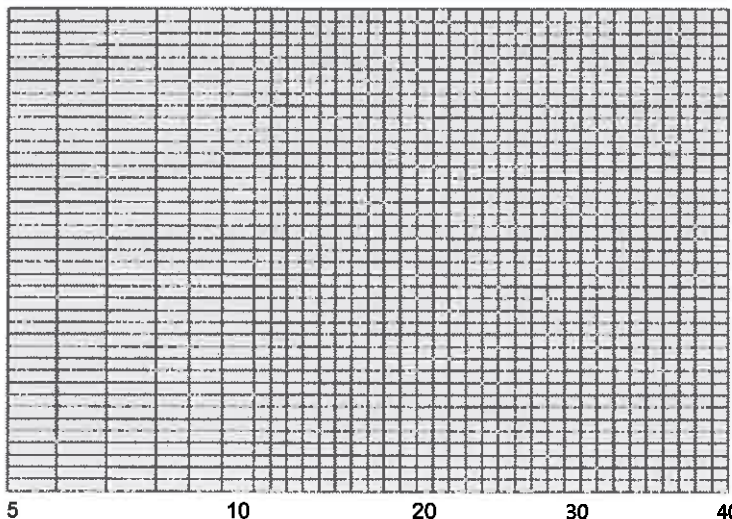
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	400A	910	29			
Weight in grams	Tare + Wet Soil	31.26	30.15	29.90		
	Tare + Dry Soil	25.40	24.63	24.19		
	Water W _w					
	Tare	15.12	15.22	14.86		
	Dry Soil W _d					
Water Content	W					
No. of Blows	33	23	15			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 626105
 Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	117	116				
Weight in grams	Tare + Wet Soil	36.73	36.47			
	Tare + Dry Soil	35.48	35.25			
	Water W _w					
	Tare	29.26	29.18			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician CH JC

Computed by _____

Checked by _____

Date: 1-16-14

Date: _____

Che Date: _____

1/29

received on 2/19/14

Terracon Consultants, Inc.

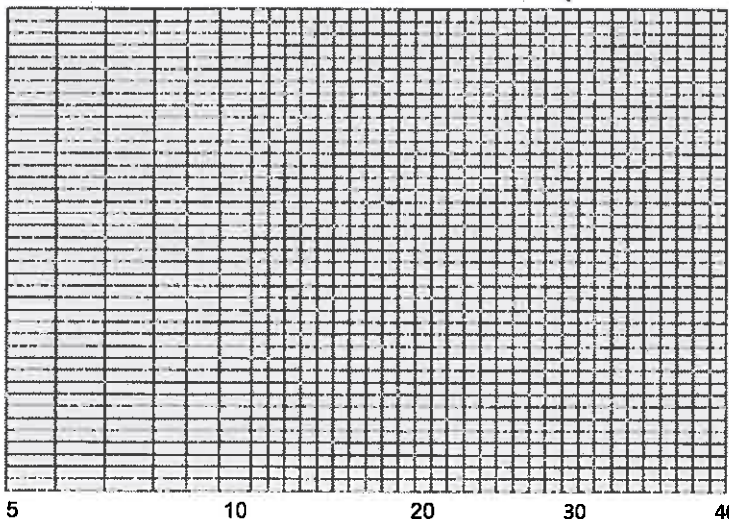
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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106Project: Port Arthur Resident Office - USACEProject No. 92145005USACE : Contract No. W912HY-13-D-0001-DY08Boring No: 131003 Depth 38-40Date: 2/17/2014Material Description: Grey Fat clay☐ One Point☒ Three Points☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	405	710	711			
Weight in grams	Tare + Wet Soil	31.15	33.38	33.15		
	Tare + Dry Soil	26.35	27.73	27.50		
	Water W_w					
	Tare	15.13	15.07	15.20		
	Dry Soil W_d					
Water Content W						
No. of Blows		34	24	17		

Water Content, W



LL _____

PL _____

PI _____

Symbol from
plasticity chartLL MTE No. G26105
Scale MTE No. B7854

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	7P	21				
Weight in grams	Tare + Wet Soil	22.24	22.89			
	Tare + Dry Soil	21.09	21.65			
	Water W_w					
	Tare	14.96	14.99			
	Dry Soil W_d					
Water Content W						
Plastic Limit						

Remarks

Technician JC

Computed by _____

Checked by JCP

Date: _____

Date: _____

Che Date: 2/21

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 Depth 46-48

Date: 1-17-2014

Material Description: CH

Gray fat clay

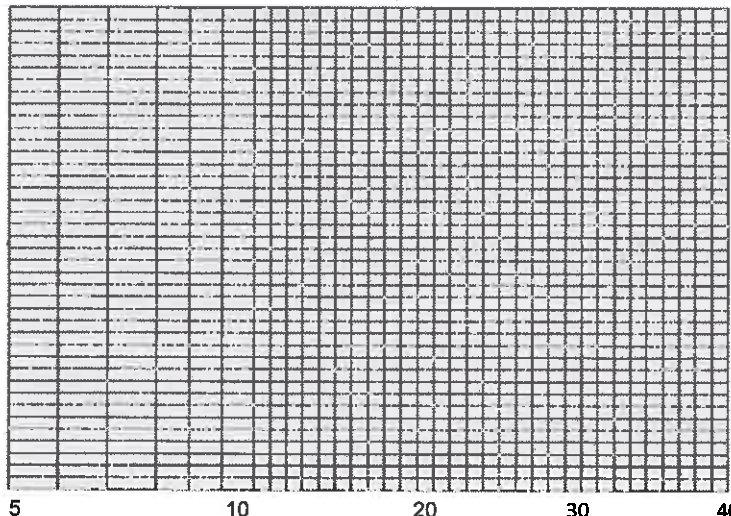
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	212	415	517			
Weight in grams	Tare + Wet Soil	30.75	32.02	31.39		
	Tare + Dry Soil	24.25	24.95	24.42		
	Water W_w					
	Tare	14.84	15.24	14.15.15		
	Dry Soil W_d					
Water Content	W					
No. of Blows	32	23	16			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 626105

Scale MTE No. 82894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	113	123				
Weight in grams	Tare + Wet Soil	37.86	35.88			
	Tare + Dry Soil	35.93	34.41			
	Water W_w					
	Tare	29.12	29.21			
	Dry Soil W_d					
Water Content	W					
Plastic Limit						

Remarks

Technician CH, JC Computed by _____

Checked by 112

Date: 1-16-14 Date: _____

Che Date: 1-17-14

ENT 2/18/2014

Received on 2/18/14

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 Depth 50-52

Date: 2/5/2014

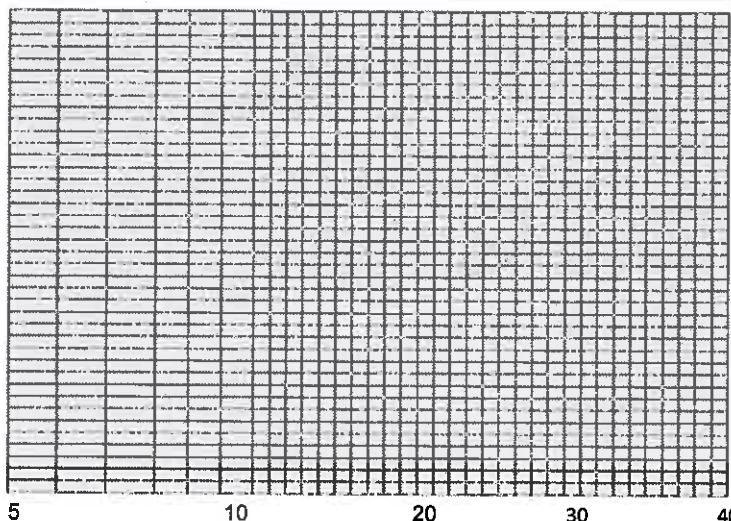
Material Description:

Grey fat clay

☐ One Point☒ Three Points☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	421	711	826			
Weight in grams	Tare + Wet Soil	31.00	31.19	30.87		
	Tare + Dry Soil	23.55	23.50	23.22		
	Water W _w					
	Tare	15.16	15.20	15.22		
	Dry Soil W _d					
Water Content	W					
No. of Blows	33	24	17			

Water Content, W



LL _____

PL _____

PI _____

Symbol from
plasticity chart

LL MTE No. G26105

Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	902	910				
Weight in grams	Tare + Wet Soil	22.36	22.34			
	Tare + Dry Soil	20.75	20.74			
	Water W _w					
	Tare	15.23	15.21			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician

JC

Computed by

Checked by

BP

Date:

Date:

Che Date:

2/21

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 **Depth** 58-60

Date: 2/14/2014

Material Description: G fat clay

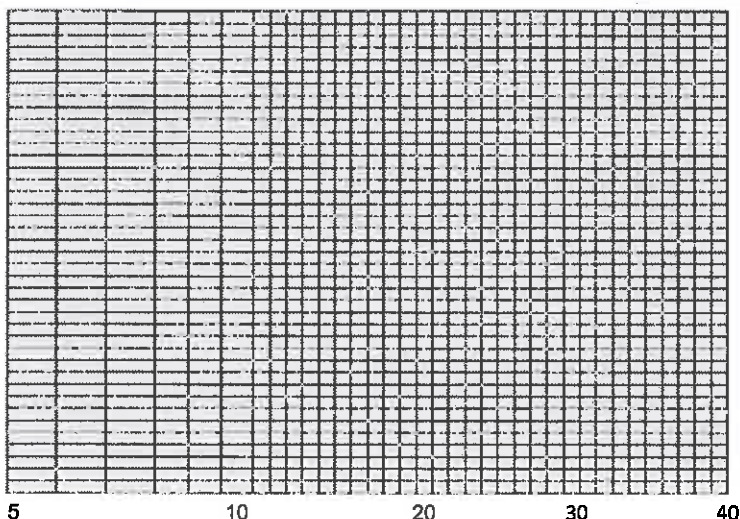
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	501	511	513			
Weight in grams	Tare + Wet Soil	29.58	29.88	31.26		
	Tare + Dry Soil	24.97	25.04	25.90		
	Water W_w					
	Tare	15.22	15.03	15.12		
	Dry Soil W_d					
Water Content	W					
No. of Blows	33	23	16			

Water Content, W



LL _____

PL _____

PI _____

Symbol from
plasticity chart

LL MTE No. G26105
 Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	711	2P				
Weight in grams	Tare + Wet Soil	22.16	22.32			
	Tare + Dry Soil	21.06	21.16			
	Water W_w					
	Tare	15.20	14.93			
	Dry Soil W_d					
Water Content	W					
Plastic Limit						

Remarks

Technician JC

Computed by _____

Checked by HP

Date: _____

Date: _____

Che Date: 2/21

Terracon Consultants, Inc.
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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☐ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-^B1003 **Depth** 62-64

Date: 1-20-2014

Material Description: CH Gray fat clay

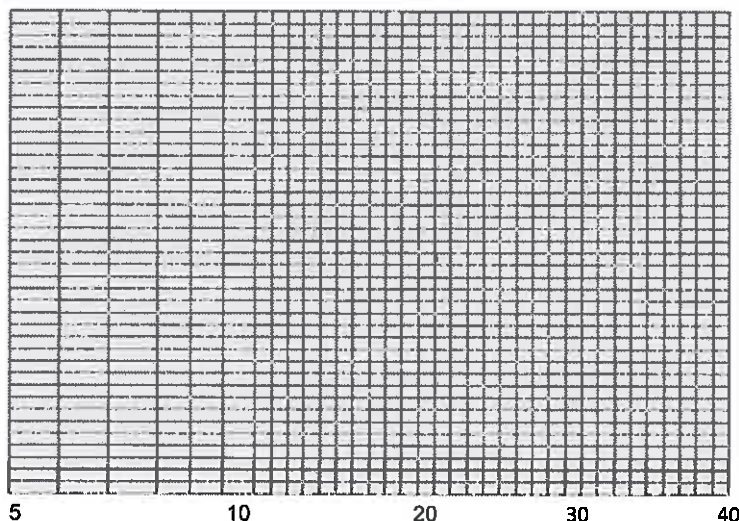
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	413	505	902			
Weight in grams	Tare + Wet Soil	30.51	31.48	30.01		
	Tare + Dry Soil	23.38	23.80	22.82		
	Water W _w					
	Tare	15.19	15.17	15.24		
	Dry Soil W _d					
Water Content	W					
No. of Blows	35	26	15			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 626105
 Scale MTE No. 132894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	119	116				
Weight in grams	Tare + Wet Soil	37.75	36.87			
	Tare + Dry Soil	35.81	35.12			
	Water W _w					
	Tare	29.13	29.18			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician W JC Computed by _____ Checked by _____
 Date: 1-17-14 Date: _____ Che Date: 1/20

Terracon Consultants, Inc.
11555 Clay Road, Suite 100 Houston, TX 77043 P [713] 690 8989

Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13-1003 **Depth** 80-82

Date: 2/15/2014

Material Description:

Gray fat clay

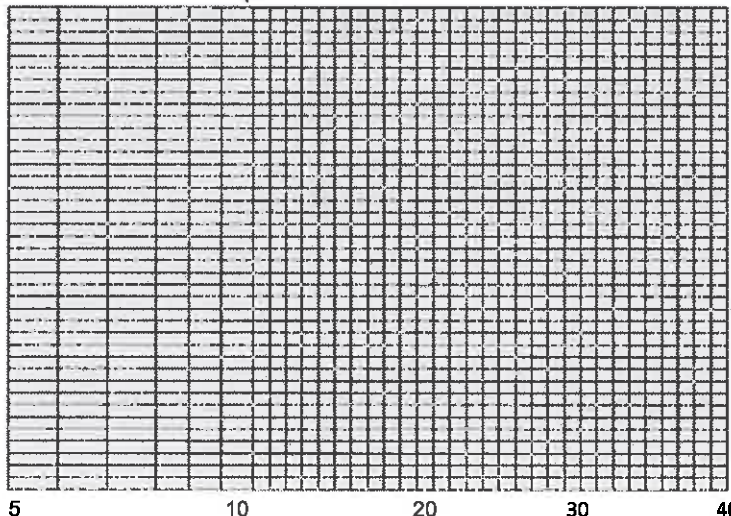
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit									
Run No.		1	2	3	4	5	6		
Tare No.		405	710	830					
Weight in grams	Tare + Wet Soil	29.27	31.36	30.32					
	Tare + Dry Soil	22.16	22.98	22.40					
	Water W _w								
	Tare	15.13	15.06	15.18					
	Dry Soil W _d								
Water Content W									
No. of Blows		35	24	16					

Water Content, W



LL _____

PL _____

PI _____

Symbol from
plasticity chart

LL MTE No. G26105
 Scale MTE No. B7894

Plastic Limit							Natural Water Content
Run No.		1	2	3	4	5	
Tare No.		21	23				
Weight in grams	Tare + Wet Soil	22.07	22.49				
	Tare + Dry Soil	20.32	20.63				
	Water W _w						
	Tare	15.00	15.02				
	Dry Soil W _d						
Water Content W							
Plastic Limit							

Remarks

Technician JC

Computed by _____

Checked by BP

Date: _____

Date: _____

Che Date: 2/21

Terracon Consultants, Inc.
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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No.W912HY-13-D-0001-DY08

Boring No: 13-B1003 **Depth** 86-88

Date: 1-17-2014

Material Description: CH

Lt Gray Fat clay

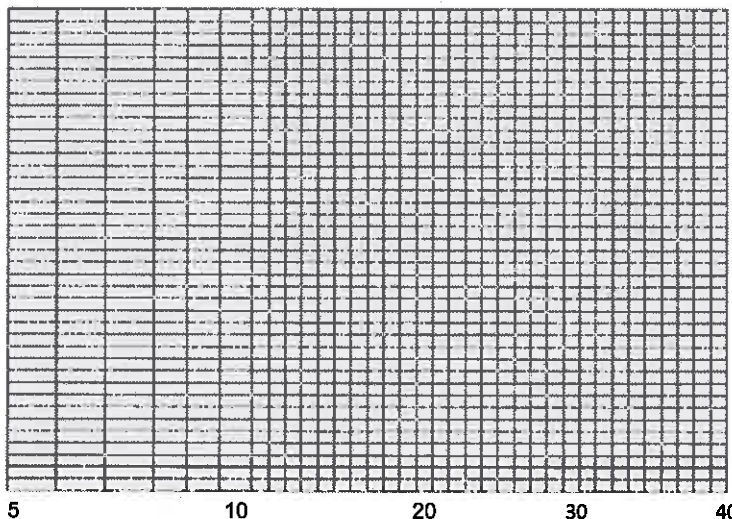
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	807	826	830			
Weight in grams	Tare + Wet Soil	32.24	30.19	31.77		
	Tare + Dry Soil	26.13	24.77	25.61		
	Water W _w					
	Tare	15.96	15.23	15.19		
	Dry Soil W _d					
Water Content	W					
No. of Blows	34	26	18			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. G26105
 Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	122	121				
Weight in grams	Tare + Wet Soil	38.82	35.12			
	Tare + Dry Soil	37.23	34.15			
	Water W _w					
	Tare	29.05	29.12			
	Dry Soil W _d					
Water Content	W					
Plastic Limit						

Remarks

Technician CH JC Computed by

Checked by

Date: 1-16-14

Date:

Che Date:

2 114

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 1003 **Depth** 8-10

Date: 1-23-2014

Material Description:

Loose Tan Fat clay

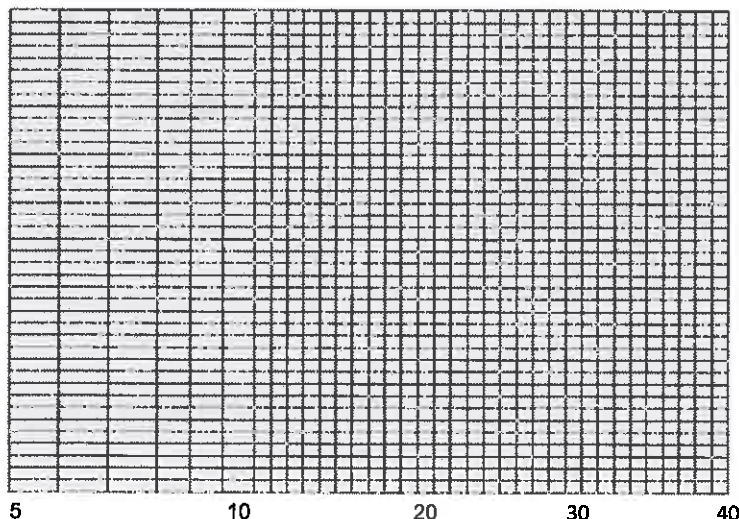
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	421	501	507			
Weight in grams	Tare + Wet Soil	30.61	30.43	31.75		
	Tare + Dry Soil	24.93	24.72	25.40		
	Water W_w					
	Tare	15.17	15.23	15.20		
	Dry Soil W_d					
Water Content	W					
No. of Blows	35	26	18			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. G26105
 Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	830	24				
Weight in grams	Tare + Wet Soil	22.19	22.52			
	Tare + Dry Soil	21.19	21.41			
	Water W_w					
	Tare	15.19	15.09			
	Dry Soil W_d					
Water Content	W					
Plastic Limit						

Remarks

Technician JC

Computed by _____

Checked by JSP

Date: _____

Date: _____

Che Date: 2/11

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DY08

Boring No: 13- 1003 **Depth** 30-32

Date: 1-25-2014

Material Description: Gray lean clay

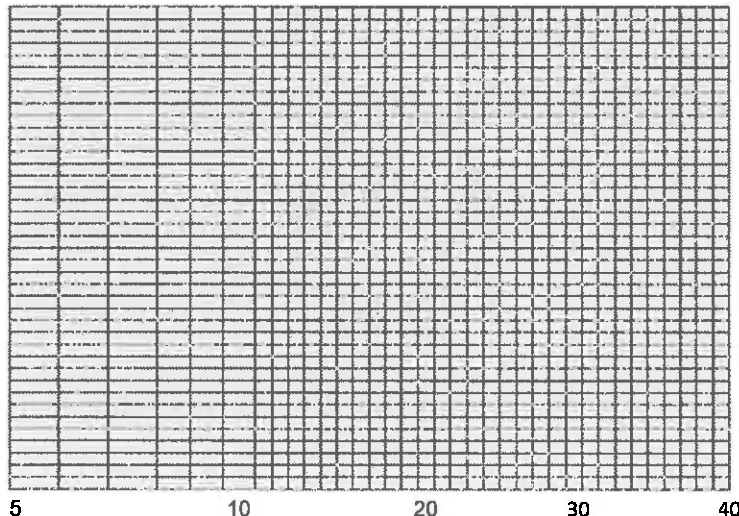
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	212	500	513			
Weight in grams	Tare + Wet Soil	29.82	29.96	32.33		
	Tare + Dry Soil	24.49	24.59	25.95		
	Water W _w					
	Tare	14.84	15.20	15.12		
	Dry Soil W _d		14			
Water Content W						
No. of Blows	32	23	15			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. 626105
 Scale MTE No. B7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	714	826				
Weight in grams	Tare + Wet Soil	22.41	22.21			
	Tare + Dry Soil	21.11	20.96			
	Water W _w					
	Tare	15.10	15.21			
	Dry Soil W _d					
Water Content W						
Plastic Limit						

Remarks

Technician JC

Computed by _____

Checked by BPO

Date:

Date:

Che Date: 2/21

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DYO8

Boring No: 13-1003 **Depth** 42.44

Date: 1-25-2014

Material Description: Gray Catclay

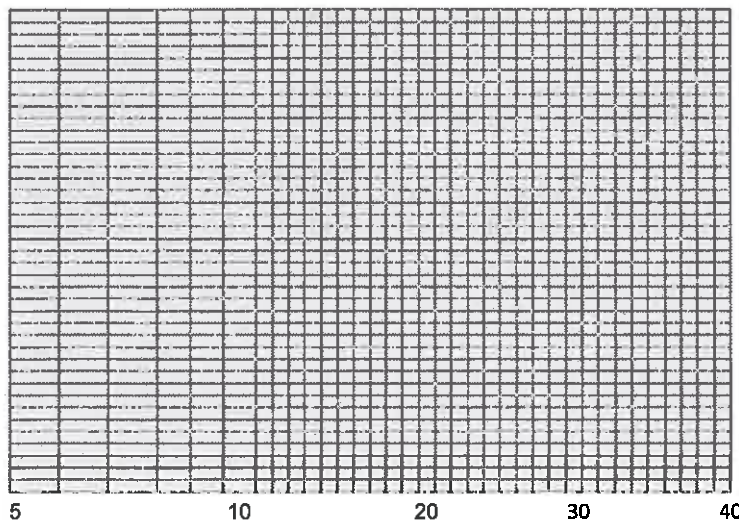
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	715	813	817			
Weight in grams	Tare + Wet Soil	31.00	31.04	31.18		
	Tare + Dry Soil	25.16	24.94	24.69		
	Water W _w					
	Tare	15.18	15.02	14.97		
	Dry Soil W _d					
Water Content W						
No. of Blows	35	24	15			

Water Content, W



LL _____

PL _____

PI _____

Symbol from plasticity chart

LL MTE No. G-26105
Scale MTE No. B-7894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	901	23				
Weight in grams	Tare + Wet Soil	22.57	22.93			
	Tare + Dry Soil	21.24	21.51			
	Water W _w					
	Tare	15.16	15.02			
	Dry Soil W _d					
Water Content W						
Plastic Limit						

Remarks _____

Technician JC

Computed by _____

Checked by JP

Date: _____

Date: _____

Che Date: 2/21

Terracon Consultants, Inc.
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Liquid Limit, Plastic Limit, and Plasticity Index of Soils

☒ ASTM D 4318 ☐ AASHTO T 89 & T 90 ☐ TEX 104, 105, & 106

Project: Port Arthur Resident Office - USACE

Project No. 92145005

USACE : Contract No. W912HY-13-D-0001-DYO8

Boring No: 13-¹⁰⁰³ **Depth** 68-70

Date: 1/27/2014

Material Description:

Grey Fat clay

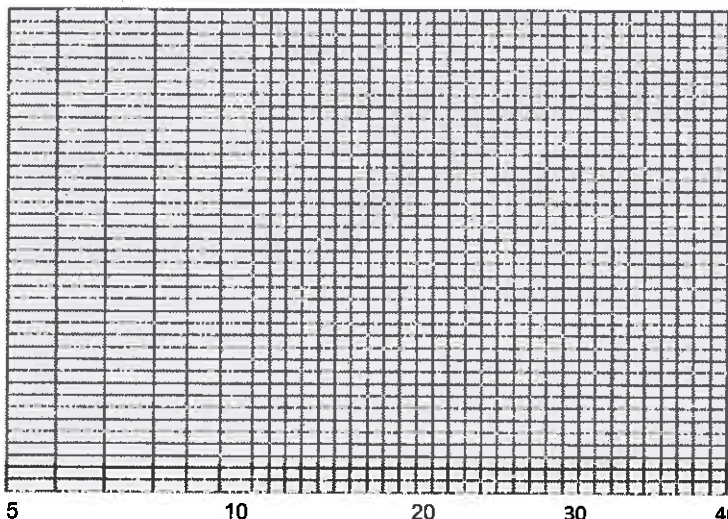
☐ One Point

☒ Three Points

☒ Pass #40 sieve

Liquid Limit						
Run No.	1	2	3	4	5	6
Tare No.	400A	401	402			
Weight in grams	Tare + Wet Soil	30.88	30.30	30.10		
	Tare + Dry Soil	23.29	22.97	22.69		
	Water W _w					
	Tare	15.13	15.24	15.17		
	Dry Soil W _d					
Water Content W						
No. of Blows		35	25	17		

Water Content, W



LL _____

PL _____

PI _____

Symbol from
plasticity chart

LL MTE No. 626105

Scale MTE No. 67894

Plastic Limit						Natural Water Content
Run No.	1	2	3	4	5	
Tare No.	813	818				
Weight in grams	Tare + Wet Soil	22.07	22.46			
	Tare + Dry Soil	20.54	20.85			
	Water W _w					
	Tare	15.02	15.08			
	Dry Soil W _d					
Water Content W						
Plastic Limit						

Remarks

Technician JC

Computed by _____

Checked by BP

Date: _____

Date: _____

Che Date: 2/1

(13)

TRIAxIAL TEST DATA SHEET

PROJECT & SAMPLE DATA

Project number: 92145005 Date: 1-24-2014

Client: QRT - USACE

Project: PORT ARTHUR RESIDENT OFFICE

Sample Location: 13-B-1003, # 50-52

Sample Description: Gr, Fat cl

Type of Sample: (Undisturbed, Remolded, etc.)

Liquid Limit= Plastic Limit=

Remarks: Confining pressure ① 8.1

CONTRACT # W912HY-13-D-0001D408 ② 22.1

③ 36.1

Fig no.: 2nd page Fig no. (if applicable):

TEST PROCEDURE OPTIONS

Test Type: ☐ UU ☐ CU ☐ CU w/pore pressures ☐ CD

Deformation Dial Constant:

Specimen parameter calculation method: ☐ ASTM method A ☐ ASTM method B

☐ ASTM B w/ Saturation Estimate ☐ CORPS uniform strain

☐ CORPS saturation assumed ☐ CORPS uniform strain w/saturation assumed

Staged test method: ☐ YES ☐ NO

SHEAR PROGRAM FILE NAME:

DESCRIPTION:

TRIAxIAL TEST DATA SHEET

SPECIMEN DATA

Project number: 92145005

Date: 1-24-2014

Test Specimen number: 13-B-1003
50-52

Tested by: MM / SAM

Sample Data

	Initial	Final
Moist soil & tare	<u>323</u>	<u>197.65</u>
Dry soil and tare	<u>150.84</u>	<u>152.42</u>
Tare	<u>110.18</u>	<u>58.72</u>
Moisture content	<u>22.46</u>	

Saturation

Consolidation

Change in height
(initial - final)

Change in water volume
(initial - final)

Moist weight = 964.51

Specific gravity = _____

Diameter @ top = 2.69

Diameter @ center = 2.70

Diameter @ bottom = 2.67

Average diameter = 2.69

Height 1 = 6.04

Height 2 = 6.04

Height 3 = 6.04

Height 4 = _____

Average height = 6.04

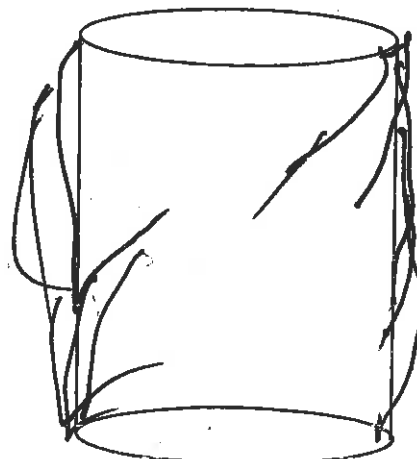
Wet density = _____

Dry density = _____

Saturation = _____

Void ratio = _____

Estimated final saturation = _____

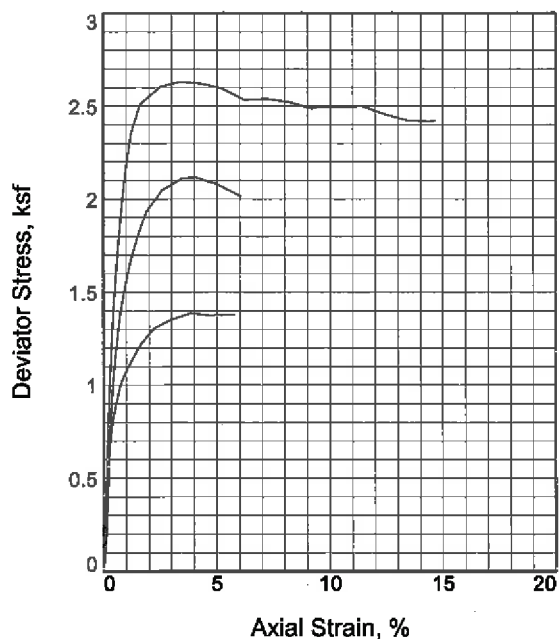
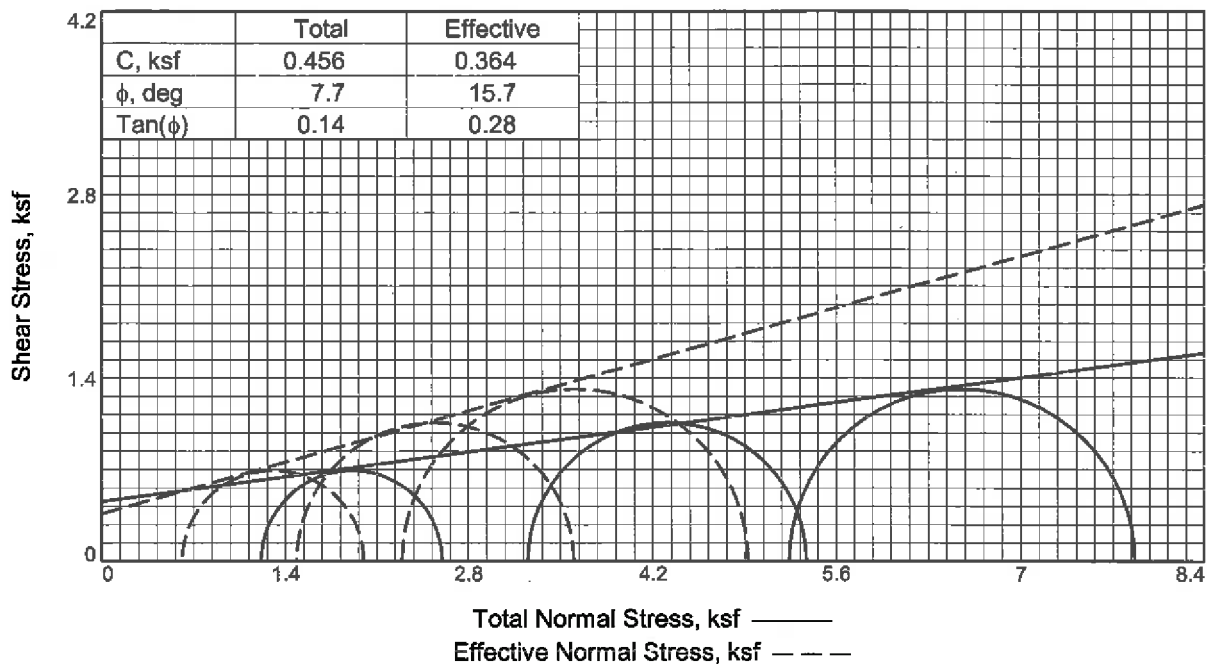


Shear _____

Bulge _____

Vertical Split _____

Project Name			Triaxial Board:			Technician				
Project No: 92145005			Boring No.: B-1003.50-52			Depth				
Back Pressure Saturation						Consolidation				
Chamber Pressure	Back Pressure (psi)	Pore Pressure (psi)	Burette reading (cc)	Volume Change (cc)	"B" (Z)	Date	Clock Time	Elapsed Time (min.)	Burette Reading (cc)	Volume Change (cc)
10	8						60/68.1	24.00		
20	18		11.00	14.50	60/82.1		0.5	22.90		
30	28				12.00		1.0	22.35		
40	38		12.00	15.00	3.15		2.0	22.00		
50	48		10.50		3.15		4	21.5		
60	58		16.00				8	20.80		
					60/96.7		28	18.17		
			17.5		24.00		60	17.00		
			17.80		12.05		90	16.00		
			17.00		11.90		8-45	6.10		
					11.85					
					11.85		24h	5.00		
1st Cell Pressure		59.93					2dr	4.95		
back Pressure		58.25					3dr	4.90		
1st Pore Pressure		58.20								
2nd Cell Pressure		65.02								
2nd Pore Pressure		63.37								
B value		5.17 / 5.09 = 1.01								
Remarks						Chamber Pressure		68.1 psi		
						Back Pressure		60.0 psi		
						Consolidation Pressure		8.1 psi		



Sample No.		1	2	3
Initial	Water Content, %	46.4	46.4	46.4
	Dry Density, pcf	73.1	73.1	73.1
	Saturation, %	94.6	94.6	94.6
	Void Ratio	1.3472	1.3472	1.3472
	Diameter, in.	2.690	2.690	2.690
	Height, in.	6.040	6.040	6.040
At Test	Water Content, %	49.0	49.0	49.0
	Dry Density, pcf	73.1	73.1	73.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	1.3472	1.3472	1.3472
	Diameter, in.	2.690	2.690	2.690
	Height, in.	6.040	6.040	6.040
Strain rate, in./min.		0.000	0.000	0.000
Back Pressure, psi		60.000	60.000	60.000
Cell Pressure, psi		68.430	82.590	96.380
Fail. Stress, ksf		1.386	2.116	2.629
Excess Pore Pr., ksf		0.604	1.767	2.946
Ult. Stress, ksf				
Excess Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		1.996	3.601	4.922
$\bar{\sigma}_3$ Failure, ksf		0.610	1.485	2.293

Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: Gray Fat Clay

Assumed Specific Gravity= 2.75

Remarks: ASTM D4767

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office

Location: 13-B1003

Sample Number: 26

Depth: 50-52 ft.

Proj. No.: 92145005

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Houston, TX

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

2/14/2014
12:12 PM

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office
Project No.: 92145005
Location: 13-B1003
Depth: 50-52 ft. **Sample Number:** 26
Description: Gray Fat Clay
Remarks: ASTM D4767
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.840			197.650
Moisture content: Dry soil+tare, gms.	110.180			152.420
Moisture content: Tare, gms.	22.460			58.720
Moisture, %	46.4	49.0	49.0	48.3
Moist specimen weight, gms.	964.51			
Diameter, in.	2.690	2.690	2.690	
Area, in. ²	5.683	5.683	5.683	
Height, in.	6.040	6.040	6.040	
Net decrease in height, in.		0.000	0.000	
Wet density, pcf	107.0	109.0	109.0	
Dry density, pcf	73.1	73.1	73.1	
Void ratio	1.3472	1.3472	1.3472	
Saturation, %	94.6	100.0	100.0	

Test Readings for Specimen No. 1

Consolidation cell pressure = 68.430 psi (9.854 ksf)
Consolidation back pressure = 60.000 psi (8.640 ksf)
Consolidation effective confining stress = 1.214 ksf
Strain rate, in./min. = 0.000
Fail. Stress = 1.386 ksf at reading no. 16

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	9.854	9.854	1.00	0.000	9.854	0.000
1	0.0007	5.890	5.9	0.0	0.149	1.210	1.360	1.12	60.025	1.285	0.075
2	0.0036	10.662	10.7	0.1	0.270	1.123	1.393	1.24	60.629	1.258	0.135
3	0.0065	14.836	14.8	0.1	0.375	1.076	1.451	1.35	60.959	1.264	0.188
4	0.0094	18.765	18.8	0.2	0.475	1.045	1.520	1.45	61.173	1.282	0.237
5	0.0123	22.167	22.2	0.2	0.561	1.006	1.567	1.56	61.444	1.286	0.280
6	0.0167	26.310	26.3	0.3	0.665	0.959	1.624	1.69	61.771	1.291	0.332
7	0.0210	29.789	29.8	0.3	0.752	0.879	1.631	1.86	62.325	1.255	0.376
8	0.0268	32.737	32.7	0.4	0.826	0.873	1.699	1.95	62.366	1.286	0.413
9	0.0341	35.813	35.8	0.6	0.902	0.811	1.713	2.11	62.801	1.262	0.451
10	0.0443	39.559	39.6	0.7	0.995	0.775	1.770	2.28	63.046	1.273	0.497
11	0.0588	42.647	42.6	1.0	1.070	0.693	1.763	2.54	63.618	1.228	0.535
12	0.0762	45.547	45.5	1.3	1.139	0.655	1.794	2.74	63.882	1.225	0.570
13	0.0994	49.062	49.1	1.6	1.223	0.631	1.854	2.94	64.047	1.242	0.611
14	0.1342	52.660	52.7	2.2	1.305	0.620	1.924	3.11	64.127	1.272	0.652
15	0.1806	55.000	55.0	3.0	1.352	0.629	1.981	3.15	64.065	1.305	0.676
16	0.2328	56.895	56.9	3.9	1.386	0.610	1.996	3.27	64.192	1.303	0.693
17	0.2850	56.873	56.9	4.7	1.373	0.633	2.006	3.17	64.037	1.319	0.687
18	0.3488	57.736	57.7	5.8	1.378	0.658	2.037	3.09	63.858	1.348	0.689
19	0.3489	57.777	57.8	5.8	1.379	0.654	2.033	3.11	63.888	1.344	0.690

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.840			197.650
Moisture content: Dry soil+tare, gms.	110.180			152.420
Moisture content: Tare, gms.	22.460			58.720
Moisture, %	46.4	49.0	49.0	48.3
Moist specimen weight, gms.	964.51			
Diameter, in.	2.690	2.690	2.690	
Area, in. ²	5.683	5.683	5.683	
Height, in.	6.040	6.040	6.040	
Net decrease in height, in.		0.000	0.000	
Wet density, pcf	107.0	109.0	109.0	
Dry density, pcf	73.1	73.1	73.1	
Void ratio	1.3472	1.3472	1.3472	
Saturation, %	94.6	100.0	100.0	

Test Readings for Specimen No. 2

Consolidation cell pressure = 82.590 psi (11.893 ksf)

Consolidation back pressure = 60.000 psi (8.640 ksf)

Consolidation effective confining stress = 3.253 ksf

Strain rate, in./min. = 0.000

Fail. Stress = 2.116 ksf at reading no. 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	11.893	11.893	1.00	0.000	11.893	0.000
1	0.0048	3.170	3.2	0.1	0.080	3.200	3.280	1.03	60.370	3.240	0.040
2	0.0096	9.320	9.3	0.2	0.236	2.975	3.210	1.08	61.933	3.092	0.118
3	0.0111	13.771	13.8	0.2	0.348	2.890	3.239	1.12	62.518	3.064	0.174
4	0.0141	20.877	20.9	0.2	0.528	2.768	3.296	1.19	63.365	3.032	0.264
5	0.0171	28.018	28.0	0.3	0.708	2.663	3.371	1.27	64.094	3.017	0.354
6	0.0201	32.977	33.0	0.3	0.833	2.581	3.414	1.32	64.665	2.998	0.416
7	0.0246	39.177	39.2	0.4	0.989	2.487	3.476	1.40	65.319	2.981	0.494
8	0.0306	44.947	44.9	0.5	1.133	2.355	3.488	1.48	66.236	2.921	0.567
9	0.0366	49.552	49.6	0.6	1.248	2.251	3.499	1.55	66.959	2.875	0.624
10	0.0441	54.548	54.5	0.7	1.372	2.161	3.533	1.63	67.582	2.847	0.686
11	0.0546	59.778	59.8	0.9	1.501	2.043	3.544	1.73	68.403	2.793	0.750
12	0.0711	66.317	66.3	1.2	1.661	1.896	3.557	1.88	69.422	2.726	0.830
13	0.0891	71.801	71.8	1.5	1.792	1.789	3.581	2.00	70.169	2.685	0.896
14	0.1131	77.669	77.7	1.9	1.931	1.680	3.611	2.15	70.922	2.646	0.966
15	0.1551	82.964	83.0	2.6	2.048	1.572	3.620	2.30	71.676	2.596	1.024
16	0.2091	86.317	86.3	3.5	2.111	1.494	3.605	2.41	72.218	2.549	1.056
17	0.2451	87.036	87.0	4.1	2.116	1.485	3.601	2.42	72.274	2.543	1.058
18	0.2511	87.024	87.0	4.2	2.113	1.485	3.598	2.42	72.281	2.541	1.057
19	0.3051	86.392	86.4	5.1	2.078	1.477	3.555	2.41	72.334	2.516	1.039
20	0.3649	84.702	84.7	6.0	2.016	1.481	3.497	2.36	72.307	2.489	1.008

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.840			197.650
Moisture content: Dry soil+tare, gms.	110.180			152.420
Moisture content: Tare, gms.	22.460			58.720
Moisture, %	46.4	49.0	49.0	48.3
Moist specimen weight, gms.	964.51			
Diameter, in.	2.690	2.690	2.690	
Area, in. ²	5.683	5.683	5.683	
Height, in.	6.040	6.040	6.040	
Net decrease in height, in.		0.000	0.000	
Wet density, pcf	107.0	109.0	109.0	
Dry density, pcf	73.1	73.1	73.1	
Void ratio	1.3472	1.3472	1.3472	
Saturation, %	94.6	100.0	100.0	

Test Readings for Specimen No. 3

Consolidation cell pressure = 96.380 psi (13.879 ksf)

Consolidation back pressure = 60.000 psi (8.640 ksf)

Consolidation effective confining stress = 5.239 ksf

Strain rate, in./min. = 0.000

Fail. Stress = 2.629 ksf at reading no. 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	13.879	13.879	1.00	0.000	13.879	0.000
1	0.0007	3.281	3.3	0.0	0.083	5.215	5.298	1.02	60.168	5.256	0.042
2	0.0022	3.275	3.3	0.0	0.083	5.218	5.301	1.02	60.141	5.260	0.041
3	0.0067	11.155	11.2	0.1	0.282	4.790	5.072	1.06	63.118	4.931	0.141
4	0.0097	20.767	20.8	0.2	0.525	4.490	5.015	1.12	65.201	4.752	0.263
5	0.0127	30.062	30.1	0.2	0.760	4.254	5.014	1.18	66.836	4.634	0.380
6	0.0157	37.041	37.0	0.3	0.936	4.092	5.028	1.23	67.964	4.560	0.468
7	0.0187	43.191	43.2	0.3	1.091	3.942	5.033	1.28	69.008	4.487	0.545
8	0.0232	51.076	51.1	0.4	1.289	3.757	5.046	1.34	70.291	4.401	0.645
9	0.0277	57.063	57.1	0.5	1.439	3.619	5.058	1.40	71.246	4.339	0.720
10	0.0322	62.728	62.7	0.5	1.581	3.466	5.047	1.46	72.312	4.256	0.790
11	0.0383	69.148	69.1	0.6	1.741	3.333	5.074	1.52	73.232	4.204	0.870
12	0.0443	74.801	74.8	0.7	1.881	3.218	5.099	1.58	74.036	4.158	0.941
13	0.0518	80.818	80.8	0.9	2.030	3.080	5.110	1.66	74.990	4.095	1.015
14	0.0608	87.265	87.3	1.0	2.189	2.980	5.169	1.73	75.683	4.075	1.094
15	0.0728	93.994	94.0	1.2	2.353	2.793	5.146	1.84	76.984	3.969	1.176
16	0.0968	100.736	100.7	1.6	2.512	2.611	5.122	1.96	78.248	3.867	1.256
17	0.1508	105.378	105.4	2.5	2.603	2.386	4.989	2.09	79.813	3.687	1.302
18	0.2048	107.391	107.4	3.4	2.629	2.293	4.922	2.15	80.455	3.608	1.314
19	0.2588	108.081	108.1	4.3	2.621	2.223	4.844	2.18	80.945	3.533	1.311
20	0.3158	108.100	108.1	5.2	2.596	2.188	4.784	2.19	81.183	3.486	1.298
21	0.3758	106.612	106.6	6.2	2.533	2.140	4.673	2.18	81.517	3.407	1.267
22	0.4358	107.955	108.0	7.2	2.538	2.168	4.706	2.17	81.323	3.437	1.269
23	0.4958	108.421	108.4	8.2	2.522	2.121	4.642	2.19	81.652	3.382	1.261
24	0.5558	108.120	108.1	9.2	2.487	2.539	5.026	1.98	78.750	3.782	1.244
25	0.5708	108.742	108.7	9.4	2.495	2.083	4.578	2.20	81.914	3.331	1.247
26	0.6308	109.962	110.0	10.4	2.495	2.046	4.541	2.22	82.172	3.294	1.248

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
27	0.6908	111.313	111.3	11.4	2.498	2.100	4.598	2.19	81.797	3.349	1.249
28	0.7508	110.638	110.6	12.4	2.455	2.002	4.457	2.23	82.475	3.230	1.227
29	0.8108	110.426	110.4	13.4	2.422	2.035	4.457	2.19	82.248	3.246	1.211
30	0.8708	111.490	111.5	14.4	2.418	2.003	4.421	2.21	82.471	3.212	1.209
31	0.8839	111.925	111.9	14.6	2.421	2.012	4.433	2.20	82.410	3.222	1.210

DIRECT SHEAR TEST DATA SHEET

PROJECT DATA

Project number: 92145005 Date: 1-29-2014

Client: QRI - USACE

Project: PORT ARTHUR RESIDENT OFFICE

Sample Location: 13-B1003, 23-25'

Sample Description: Tan fine sand.

Type of Sample: (Undisturbed, Remolded, etc.) ① 3

Liquid Limit= ② 11.8 Plastic Limit= ③ 25.8

Remarks: Normal loading ①

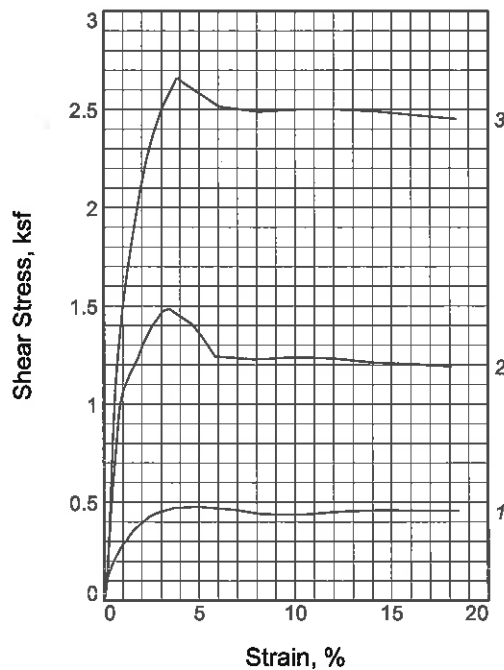
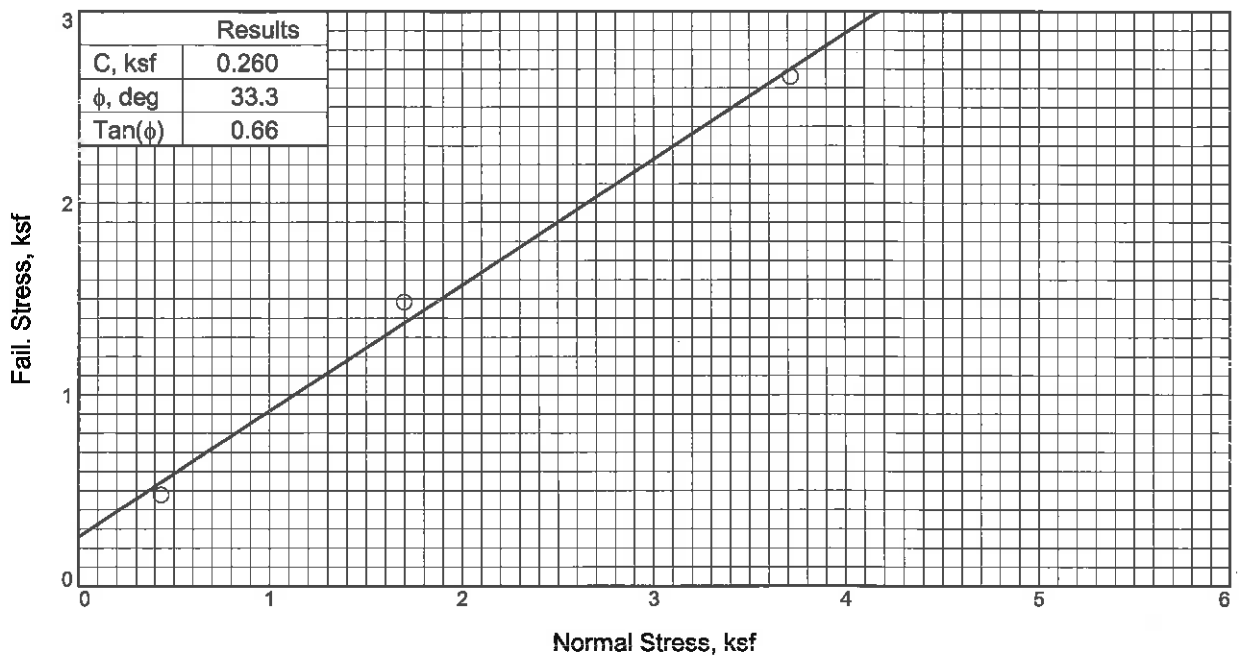
Contract # W912HY-13-D-0001 P408 ②
③

Strain Dial Constants, Horizontal: _____ Vertical: _____

SHEAR PROGRAM FILE NAME: _____

DESCRIPTION: _____

[illegible]



Sample No.		1	2	3
Initial	Water Content, %	23.8	23.8	23.8
	Dry Density, pcf	93.9	94.3	93.8
	Saturation, %	80.8	81.7	80.8
	Void Ratio	0.7959	0.7879	0.7961
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.000	1.000	1.000
At Test	Water Content, %	23.8	23.0	22.8
	Dry Density, pcf	93.9	94.3	93.8
	Saturation, %	80.7	78.7	77.2
	Void Ratio	0.7959	0.7879	0.7961
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.000	1.000	1.000
Normal Stress, ksf		0.432	1.699	3.715
Fail. Stress, ksf		0.477	1.484	2.659
Strain, %		4.9	3.4	3.9
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.003	0.003	0.003

Sample Type: Laboratory molded
Description: Tan fine Sand

Assumed Specific Gravity= 2.7
Remarks: ASTM D3080

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office

Location: 13-B1003

Sample Number: 12

Depth: 23-25 ft.

Proj. No.: 92145005

Date Sampled:

DIRECT SHEAR TEST REPORT
 Terracon Consultants, Inc.
 Houston, TX

DIRECT SHEAR TEST

2/14/2014

Date:**Client:** Quaternary Resource Investigations, L.L.C.**Project:** Port Arthur Resident Office**Project No.:** 92145005**Location:** 13-B1003**Depth:** 23-25 ft.**Sample Number:** 12**Description:** Tan fine Sand**Remarks:** ASTM D3080**Type of Sample:** Laboratory molded**Assumed Specific Gravity=**2.7**LL=****PL=****PI=****Parameters for Specimen No. 1**

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	97.800		178.110
Moisture content: Dry soil+tare, gms.	85.130		151.440
Moisture content: Tare, gms.	31.960		39.370
Moisture, %	23.8	23.8	23.8
Moist specimen weight, gms.	149.75		
Diameter, in.	2.500	2.500	
Area, in.²	4.909	4.909	
Height, in.	1.000	1.000	
Net decrease in height, in.		0.000	
Wet density, pcf	116.2	116.2	
Dry density, pcf	93.9	93.9	
Void ratio	0.7959	0.7959	
Saturation, %	80.8	80.7	

Test Readings for Specimen No. 1**Normal stress =** 0.432 ksf**Strain rate, in./min. =** 0.003**Fail. Stress =** 0.477 ksf at reading no. 22

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
0	0.0000	-2.550	0.0	0.0	0.000
1	0.0005	-1.931	0.6	0.0	0.018
2	0.0015	-0.948	1.6	0.1	0.047
3	0.0025	-0.230	2.3	0.1	0.068
4	0.0035	0.715	3.3	0.1	0.096
5	0.0055	1.707	4.3	0.2	0.125
6	0.0075	2.493	5.0	0.3	0.148
7	0.0111	3.596	6.1	0.4	0.180
8	0.0131	4.286	6.8	0.5	0.201
9	0.0156	4.994	7.5	0.6	0.221
10	0.0191	5.793	8.3	0.8	0.245
11	0.0217	6.500	9.0	0.9	0.265
12	0.0252	7.197	9.7	1.0	0.286
13	0.0302	7.908	10.5	1.2	0.307
14	0.0332	8.641	11.2	1.3	0.328

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
15	0.0392	9.653	12.2	1.6	0.358
16	0.0467	10.456	13.0	1.9	0.382
17	0.0527	11.186	13.7	2.1	0.403
18	0.0603	12.054	14.6	2.4	0.428
19	0.0723	12.757	15.3	2.9	0.449
20	0.0918	13.479	16.0	3.7	0.470
21	0.1189	13.660	16.2	4.8	0.476
22	0.1219	13.719	16.3	4.9	0.477
23	0.1729	13.123	15.7	6.9	0.460
24	0.2059	12.434	15.0	8.2	0.440
25	0.2570	12.324	14.9	10.3	0.436
26	0.3081	12.861	15.4	12.3	0.452
27	0.3592	13.098	15.6	14.4	0.459
28	0.4102	13.053	15.6	16.4	0.458
29	0.4613	12.994	15.5	18.5	0.456

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	97.800		214.070
Moisture content: Dry soil+tare, gms.	85.130		185.580
Moisture content: Tare, gms.	31.960		61.600
Moisture, %	23.8	23.0	23.0
Moist specimen weight, gms.	150.42		
Diameter, in.	2.500	2.500	
Area, in. ²	4.909	4.909	
Height, in.	1.000	1.000	
Net decrease in height, in.		0.000	
Wet density, pcf	116.7	115.9	
Dry density, pcf	94.3	94.3	
Void ratio	0.7879	0.7879	
Saturation, %	81.7	78.7	

Test Readings for Specimen No. 2

Normal stress = 1.6992 ksf

Strain rate, in./min. = 0.003

Fail. Stress = 1.484 ksf at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
0	0.0000	0.000	0.0	0.0	0.000
1	0.0000	2.488	2.5	0.0	0.073
2	0.0035	2.354	2.4	0.1	0.069
3	0.0050	5.402	5.4	0.2	0.158
4	0.0060	8.251	8.3	0.2	0.242
5	0.0075	11.350	11.3	0.3	0.333
6	0.0090	14.771	14.8	0.4	0.433
7	0.0106	17.651	17.7	0.4	0.518
8	0.0121	20.186	20.2	0.5	0.592
9	0.0141	23.101	23.1	0.6	0.678
10	0.0156	25.684	25.7	0.6	0.753
11	0.0172	28.320	28.3	0.7	0.831
12	0.0192	31.185	31.2	0.8	0.915
13	0.0212	33.847	33.8	0.8	0.993
14	0.0257	36.483	36.5	1.0	1.070
15	0.0348	39.456	39.5	1.4	1.157
16	0.0453	42.119	42.1	1.8	1.236
17	0.0528	44.823	44.8	2.1	1.315
18	0.0633	47.640	47.6	2.5	1.398
19	0.0769	50.229	50.2	3.1	1.473
20	0.0844	50.542	50.5	3.4	1.483
21	0.0859	50.586	50.6	3.4	1.484
22	0.1159	47.949	47.9	4.6	1.407
23	0.1309	45.305	45.3	5.2	1.329
24	0.1459	42.302	42.3	5.8	1.241
25	0.1970	41.807	41.8	7.9	1.226
26	0.2481	42.160	42.2	9.9	1.237
27	0.2991	42.019	42.0	12.0	1.233
28	0.3502	41.284	41.3	14.0	1.211

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
29	0.4012	40.984	41.0	16.0	1.202
30	0.4523	40.613	40.6	18.1	1.191

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	97.800		202.900
Moisture content: Dry soil+tare, gms.	85.130		174.670
Moisture content: Tare, gms.	31.960		50.610
Moisture, %	23.8	22.8	22.8
Moist specimen weight, gms.	149.74		
Diameter, in.	2.500	2.500	
Area, in. ²	4.909	4.909	
Height, in.	1.000	1.000	
Net decrease in height, in.		0.000	
Wet density, pcf	116.2	115.2	
Dry density, pcf	93.8	93.8	
Void ratio	0.7961	0.7961	
Saturation, %	80.8	77.2	

Test Readings for Specimen No. 3

Normal stress = 3.7152 ksf

Strain rate, in./min. = 0.003

Fail. Stress = 2.659 ksf at reading no. 21

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
0	0.0000	-0.075	0.0	0.0	0.000
1	0.0005	0.032	0.1	0.0	0.003
2	0.0010	-0.126	-0.1	0.0	-0.002
3	0.0055	4.452	4.5	0.2	0.133
4	0.0070	10.193	10.3	0.3	0.301
5	0.0085	15.888	16.0	0.3	0.468
6	0.0101	21.614	21.7	0.4	0.636
7	0.0116	26.999	27.1	0.5	0.794
8	0.0131	31.784	31.9	0.5	0.935
9	0.0151	37.141	37.2	0.6	1.092
10	0.0182	41.860	41.9	0.7	1.230
11	0.0217	46.640	46.7	0.9	1.370
12	0.0252	51.293	51.4	1.0	1.507
13	0.0303	56.425	56.5	1.2	1.657
14	0.0363	61.728	61.8	1.5	1.813
15	0.0423	66.607	66.7	1.7	1.956
16	0.0483	71.235	71.3	1.9	2.092
17	0.0558	76.240	76.3	2.2	2.239
18	0.0648	80.793	80.9	2.6	2.372
19	0.0768	85.743	85.8	3.1	2.517
20	0.0949	90.433	90.5	3.8	2.655
21	0.0979	90.554	90.6	3.9	2.659
22	0.0994	90.219	90.3	4.0	2.649

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress ksf
23	0.1519	85.643	85.7	6.1	2.515
24	0.2029	84.714	84.8	8.1	2.487
25	0.2540	85.128	85.2	10.2	2.499
26	0.3050	85.112	85.2	12.2	2.499
27	0.3561	84.761	84.8	14.2	2.489
28	0.4072	84.130	84.2	16.3	2.470
29	0.4582	83.535	83.6	18.3	2.453

Moisture Content Tests (ASTM D2216)

Terracon

Date: 01 - 15 - 2014

Project No: 92145005

Project Name: Port Arthur Resident Office - USACE

Contract #W912HY-D-0001-DY08

Boring No.	Sample No	Depth (Ft.)	Torvane (tsf)	PPN (tsf)	Description of Material	Tare No.	Wet + Tare (g)	Dry + Tare (g)	Tare Wt. (g)	Water (g)	(%) Moisture
13-B1003		0-2			G.T. lean clay w/ sand fill w/ cal w/ FE	DD	205.03	179.63	64.40		
	PI	2-4			L.T. fat clay w/ sand pck w/ FE fill	U	158.40	137.00	61.58		
		6-8			G.T. sandy silty clay	G	160.03	140.33	59.15		
		10-12			L.T. fat clay w/ cal w/ FE	205	188.42	160.68	59.21		
		14-16			L.T. fat clay w/ FE	3E	172.16	150.21	58.20		
	ABB PI	16-18			L.T. fat clay w/ cal	NIS	152.11	131.40	41.60		
		20-22			R.T. sandy silty clay w/ FE	LL	184.46	161.58	65.53		
		28-30			G. fat clay w/ silty sand pcks	BB	204.64	169.89	59.76		
	PI	34-36			Sandy lean clay G. fat clay w/ sandy lean clay	RRR	182.78	153.46	62.24		
		36-38			G. sandy lean clay	3D	196.14	162.40	59.92		
		40-42			G. fat clay w/ FE	L	141.13	111.60	58.75		
		44-46			G. fat clay w/ silt lenses	K59	156.71	121.63	32.23		
	PI	46-48			G. fat clay w/ FE	3C	167.45	132.73	59.60		
		56-58			G. fat clay w/ shell	HF	145.77	113.29	38.97		
		60-62			G. fat clay w/ shell	HAL	130.08	101.62	38.94		
ABB PI		62-64			G. fat clay w/ FE w/ odor	S11	140.00	106.57	42.79		

Technician:

Rodrigo

Scale No.: ☐J350: ☐MTE B93: ☐B8449: ☐

Tested By:

Date: 01 - 28 - 2014 Reviewed By:

R

1-28

- 2014

Moisture Content Tests (ASTM D2216)

Terracon

Date: 01 - 15 - 2014

Project No: 92145005

Project Name: Port Arthur Resident Office - USACE

Contract #W912HY-D-0001-DY08

Boring No.	Sample No	Depth (Ft.)	Torvane (tsf)	PPN (tsf)	Description of Material	Tare No.	Wet + Tare (g)	Dry + Tare (g)	Tare Wt. (g)	Water (g)	(%) Moisture
13-B1003		66-68			G fat clay w/FE	K13	136. 49	103. 48	31.92		
		70-72			G fat clay w/shell w/silty sand pk	K62	142. 48	105. 64	33.00		
		72-74			G fat clay	HAR	153. 20	112. 72	39.39		
		78-80			G fat clay w/FE	K85	128. 61	98. 75	39.28		
		84-86			G fat clay w/sand pk	N-4	138. 24	113. 41	31.17		
	PI	86-88			G fat clay w/FE w/sand pk	N-2	156. 06	127. 22	30.81		
		88-90			G sandy silty clay	HAC	205. 69	174. 64	39.30		
	ABB	90-92			GB silty sand	IF	174. 70	146. 98	41.37		
		98-100			G sand w/silt pk	K-4	206. 84	179. 95	31.76		

Technician:

Rodrigo

Scale No.: ☐J350: ☐MTE B93: ☐B8449: ☐

Tested By:

Date: 01 -

-2014 Reviewed By:

8

1/28

- 2014

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. 92145005

Material Description

Boring No.: 13-B1003

Depth (ft) 8-10

Sample Length (inch)

Cohesion (tsf)

Sample Diameter (inch)

Date of Test - -2013

Moist Weight (g)

Contract No. W912HY-13-D-0001-DY06

Caliper No.

☐ W10202

☐ W10203

☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

Unconfined

Moisture Content Determination

Tare Number	E10
Wet Soil + Tare (g)	158.29
Dry Soil + Tare (g)	137.61
Tare Weight (g)	49.43

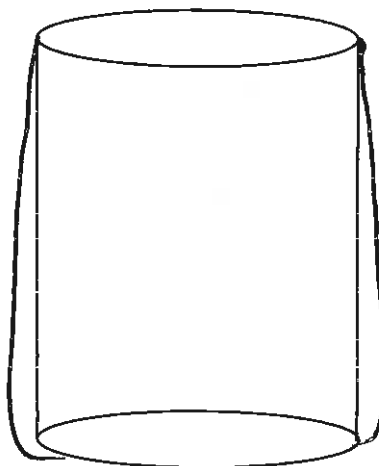
Prepared By: CH

Date: 01-23

-2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear

Bulge

Vertical

Split

Tested By:

SA 01-

- 2014

Computed By:

- 2014

Machine: ☐ HM 2000

☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005**

Material Description

Fill L.T. lean clay w/ silt, some tal nodules, clay sm

Boring No.: **13-B1003**

Depth (ft) **18-20**

Sample Length (inch) **5.773 5.77 5.778 5.774**

Cohesion (tsf) **2.730 2.730 2.735 2.732**

Date of Test **-2013**

Moist Weight (g) **1145.9** Ave

Contract No. **W912HY-13-D-0001-DY06**

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

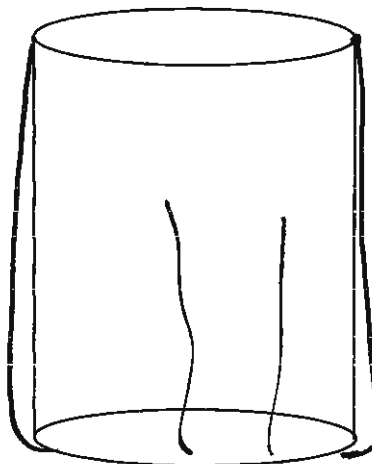
☒ Unconfined

Moisture Content Determination	
Tare Number	208
Wet Soil + Tare (g)	162.73
Dry Soil + Tare (g)	143.87
Tare Weight (g)	59.93

Prepared By: **ch** Date: **01-23** -2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear _____

Bulge ☒

Vertical Split ☒

Tested By: **SA** 01- -2014

Computed By: _____ -2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005**

Material Description

6 Fair clay w/ silt, Fe

Boring No.: **13-1003**

Depth (ft) 30-32

Sample Length (inch)

5.753 5.749 5.762 5.755

Cohesion (tsf)

Sample Diameter (inch)

2.781 2.771 2.775 2.776

Date of Test - **-2013**

Moist Weight (g)

1079.7

Ave

Contract No. **W912HY-13-D-0001-DY06**

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	



Unconfined

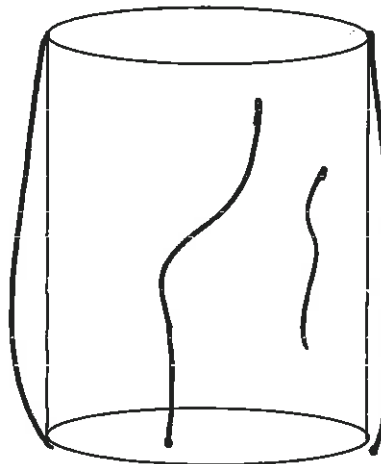
Moisture Content Determination	
Tare Number	<u>✓22</u>
Wet Soil + Tare (g)	<u>147.55</u>
Dry Soil + Tare (g)	<u>120.97</u>
Tare Weight (g)	<u>49.44</u>

Prepared By: ch

Date: 01-23 -2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear

Bulge

Vertical

Split

Tested By: SA

01- -2014

Computed By:

-2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005**

Material Description

6 Fat clay

Boring No.: **13-B1003**

Depth (ft)

42-44

Sample Length (inch)

5.757 5.759 5.758 5.758

Cohesion (tsf)

Sample Diameter (inch)

2.761 2.755 2.768 2.761

Date of Test

- **2013**

Moist Weight (g)

1053.2

Ave

Contract No. **W912HY-13-D-0001-DY06**

Caliper No.

☐ W10202

☐ W10203

☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	



Unconfined

Moisture Content Determination	
Tare Number	<u>C12</u>
Wet Soil + Tare (g)	<u>161.68</u>
Dry Soil + Tare (g)	<u>131.61</u>
Tare Weight (g)	<u>50.55</u>

Prepared By: CH

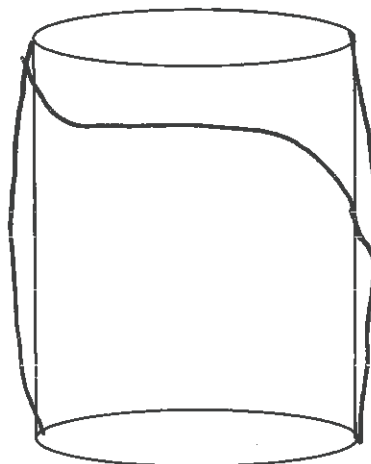
Date: 01-23 -2014

Scale No.: ☐ J350

☐ MTE B93

☐ B8449

Failed Sample Sketch



Shear

40°

Bulge



Vertical

Split

Tested By: SR

01- -2014

Computed By: _____

- -2014

Machine: ☐ HM 2000

☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005**

Material Description

G Fat clay CH

Boring No.: **13-B1003**

Depth (ft)

54-56

Sample Length (inch)

5.77 5.761 5.761 5.770 ^{*5764*}

Cohesion (tsf)

Sample Diameter (inch)

2.642 2.651 2.645 2.646

Date of Test

-2013

Moist Weight (g)

861.1

Ave

Contract No. W912HY-13-D-0001-DY06

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

✓ Unconfined

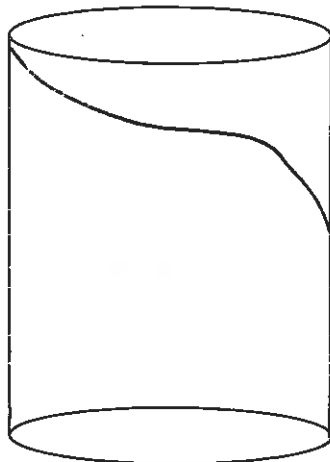
Moisture Content Determination	
Tare Number	<i>0'</i>
Wet Soil + Tare (g)	<i>177.32</i>
Dry Soil + Tare (g)	<i>134.67</i>
Tare Weight (g)	<i>58.95</i>

Prepared By: *CH*

Date: *01-23* -2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear

45

Bulge

Vertical

Split

Tested By: *SL*

01- -2014

Computed By:

-2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005**

Material Description G Fat clay

Boring No.: 13- B1003

Depth (ft) 68-70

Sample Length (inch) 5.774 5.774 5.778 5.775

Cohesion (tsf) _____

Sample Diameter (inch) 2.781 2.786 2.795 2.787

Date of Test - -2013

Moist Weight (g) 987.1

Ave

Contract No. W912HY-13-D-0001-DY06

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	



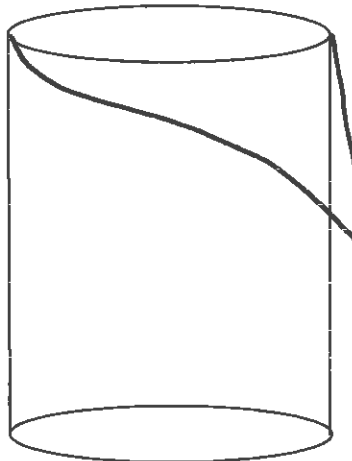
Unconfined

Moisture Content Determination	
Tare Number	<u>C19</u>
Wet Soil + Tare (g)	<u>153.47</u>
Dry Soil + Tare (g)	<u>117.89</u>
Tare Weight (g)	<u>50.13</u>

Prepared By: ch Date: 01-24 -2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear 145

Bulge _____

Vertical
Split _____

Tested By: SK 01- -2014

Computed By: _____ - -2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
UNCONFINED COMPRESSION TEST (ASTM D2166)

Terracon

Job No. **92145005** Material Description G Fat Clay CH
Boring No.: 13-B1003
Depth (ft) 76-78 Sample Length (inch) 5.757 5.751 5.759 5.758
Cohesion (tsf) Sample Diameter (inch) 2.810 2.805 2.809 2.808
Date of Test -2013 Moist Weight (g) 988.6 Ave
Contract No. W912HY-13-D-0001-DY06 Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

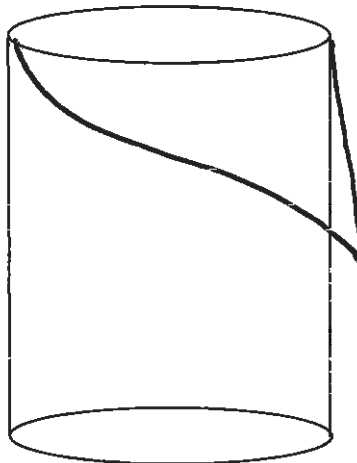
Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

✓ Unconfined

Moisture Content Determination	
Tare Number	<u>3E</u>
Wet Soil + Tare (g)	<u>145.53</u>
Dry Soil + Tare (g)	<u>114.74</u>
Tare Weight (g)	<u>58.11</u>

Prepared By: ch Date: 01-24 -2014
Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear 145

Bulge

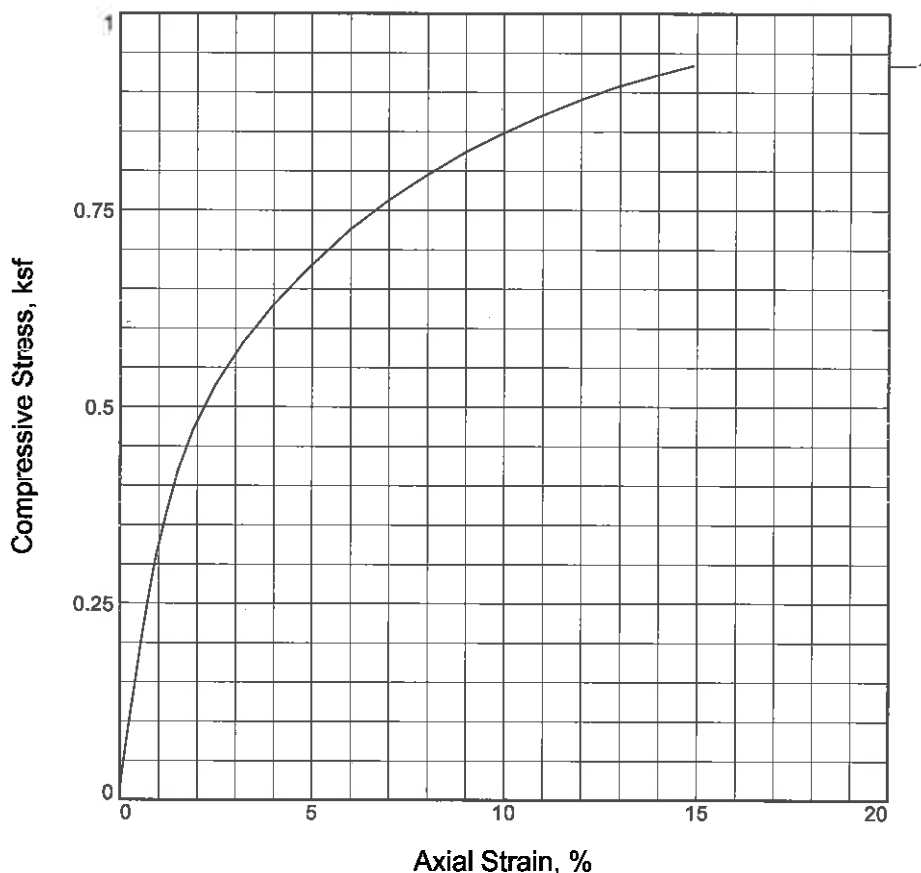
Vertical Split

Tested By: SK 01- -2014

Computed By: -2014

Machine: ☐ HM 2000 ☐ S 610

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	0.934			
Undrained shear strength, ksf	0.467			
Failure strain, %	14.9			
Strain rate, in./min.	0.055			
Water content, %	23.5			
Wet density, pcf	119.4			
Dry density, pcf	96.8			
Saturation, %	83.3			
Void ratio	0.7744			
Specimen diameter, in.	2.667			
Specimen height, in.	5.747			
Height/diameter ratio	2.15			

Description: Light gray and tan Fat Clay

LL = PL = PI = Assumed GS= 2.75 Type: Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:

ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 5 **Depth:** 8-10 ft.

UNCONFINED COMPRESSION TEST

Terracon Consultants, Inc.

Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 8-10 ft. **Sample Number:** 5
Description: Light gray and tan Fat Clay
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	158.290
Moisture content: Dry soil+tare, gms.	137.610
Moisture content: Tare, gms.	49.430
Moisture, %	23.5
Moist specimen weight, gms.	1006.60
Diameter, in.	2.667
Area, in. ²	5.586
Height, in.	5.747
Wet density, pcf	119.4
Dry density, pcf	96.8
Void ratio	0.7744
Saturation, %	83.3

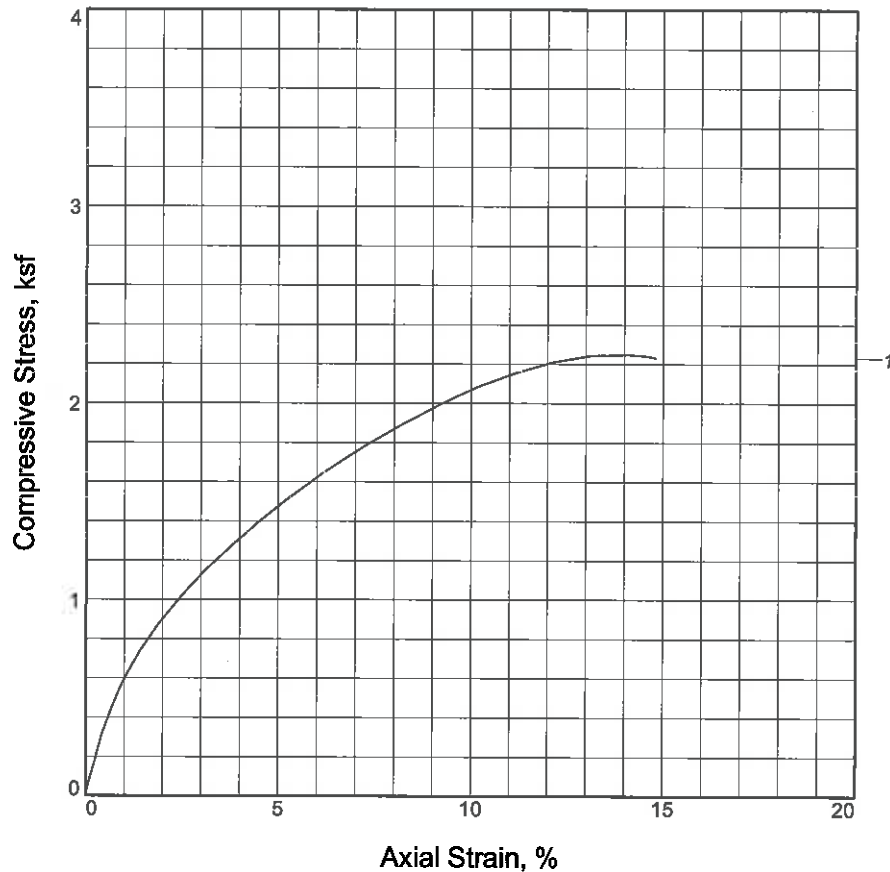
Test Readings for Specimen No. 1**Strain rate, in./min. = 0.055****Unconfined compressive strength = 0.934 ksf at reading no. 23**

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	-0.629	0.0	0.0	0.000
1	0.0012	0.360	1.0	0.0	0.025
2	0.0112	2.624	3.3	0.2	0.084
3	0.0212	4.920	5.5	0.4	0.142
4	0.0312	7.204	7.8	0.5	0.201
5	0.0413	9.309	9.9	0.7	0.254
6	0.0528	11.417	12.0	0.9	0.308
7	0.0688	13.636	14.3	1.2	0.363
8	0.0859	15.864	16.5	1.5	0.419
9	0.1089	17.964	18.6	1.9	0.470
10	0.1430	20.399	21.0	2.5	0.529
11	0.1832	22.677	23.3	3.2	0.582
12	0.2294	24.816	25.4	4.0	0.630
13	0.2810	26.931	27.6	4.9	0.676
14	0.3438	29.303	29.9	6.0	0.725
15	0.4006	31.159	31.8	7.0	0.762
16	0.4577	32.839	33.5	8.0	0.794

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.5150	34.435	35.1	9.0	0.823
18	0.5722	35.876	36.5	10.0	0.847
19	0.6290	37.242	37.9	10.9	0.869
20	0.6862	38.558	39.2	11.9	0.889
21	0.7435	39.790	40.4	12.9	0.907
22	0.8002	40.889	41.5	13.9	0.921
23	0.8559	41.952	42.6	14.9	0.934

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	2.248			
Undrained shear strength, ksf	1.124			
Failure strain, %	14.1			
Strain rate, in./min.	0.055			
Water content, %	22.5			
Wet density, pcf	129.0			
Dry density, pcf	105.3			
Saturation, %	98.0			
Void ratio	0.6302			
Specimen diameter, in.	2.732			
Specimen height, in.	5.774			
Height/diameter ratio	2.11			

Description: Light gray and tan Lean Clay w/sand pockets

LL = PL = PI = Assumed GS= 2.75 Type: Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:
ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 10 **Depth:** 18-20 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 18-20 ft. **Sample Number:** 10
Description: Light gray and tan Lean Clay w/sand pockets
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	162.730
Moisture content: Dry soil+tare, gms.	143.870
Moisture content: Tare, gms.	59.930
Moisture, %	22.5
Moist specimen weight, gms.	1145.90
Diameter, in.	2.732
Area, in. ²	5.862
Height, in.	5.774
Wet density, pcf	129.0
Dry density, pcf	105.3
Void ratio	0.6302
Saturation, %	98.0

Test Readings for Specimen No. 1

Strain rate, in./min. = 0.055

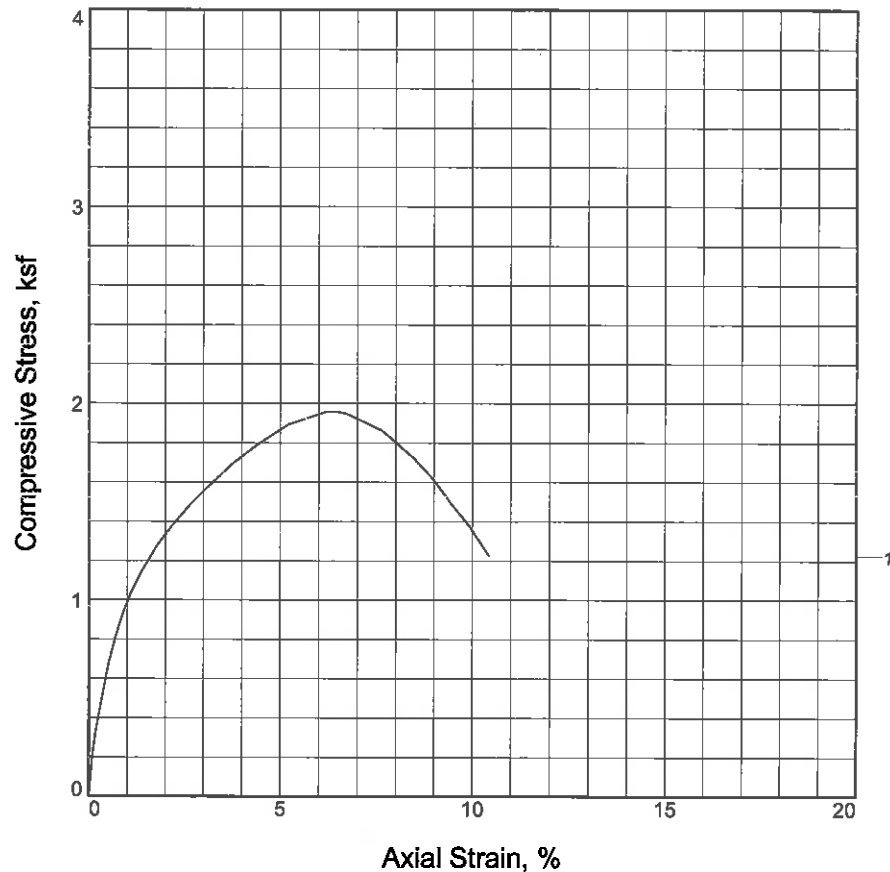
Unconfined compressive strength = 2.248 ksf at reading no. 21

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	-0.980	0.0	0.0	0.000
1	0.0013	0.600	1.6	0.0	0.039
2	0.0128	5.973	7.0	0.2	0.170
3	0.0238	11.584	12.6	0.4	0.307
4	0.0389	17.408	18.4	0.7	0.449
5	0.0560	23.010	24.0	1.0	0.584
6	0.0801	29.242	30.2	1.4	0.732
7	0.1092	35.309	36.3	1.9	0.875
8	0.1433	41.429	42.4	2.5	1.016
9	0.1774	46.967	47.9	3.1	1.142
10	0.2176	52.735	53.7	3.8	1.270
11	0.2578	58.265	59.2	4.5	1.390
12	0.3009	63.760	64.7	5.2	1.507
13	0.3579	70.666	71.6	6.2	1.651
14	0.4151	76.923	77.9	7.2	1.776
15	0.4721	82.748	83.7	8.2	1.889
16	0.5289	88.238	89.2	9.2	1.991

Test Readings for Specimen No. 1

No.	Def. Dial In.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.5861	93.319	94.3	10.2	2.081
18	0.6432	97.704	98.7	11.1	2.154
19	0.7002	101.350	102.3	12.1	2.209
20	0.7574	104.121	105.1	13.1	2.243
21	0.8146	105.572	106.6	14.1	2.248
22	0.8432	105.817	106.8	14.6	2.240
23	0.8552	105.702	106.7	14.8	2.232

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	1.958			
Undrained shear strength, ksf	0.979			
Failure strain, %	6.2			
Strain rate, in./min.	0.055			
Water content, %	37.2			
Wet density, pcf	118.1			
Dry density, pcf	86.1			
Saturation, %	101.3			
Void ratio	1.0230			
Specimen diameter, in.	2.776			
Specimen height, in.	5.755			
Height/diameter ratio	2.07			

Description: Gray Fat Clay w/ferrous nodules

LL = **PL =** **PI =** **Assumed GS= 2.79** **Type: Undisturbed**

Project No.: 92145005

Date Sampled:

Remarks:

ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 16 **Depth:** 30-32 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 30-32 ft. **Sample Number:** 16
Description: Gray Fat Clay w/ferrous nodules
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.79 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	147.550
Moisture content: Dry soil+tare, gms.	120.970
Moisture content: Tare, gms.	49.440
Moisture, %	37.2
Moist specimen weight, gms.	1079.70
Diameter, in.	2.776
Area, in. ²	6.052
Height, in.	5.755
Wet density, pcf	118.1
Dry density, pcf	86.1
Void ratio	1.0230
Saturation, %	101.3

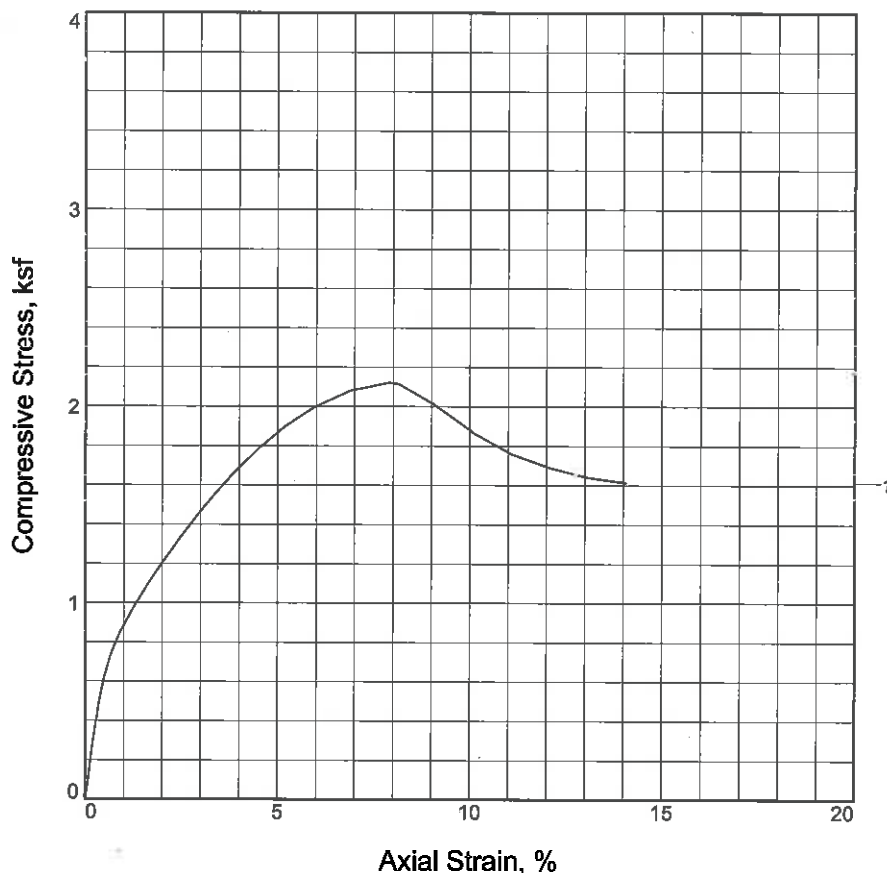
Test Readings for Specimen No. 1**Strain rate, in./min. = 0.055****Unconfined compressive strength = 1.958 ksf at reading no. 18**

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	-0.491	0.0	0.0	0.000
1	0.0013	1.763	2.3	0.0	0.054
2	0.0054	8.027	8.5	0.1	0.202
3	0.0099	13.302	13.8	0.2	0.328
4	0.0169	18.596	19.1	0.3	0.453
5	0.0239	23.896	24.4	0.4	0.578
6	0.0309	28.588	29.1	0.5	0.688
7	0.0400	33.636	34.1	0.7	0.806
8	0.0500	38.442	38.9	0.9	0.918
9	0.0626	43.249	43.7	1.1	1.029
10	0.0801	48.485	49.0	1.4	1.149
11	0.1027	54.088	54.6	1.8	1.275
12	0.1258	58.814	59.3	2.2	1.380
13	0.1539	63.913	64.4	2.7	1.491
14	0.1830	68.446	68.9	3.2	1.588
15	0.2171	73.529	74.0	3.8	1.695
16	0.2517	78.042	78.5	4.4	1.787

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.3003	83.499	84.0	5.2	1.894
18	0.3574	87.275	87.8	6.2	1.958
19	0.3715	87.463	88.0	6.5	1.958
20	0.3860	87.275	87.8	6.7	1.948
21	0.4397	84.263	84.8	7.6	1.862
22	0.4858	78.908	79.4	8.4	1.730
23	0.5144	74.472	75.0	8.9	1.624
24	0.5430	68.814	69.3	9.4	1.493
25	0.5716	63.645	64.1	9.9	1.374
26	0.6001	57.023	57.5	10.4	1.226

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	2.120			
Undrained shear strength, ksf	1.060			
Failure strain, %	7.9			
Strain rate, in./min.	0.055			
Water content, %	37.1			
Wet density, pcf	115.9			
Dry density, pcf	84.5			
Saturation, %	98.9			
Void ratio	1.0311			
Specimen diameter, in.	2.761			
Specimen height, in.	5.783			
Height/diameter ratio	2.09			

Description: Gray Fat Clay

LL = **PL =** **PI =** **Assumed GS= 2.75** **Type:** Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:
ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 22 **Depth:** 42-44 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 42-44 ft. **Sample Number:** 22
Description: Gray Fat Clay
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	161.680
Moisture content: Dry soil+tare, gms.	131.610
Moisture content: Tare, gms.	50.550
Moisture, %	37.1
Moist specimen weight, gms.	1053.20
Diameter, in.	2.761
Area, in. ²	5.987
Height, in.	5.783
Wet density, pcf	115.9
Dry density, pcf	84.5
Void ratio	1.0311
Saturation, %	98.9

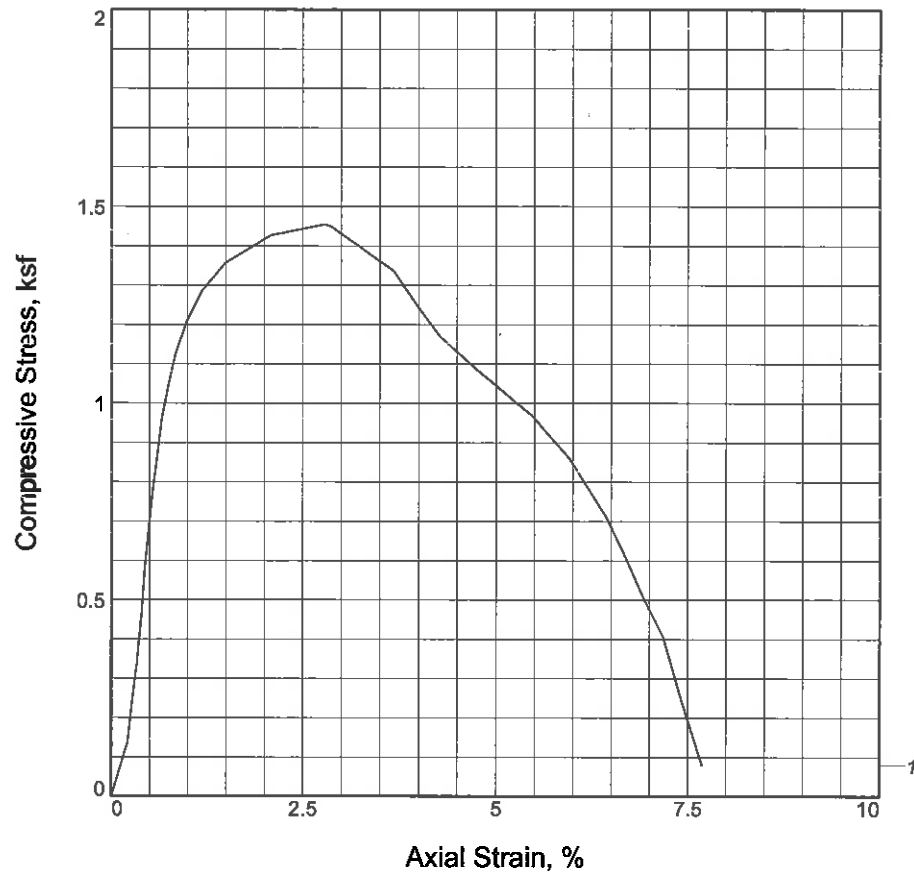
Test Readings for Specimen No. 1**Strain rate, in./min. = 0.055****Unconfined compressive strength = 2.120 ksf at reading no. 20**

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	0.000	0.0	0.0	0.000
1	0.0000	0.000	0.0	0.0	0.000
2	0.0041	3.910	3.9	0.1	0.094
3	0.0097	10.289	10.3	0.2	0.247
4	0.0152	15.450	15.5	0.3	0.371
5	0.0212	20.832	20.8	0.4	0.499
6	0.0287	25.858	25.9	0.5	0.619
7	0.0387	30.809	30.8	0.7	0.736
8	0.0527	35.781	35.8	0.9	0.853
9	0.0743	41.577	41.6	1.3	0.987
10	0.0973	46.998	47.0	1.7	1.111
11	0.1199	51.974	52.0	2.1	1.224
12	0.1430	56.847	56.8	2.5	1.333
13	0.1716	62.544	62.5	3.0	1.460
14	0.2001	67.853	67.9	3.5	1.575
15	0.2287	72.774	72.8	4.0	1.681
16	0.2628	78.126	78.1	4.5	1.794

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.2999	83.244	83.2	5.2	1.898
18	0.3430	88.172	88.2	5.9	1.995
19	0.3997	92.966	93.0	6.9	2.081
20	0.4569	95.723	95.7	7.9	2.120
21	0.4714	95.709	95.7	8.2	2.114
22	0.5221	92.179	92.2	9.0	2.017
23	0.5854	86.274	86.3	10.1	1.865
24	0.6425	82.184	82.2	11.1	1.757
25	0.6996	79.852	79.9	12.1	1.688
26	0.7568	78.463	78.5	13.1	1.640
27	0.8134	78.035	78.0	14.1	1.613

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	1.454			
Undrained shear strength, ksf	0.727			
Failure strain, %	2.8			
Strain rate, in./min.	0.055			
Water content, %	56.3			
Wet density, pcf	103.5			
Dry density, pcf	66.2			
Saturation, %	97.3			
Void ratio	1.5927			
Specimen diameter, in.	2.646			
Specimen height, in.	5.764			
Height/diameter ratio	2.18			

Description: Gray Fat Clay

LL = PL = PI = Assumed GS= 2.75 Type: Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:
ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 26 **Depth:** 54-56 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 54-56 ft. **Sample Number:** 26
Description: Gray Fat Clay
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity: 2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	177.320
Moisture content: Dry soil+tare, gms.	134.670
Moisture content: Tare, gms.	58.950
Moisture, %	56.3
Moist specimen weight, gms.	861.20
Diameter, in.	2.646
Area, in. ²	5.499
Height, in.	5.764
Wet density, pcf	103.5
Dry density, pcf	66.2
Void ratio	1.5927
Saturation, %	97.3

Test Readings for Specimen No. 1

Strain rate, in./min. = 0.055

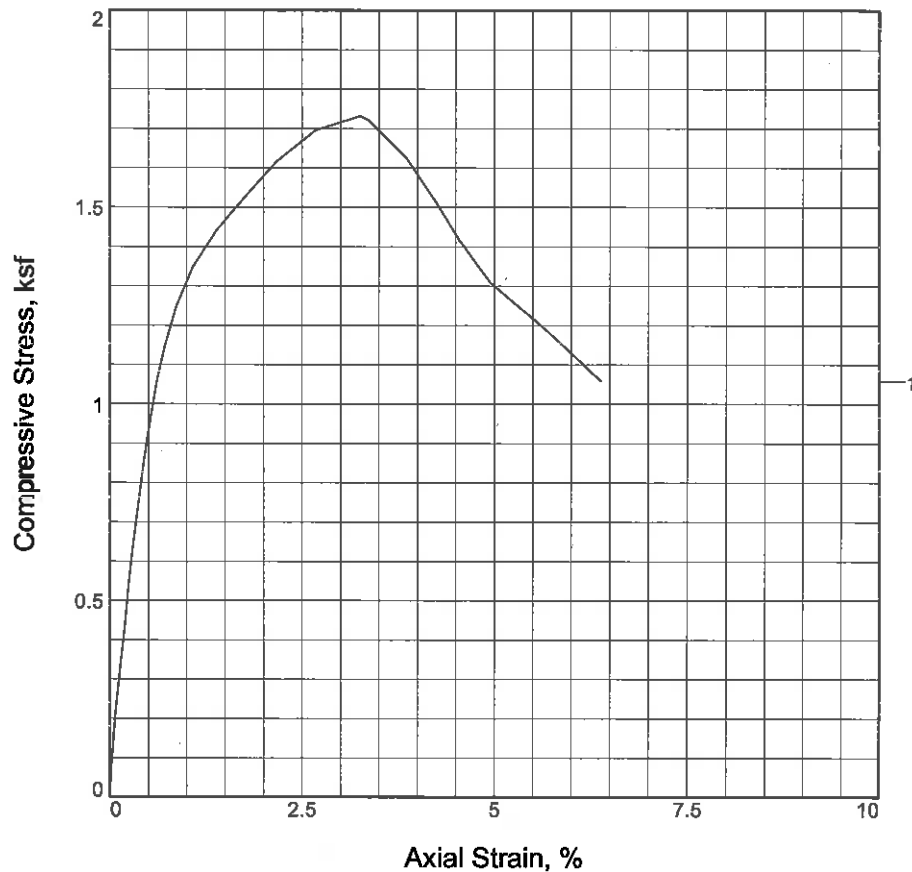
Unconfined compressive strength = 1.454 ksf at reading no. 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	0.000	0.0	0.0	0.000
1	0.0123	5.206	5.2	0.2	0.136
2	0.0153	8.803	8.8	0.3	0.230
3	0.0198	13.241	13.2	0.3	0.346
4	0.0228	17.598	17.6	0.4	0.459
5	0.0253	22.118	22.1	0.4	0.577
6	0.0283	26.201	26.2	0.5	0.683
7	0.0313	29.787	29.8	0.5	0.776
8	0.0344	32.940	32.9	0.6	0.857
9	0.0384	36.996	37.0	0.7	0.962
10	0.0429	40.029	40.0	0.7	1.040
11	0.0484	43.279	43.3	0.8	1.124
12	0.0574	46.726	46.7	1.0	1.211
13	0.0685	49.703	49.7	1.2	1.286
14	0.0861	52.620	52.6	1.5	1.357
15	0.1202	55.646	55.6	2.1	1.427
16	0.1603	57.120	57.1	2.8	1.454

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.1658	56.954	57.0	2.9	1.449
18	0.2115	53.032	53.0	3.7	1.338
19	0.2291	49.669	49.7	4.0	1.249
20	0.2462	46.765	46.8	4.3	1.172
21	0.2748	43.457	43.5	4.8	1.084
22	0.3145	39.210	39.2	5.5	0.971
23	0.3431	34.914	34.9	6.0	0.860
24	0.3717	28.801	28.8	6.4	0.706
25	0.3858	24.826	24.8	6.7	0.607
26	0.4003	20.367	20.4	6.9	0.496
27	0.4144	16.560	16.6	7.2	0.402
28	0.4289	9.496	9.5	7.4	0.230
29	0.4430	3.310	3.3	7.7	0.080

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	1.732			
Undrained shear strength, ksf	0.866			
Failure strain, %	3.3			
Strain rate, in./min.	0.055			
Water content, %	52.5			
Wet density, pcf	106.7			
Dry density, pcf	70.0			
Saturation, %	99.4			
Void ratio	1.4529			
Specimen diameter, in.	2.787			
Specimen height, in.	5.775			
Height/diameter ratio	2.07			

Description: Gray Fat Clay

LL = **PL =** **PI =** **Assumed GS= 2.75** **Type:** Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:
ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 35 **Depth:** 68-70 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 68-70 ft. **Sample Number:** 35
Description: Gray Fat Clay
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	153.470
Moisture content: Dry soil+tare, gms.	117.890
Moisture content: Tare, gms.	50.130
Moisture, %	52.5
Moist specimen weight, gms.	987.10
Diameter, in.	2.787
Area, in. ²	6.100
Height, in.	5.775
Wet density, pcf	106.7
Dry density, pcf	70.0
Void ratio	1.4529
Saturation, %	99.4

Test Readings for Specimen No. 1

Strain rate, in./min. = 0.055

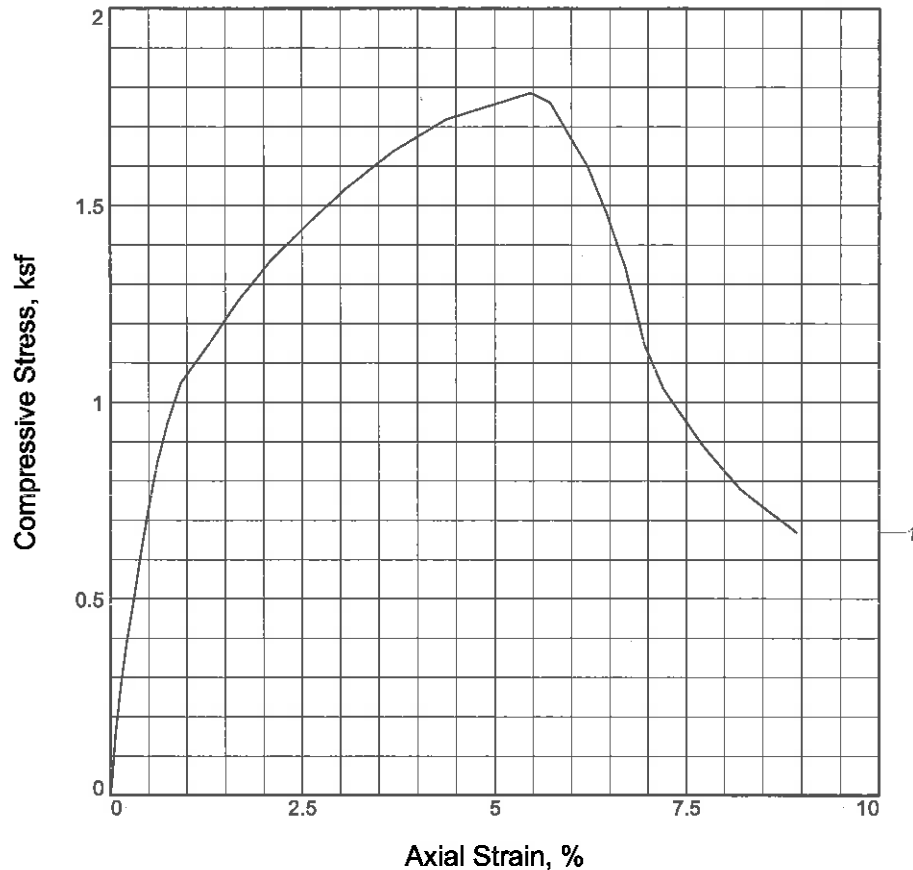
Unconfined compressive strength = 1.732 ksf at reading no. 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	-1.327	0.0	0.0	0.000
1	0.0012	2.186	3.5	0.0	0.083
2	0.0042	7.819	9.1	0.1	0.216
3	0.0082	13.432	14.8	0.1	0.348
4	0.0112	17.487	18.8	0.2	0.443
5	0.0137	21.339	22.7	0.2	0.534
6	0.0168	25.128	26.5	0.3	0.623
7	0.0213	30.304	31.6	0.4	0.744
8	0.0253	34.898	36.2	0.4	0.851
9	0.0298	39.014	40.3	0.5	0.947
10	0.0353	43.769	45.1	0.6	1.058
11	0.0413	47.625	49.0	0.7	1.147
12	0.0499	51.888	53.2	0.9	1.245
13	0.0629	56.483	57.8	1.1	1.350
14	0.0799	60.549	61.9	1.4	1.440
15	0.1025	64.656	66.0	1.8	1.530
16	0.1255	68.692	70.0	2.2	1.617

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.1541	72.438	73.8	2.7	1.695
18	0.1882	74.520	75.8	3.3	1.732
19	0.1942	74.149	75.5	3.4	1.722
20	0.2227	70.246	71.6	3.9	1.624
21	0.2453	65.551	66.9	4.2	1.512
22	0.2628	61.470	62.8	4.6	1.415
23	0.2853	57.099	58.4	4.9	1.311
24	0.3284	51.976	53.3	5.7	1.187
25	0.3690	46.577	47.9	6.4	1.059

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	1.785			
Undrained shear strength, ksf	0.893			
Failure strain, %	5.5			
Strain rate, in./min.	0.055			
Water content, %	54.4			
Wet density, pcf	105.6			
Dry density, pcf	68.4			
Saturation, %	99.1			
Void ratio	1.5092			
Specimen diameter, in.	2.808			
Specimen height, in.	5.758			
Height/diameter ratio	2.05			

Description: Gray Fat Clay

LL = PL = PI = Assumed GS= 2.75 Type: Undisturbed

Project No.: 92145005

Date Sampled:

Remarks:
ASTM D2166

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Resident Office USACE

Location: 13-B1003

Sample Number: 39 **Depth:** 76-78 ft.

UNCONFINED COMPRESSION TEST
Terracon Consultants, Inc.
Houston, TX

UNCONFINED COMPRESSION TEST

2/14/2014

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Resident Office USACE
Project No.: 92145005
Location: 13-B1003
Depth: 76-78 ft. **Sample Number:** 39
Description: Gray Fat Clay
Remarks: ASTM D2166
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	145.530
Moisture content: Dry soil+tare, gms.	114.740
Moisture content: Tare, gms.	58.110
Moisture, %	54.4
Moist specimen weight, gms.	988.60
Diameter, in.	2.808
Area, in. ²	6.193
Height, in.	5.758
Wet density, pcf	105.6
Dry density, pcf	68.4
Void ratio	1.5092
Saturation, %	99.1

Test Readings for Specimen No. 1**Strain rate, in./min. = 0.055****Unconfined compressive strength = 1.785 ksf at reading no. 18**

No.	Def. Dial In.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
0	0.0000	0.000	0.0	0.0	0.000
1	0.0013	2.106	2.1	0.0	0.049
2	0.0038	6.809	6.8	0.1	0.158
3	0.0083	12.507	12.5	0.1	0.290
4	0.0123	16.627	16.6	0.2	0.386
5	0.0184	21.953	22.0	0.3	0.509
6	0.0238	27.304	27.3	0.4	0.632
7	0.0299	32.387	32.4	0.5	0.749
8	0.0354	36.690	36.7	0.6	0.848
9	0.0429	40.978	41.0	0.7	0.946
10	0.0529	45.496	45.5	0.9	1.048
11	0.0744	50.117	50.1	1.3	1.150
12	0.0970	55.221	55.2	1.7	1.262
13	0.1201	59.676	59.7	2.1	1.359
14	0.1487	64.250	64.3	2.6	1.455
15	0.1772	68.493	68.5	3.1	1.544
16	0.2118	73.067	73.1	3.7	1.637

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf
17	0.2519	77.288	77.3	4.4	1.719
18	0.3150	81.228	81.2	5.5	1.785
19	0.3290	80.364	80.4	5.7	1.762
20	0.3576	73.213	73.2	6.2	1.597
21	0.3716	68.056	68.1	6.5	1.480
22	0.3862	61.738	61.7	6.7	1.339
23	0.4002	53.036	53.0	7.0	1.148
24	0.4147	47.872	47.9	7.2	1.033
25	0.4433	41.642	41.6	7.7	0.894
26	0.4719	36.570	36.6	8.2	0.781
27	0.5145	31.574	31.6	8.9	0.669

Project Name: Port Arthur Resident Office - USACE

Project No.: 92145005

Boring No.	13-B1003	13B1003	13-B1003	13-B1003	13-B1003	13-B1003
Depth (ft)	4-6	12-14 PI	32-34	48-50	52-54	64-66
Diameter (mm)	1. 65.8 2. 65.9 3. 65.7	68.5 68.6 68.4	70.5 70.6 70.4	70.6 70.5 70.6	68.6 68.7 68.5	70.0 70.1 70.0
Height (mm)	1. 140.1 2. 140.2 3. 140.0	139.7 139.8 139.6	139.9 139.7 139.8	139.6 139.7 139.5	139.4 139.7 139.6	139.8 139.7 139.9
Sample Wt.(g)	958.28	1116.30	1029.98	963.06	934.66	964.38
Tare No.	JJ	207	GD	A	D	FF
Wet Wt. + Tare (g)	166.67	170.18	185.05	206.97	186.14	178.75
Dry Wt. + Tare (g)	137.16	145.96	155.87	157.95	144.64	140.45
Tare Wt. (g)	58.53	59.16	61.51	59.61	62.11	59.13
Dry Soil Wt. (g)						
% Moisture						
Dry Unit Wt. (pcf)						
Discription	G, B fat clay w/ sand w/FE	L/T fat clay w/ cal w/FE	G fat clay w/ silty sand & peck w/FE	G fat clay	G fat clay	G fat clay

Tested By: Rodrigo Date 1/15/14 Reviewed By: [Signature] Date 1/27

Contract No. W912Hy-13-D-0001 DY08

Project Name: Port Arthur Resident Office - USACE

Project No.: 92145005

Boring No.	13-B1003	13-B1003	13-B1004	13-B1004	13-B1004	13-B1004
Depth (ft)	74-76	82-84	12-14	16-18	22-24	32-34
Diameter (mm)	1. 69.5 2. 69.4 3. 69.6 69.5	69.1 69.2 69.1 69.0 69.1	69.2 69.1 69.2 69.3 69.2	63.8 63.9 63.8 63.7 63.8	69.6 69.5 69.6 69.7 69.6	69.6 69.7 69.6 69.7 69.6
Height (mm)	1. 140.2 2. 140.1 3. 140.3 140.2	139.9 140.0 140.0 140.0 140.0	139.8 139.9 139.8 139.7 139.8	140.0 140.1 140.0 140.0 140.0	139.5 139.6 139.5 139.5 139.5	139.6 139.5 139.5 139.7 139.5
Sample Wt.(g)	928.50	890.23	1127.64	856.52	1096.27	1034.50
Tare No.	206	201	3C	PmS	3G	E
Wet Wt. + Tare (g)	150.77	168.82	158.40	188.87	179.53	189.13
Dry Wt. + Tare (g)	120.42	132.99	139.81	162.44	160.13	156.10
Tare Wt. (g)	60.06	59.91	59.68	60.69	60.95	61.89
Dry Soil Wt. (g)						
% Moisture						
Dry Unit Wt. (pcf)						
Discription	G Fat clay	G Fat + clay	LIT lean clay w/ cal w/ FE	LIT Fat + clay w/ FE w/ cal	G Sandy lean w/ clay peck w/ FE w/ cal	G Fat + clay w/ s. (fines)

Tested By: Rodrigo Date: 9/15 Reviewed By: [Signature] Date: 1/27

Contract No. W912Hy-13-D-0001 DY08

Project: Port Arthur Resident Office - USACE

Unconsolidated Undrained TEST (ASTM D2850)

Terracon

Job No. 92145005

Material Description

6 Fat clay w/ silt
CH

Boring No.: 13-1003

Depth (ft)

38-40

Sample Length (inch)

5.777 5.769 5.780 5.775

Cohesion (tsf)

Sample Diameter (inch)

2.740 2.781 2.765 2.762

Date of Test

-2013

Moist Weight (g)

1061.0

Ave

Contract No. W912HY-13-D-0001-DY08

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

Confined

Pressure (psi)

17.4

Moisture Content Determination

Tare Number	2T
Wet Soil + Tare (g)	138.85
Dry Soil + Tare (g)	116.55
Tare Weight (g)	49.97

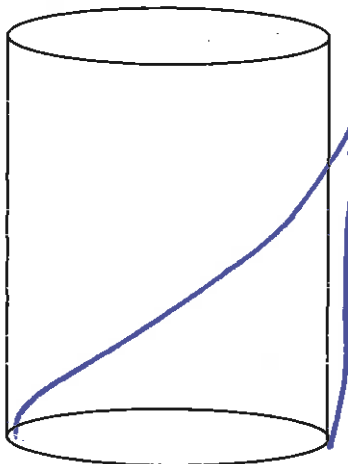
Prepared By: CW

Date: 01-2-14

-2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear

145

Bulge

Vertical

Split

Tested By: SK

-2014

Computed By:

-2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
Unconsolidated Undrained TEST (ASTM D2850)

Terracon

Job No. 92145005

Material Description 6 Fat clay w/5:PTS
CH

Boring No.: 13-1003

Depth (ft) 58-60

Sample Length (inch) 5.711 5.765 5.767 5.768

Cohesion (tsf)

Sample Diameter (inch) 2.772 2.781 2.780 2.777

Date of Test - -2013

Moist Weight (g) 1076.8 Ave

Contract No. W912HY-13-D-0001-DY08

Caliper No. ☐ W10202 ☐ W10203 ☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	



Confined

Pressure (psi) 25.0

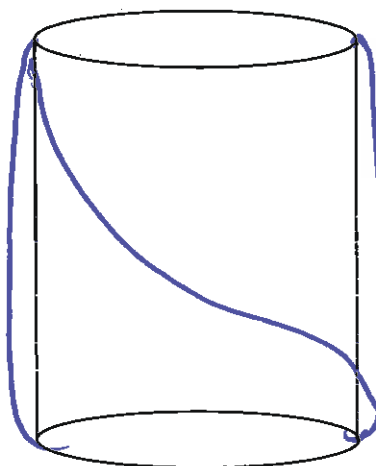
Moisture Content Determination

Tare Number	203
Wet Soil + Tare (g)	119.45
Dry Soil + Tare (g)	105.35
Tare Weight (g)	61.47

Prepared By: CH Date: 01-2-14 -2014

Scale No.: ☐ J350 ☐ MTE B93 ☐ B8449

Failed Sample Sketch



Shear 45

Bulge

Vertical Split

Tested By: SR - -2014

Computed By: - -2014

Machine: ☐ HM 2000 ☐ S 610

Project: Port Arthur Resident Office - USACE
Unconsolidated Undrained TEST (ASTM D2850)

Terracon

Job No. **92145005**

Material Description

6 Fat clay (CH)
w/ few org

Boring No.: **13-1003**

Depth (ft)

80-82

Sample Length (inch)

5.767

5.758

5.762

5.762

Cohesion (tsf)

Sample Diameter (inch)

2.791

2.801

2.795

2.796

Date of Test

-2013

Moist Weight (g)

950.7

Ave

Contract No. W912HY-13-D-0001-DY08

Caliper No.

☐ W10202

☐ W10203

☐ W10204

Strain Dial (0.001 inch)	Load (lbs.)
0	
20	
40	
60	
80	
100	
120	
140	
160	
180	
200	
220	
240	
260	
280	
300	
320	
340	
360	
380	
400	
420	
440	
460	
480	
500	
550	
600	
650	
700	
750	
800	
850	

✓

Confined

Pressure (psi)

33

Moisture Content Determination

Tare Number

97

Wet Soil + Tare (g)

114.36

Dry Soil + Tare (g)

90.75

Tare Weight (g)

51.15

Prepared By: ch

Date: 01-2-14

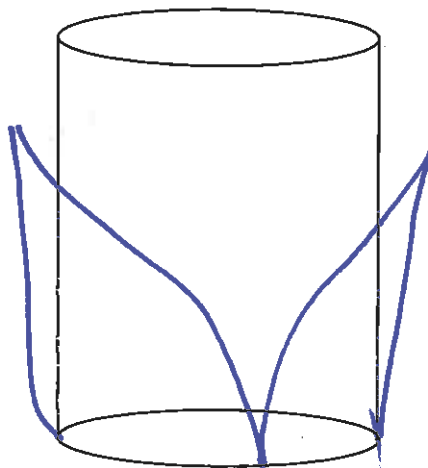
-2014

Scale No.: ☐ J350

☐ MTE B93

☐ B8449

Failed Sample Sketch



Shear

Bulge

Vertical

Split

Tested By: SK

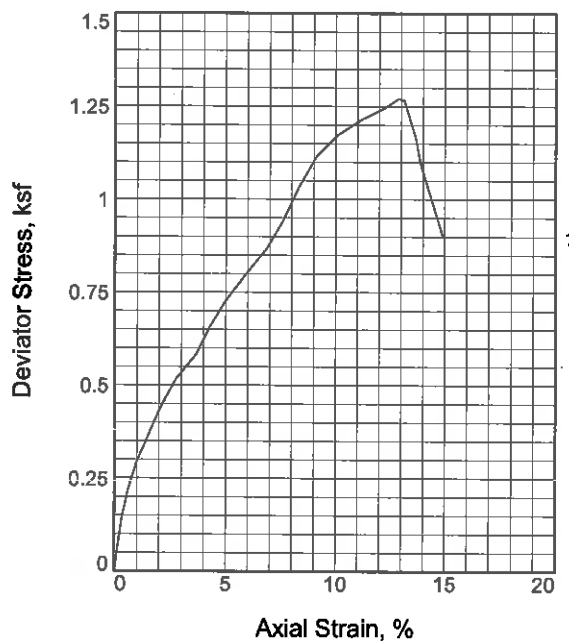
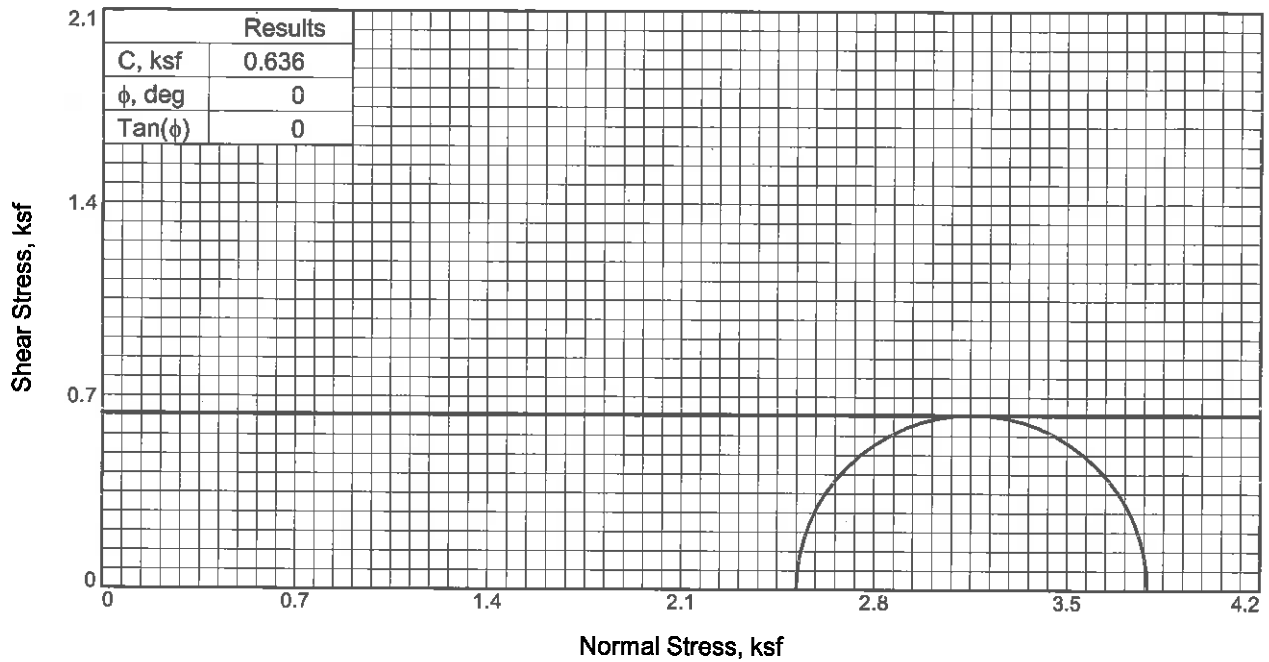
-2014

Computed By: _____

-2014

Machine: ☐ HM 2000

☐ S 610



Sample No.		1
Initial	Water Content, %	33.5
	Dry Density, pcf	87.5
	Saturation, %	95.8
	Void Ratio	0.9619
	Diameter, in.	2.762
	Height, in.	5.775
At Test	Water Content, %	33.5
	Dry Density, pcf	87.5
	Saturation, %	95.8
	Void Ratio	0.9619
	Diameter, in.	2.762
	Height, in.	5.775
Strain rate, in./min.		0.055
Back Pressure, psi		0.000
Cell Pressure, psi		17.500
Fail. Stress, ksf		1.272
Ult. Stress, ksf		
σ_1 Failure, ksf		3.792
σ_3 Failure, ksf		2.520

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Gray Fat Clay

Assumed Specific Gravity= 2.75

Remarks: ASTM D2850

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Residence Office - USACE

Location: 13-B1003

Sample Number: 20

Depth: 38-40 ft.

Proj. No.: 92145005

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Houston, TX

TRIAxIAL COMPRESSION TEST

Unconsolidated Undrained

2/14/2014

4:20 PM

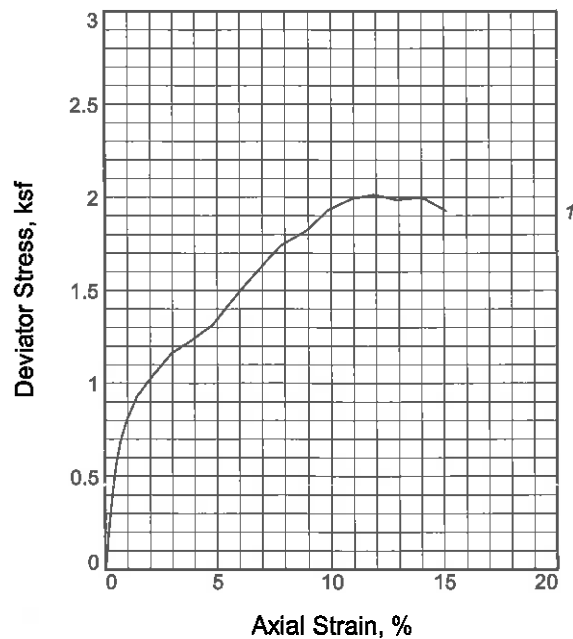
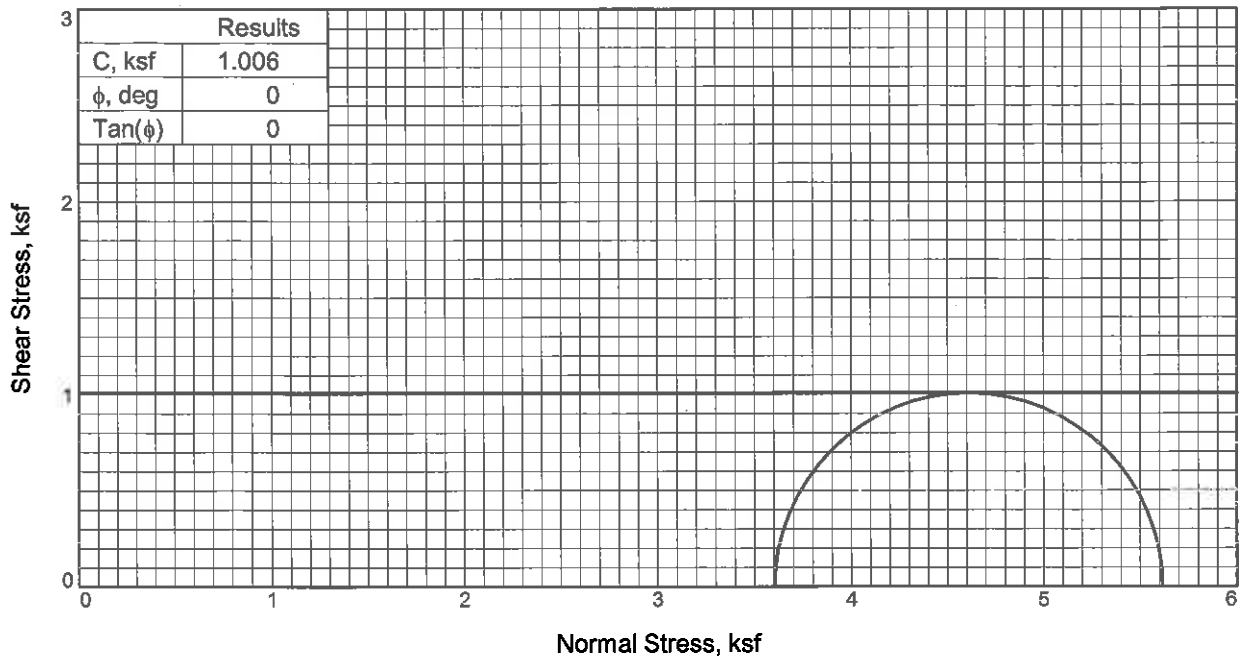
Date:**Client:** Quaternary Resource Investigations, L.L.C.**Project:** Port Arthur Residence Office - USACE**Project No.:** 92145005**Location:** 13-B1003**Depth:** 38-40 ft.**Sample Number:** 20**Description:** Gray Fat Clay**Remarks:** ASTM D2850**Type of Sample:** Undisturbed**Assumed Specific Gravity:** 2.75**LL=****PL=****PI=****Test Method:** ASTM D 2850**Parameters for Specimen No. 1**

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	138.850	138.850
Moisture content: Dry soil+tare, gms.	116.550	116.550
Moisture content: Tare, gms.	49.970	49.970
Moisture, %	33.5	33.5
Moist specimen weight, gms.	1061.00	
Diameter, in.	2.762	
Area, in.²	5.992	
Height, in.	5.775	
Wet density, pcf	116.8	
Dry density, pcf	87.5	
Void ratio	0.9619	
Saturation, %	95.8	

Test Readings for Specimen No. 1**Cell pressure** = 17.500 psi (2.520 ksf)**Back pressure** = 0.000 psi (0.000 ksf)**Strain rate, in./min.** = 0.055**Fail. Stress** = 1.272 ksf at reading no. 20

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	2.520	2.520	1.00	2.520	0.000
1	0.0000	0.000	0.0	0.0	0.000	2.520	2.520	1.00	2.520	0.000
2	0.0072	2.399	2.4	0.1	0.058	2.520	2.578	1.02	2.549	0.029
3	0.0182	5.835	5.8	0.3	0.140	2.520	2.660	1.06	2.590	0.070
4	0.0347	9.114	9.1	0.6	0.218	2.520	2.738	1.09	2.629	0.109
5	0.0568	12.293	12.3	1.0	0.293	2.520	2.813	1.12	2.666	0.146
6	0.0893	15.535	15.5	1.5	0.368	2.520	2.888	1.15	2.704	0.184
7	0.1187	18.634	18.6	2.1	0.439	2.520	2.959	1.17	2.739	0.219
8	0.1593	22.075	22.1	2.8	0.516	2.520	3.036	1.20	2.778	0.258
9	0.2119	25.187	25.2	3.7	0.583	2.520	3.103	1.23	2.812	0.292
10	0.2469	28.495	28.5	4.3	0.656	2.520	3.176	1.26	2.848	0.328
11	0.2880	31.827	31.8	5.0	0.727	2.520	3.247	1.29	2.883	0.363
12	0.3372	35.038	35.0	5.8	0.793	2.520	3.313	1.31	2.916	0.396
13	0.3957	38.716	38.7	6.9	0.867	2.520	3.387	1.34	2.953	0.433
14	0.4393	42.489	42.5	7.6	0.943	2.520	3.463	1.37	2.992	0.472
15	0.4828	47.064	47.1	8.4	1.037	2.520	3.557	1.41	3.038	0.518
16	0.5264	51.097	51.1	9.1	1.116	2.520	3.636	1.44	3.078	0.558
17	0.5850	54.376	54.4	10.1	1.174	2.520	3.694	1.47	3.107	0.587
18	0.6428	56.809	56.8	11.1	1.213	2.520	3.733	1.48	3.127	0.607
19	0.7014	58.858	58.9	12.1	1.243	2.520	3.763	1.49	3.141	0.621
20	0.7449	60.755	60.8	12.9	1.272	2.520	3.792	1.50	3.156	0.636
21	0.7593	60.621	60.6	13.1	1.265	2.520	3.785	1.50	3.153	0.633
22	0.7885	56.236	56.2	13.7	1.167	2.520	3.687	1.46	3.104	0.584
23	0.8028	52.863	52.9	13.9	1.094	2.520	3.614	1.43	3.067	0.547
24	0.8321	48.363	48.4	14.4	0.995	2.520	3.515	1.39	3.017	0.497
25	0.8607	44.049	44.0	14.9	0.901	2.520	3.421	1.36	2.970	0.450



Sample No.		1
Initial	Water Content, %	32.1
	Dry Density, pcf	88.9
	Saturation, %	94.8
	Void Ratio	0.9319
	Diameter, in.	2.777
	Height, in.	5.768
At Test	Water Content, %	32.1
	Dry Density, pcf	88.9
	Saturation, %	94.8
	Void Ratio	0.9319
	Diameter, in.	2.777
	Height, in.	5.768
Strain rate, in./min.		0.055
Back Pressure, psi		0.000
Cell Pressure, psi		25.020
Fail. Stress, ksf		2.012
Ult. Stress, ksf		
σ_1 Failure, ksf		5.615
σ_3 Failure, ksf		3.603

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Gray Fat Clay

Assumed Specific Gravity= 2.75

Remarks: ASTM D2850

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Residence Office - USACE

Location: 13-B1003

Sample Number: 30

Depth: 58-60 ft.

Proj. No.: 92145005

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Houston, TX

TRIAxIAL COMPRESSION TEST
Unconsolidated Undrained

2/14/2014
5:04 PM

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Residence Office - USACE
Project No.: 92145005
Location: 13-B1003
Depth: 58-60 ft. **Sample Number:** 30
Description: Gray Fat Clay
Remarks: ASTM D2850
Type of Sample: Undisturbed
Assumed Specific Gravity: 2.75 **LL=** **PL=** **Pi=**
Test Method: ASTM D 2850

Parameters for Specimen No. 1

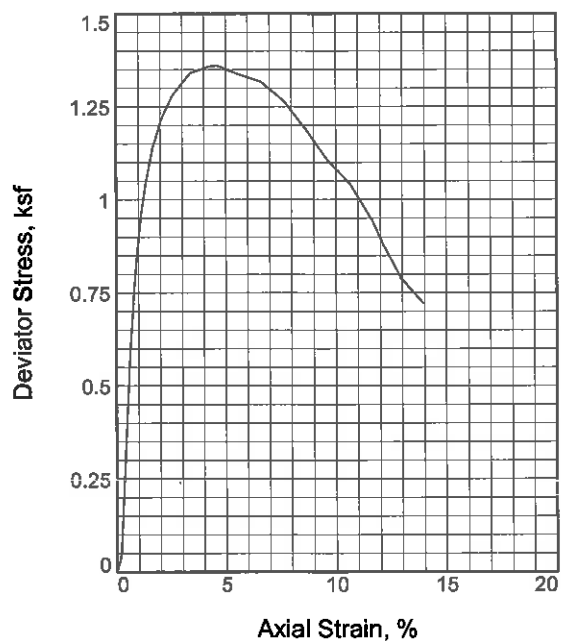
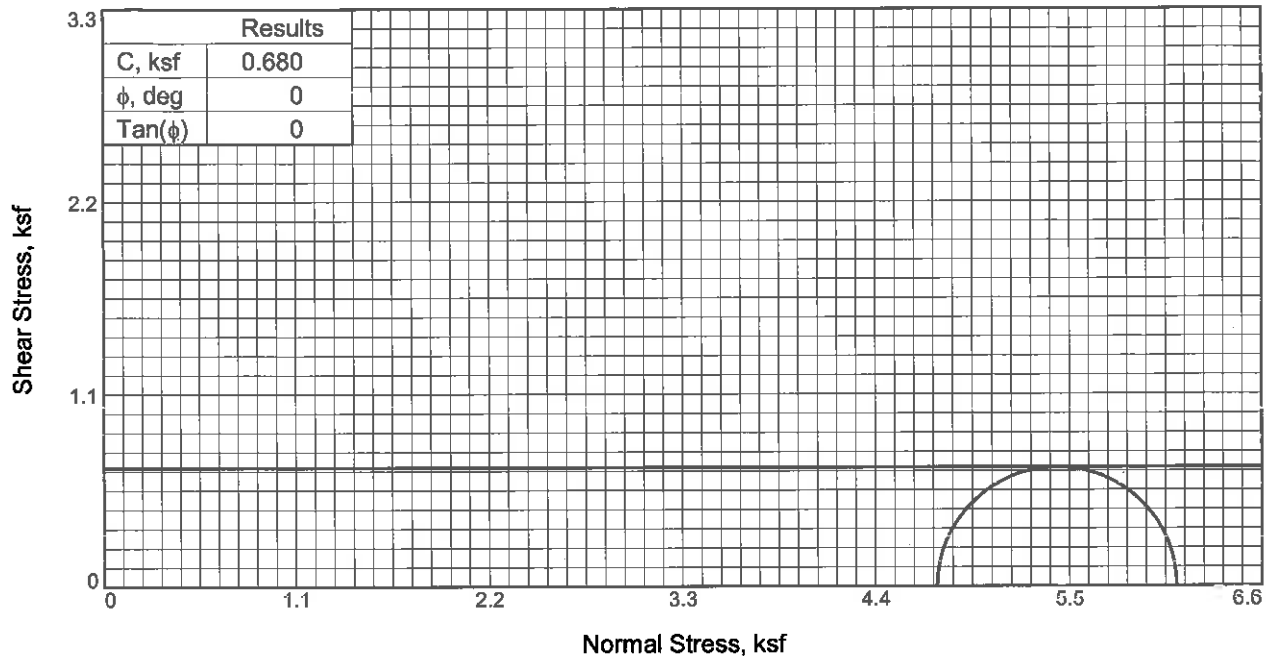
Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	119.450	119.450
Moisture content: Dry soil+tare, gms.	105.350	105.350
Moisture content: Tare, gms.	61.470	61.470
Moisture, %	32.1	32.1
Moist specimen weight, gms.	1076.80	
Diameter, in.	2.777	
Area, in. ²	6.057	
Height, in.	5.768	
Wet density, pcf	117.4	
Dry density, pcf	88.9	
Void ratio	0.9319	
Saturation, %	94.8	

Test Readings for Specimen No. 1

Cell pressure = 25.020 psi (3.603 ksf)
Back pressure = 0.000 psi (0.000 ksf)
Strain rate, in./min. = 0.055
Fail. Stress = 2.012 ksf at reading no. 21

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	3.603	3.603	1.00	3.603	0.000
1	0.0000	0.000	0.0	0.0	0.000	3.603	3.603	1.00	3.603	0.000
2	0.0027	1.020	1.0	0.0	0.024	3.603	3.627	1.01	3.615	0.012
3	0.0076	6.946	6.9	0.1	0.165	3.603	3.768	1.05	3.685	0.082
4	0.0151	13.254	13.3	0.3	0.314	3.603	3.917	1.09	3.760	0.157
5	0.0214	18.906	18.9	0.4	0.448	3.603	4.051	1.12	3.827	0.224
6	0.0283	24.072	24.1	0.5	0.569	3.603	4.172	1.16	3.888	0.285
7	0.0392	29.234	29.2	0.7	0.690	3.603	4.293	1.19	3.948	0.345
8	0.0555	34.147	34.1	1.0	0.804	3.603	4.407	1.22	4.005	0.402
9	0.0830	39.771	39.8	1.4	0.932	3.603	4.535	1.26	4.069	0.466
10	0.1242	45.019	45.0	2.2	1.047	3.603	4.650	1.29	4.127	0.524
11	0.1712	50.345	50.3	3.0	1.161	3.603	4.764	1.32	4.184	0.581
12	0.2237	53.908	53.9	3.9	1.232	3.603	4.835	1.34	4.219	0.616
13	0.2761	58.015	58.0	4.8	1.313	3.603	4.916	1.36	4.260	0.657
14	0.3228	63.859	63.9	5.6	1.433	3.603	5.036	1.40	4.320	0.717
15	0.3664	69.242	69.2	6.4	1.542	3.603	5.145	1.43	4.374	0.771
16	0.4100	74.446	74.4	7.1	1.644	3.603	5.247	1.46	4.425	0.822
17	0.4536	79.511	79.5	7.9	1.742	3.603	5.345	1.48	4.474	0.871
18	0.5121	83.830	83.8	8.9	1.816	3.603	5.419	1.50	4.511	0.908
19	0.5700	90.188	90.2	9.9	1.932	3.603	5.535	1.54	4.569	0.966
20	0.6286	93.948	93.9	10.9	1.990	3.603	5.593	1.55	4.598	0.995
21	0.6865	96.079	96.1	11.9	2.012	3.603	5.615	1.56	4.609	1.006
22	0.7444	95.880	95.9	12.9	1.985	3.603	5.588	1.55	4.596	0.993
23	0.8028	97.628	97.6	13.9	1.998	3.603	5.601	1.55	4.602	0.999
24	0.8171	97.538	97.5	14.2	1.990	3.603	5.593	1.55	4.598	0.995
25	0.8711	95.480	95.5	15.1	1.927	3.603	5.530	1.53	4.566	0.964



Sample No. 1	
Initial	Water Content, % 61.7
	Dry Density, pcf 63.4
	Saturation, % 99.2
	Void Ratio 1.7091
	Diameter, in. 2.795
	Height, in. 5.762
At Test	Water Content, % 61.6
	Dry Density, pcf 63.4
	Saturation, % 99.2
	Void Ratio 1.7091
	Diameter, in. 2.795
	Height, in. 5.762
Strain rate, in./min. 0.055	
Back Pressure, psi 0.000	
Cell Pressure, psi 33.000	
Fail. Stress, ksf 1.360	
Ult. Stress, ksf	
σ_1 Failure, ksf 6.112	
σ_3 Failure, ksf 4.752	

Type of Test:

Unconsolidated Undrained

Sample Type: Undisturbed

Description: Gray Fat Clay w/organics

Assumed Specific Gravity= 2.75

Remarks: ASTM D2850

Client: Quaternary Resource Investigations, L.L.C.

Project: Port Arthur Residence Office - USACE

Location: 13-B1003

Sample Number: 41

Depth: 80-82 ft.

Proj. No.: 92145005

Date Sampled:

TRIAXIAL SHEAR TEST REPORT

Terracon Consultants, Inc.

Houston, TX

TRIAxIAL COMPRESSION TEST
Unconsolidated Undrained

2/14/2014
4:22 PM

Date:
Client: Quaternary Resource Investigations, L.L.C.
Project: Port Arthur Residence Office - USACE
Project No.: 92145005
Location: 13-B1003
Depth: 80-82 ft. **Sample Number:** 41
Description: Gray Fat Clay w/organics
Remarks: ASTM D2850
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=** **PL=** **PI=**
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	114.360	114.350
Moisture content: Dry soil+tare, gms.	90.250	90.250
Moisture content: Tare, gms.	51.150	51.150
Moisture, %	61.7	61.6
Moist specimen weight, gms.	950.70	
Diameter, in.	2.795	
Area, in. ²	6.136	
Height, in.	5.762	
Wet density, pcf	102.4	
Dry density, pcf	63.4	
Void ratio	1.7091	
Saturation, %	99.2	

Test Readings for Specimen No. 1

Cell pressure = 33.000 psi (4.752 ksf)
Back pressure = 0.000 psi (0.000 ksf)
Strain rate, in./min. = 0.055
Fail. Stress = 1.360 ksf at reading no. 20

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.000	4.752	4.752	1.00	4.752	0.000
1	0.0000	0.100	0.1	0.0	0.002	4.752	4.754	1.00	4.753	0.001
2	0.0071	1.200	1.2	0.1	0.028	4.752	4.780	1.01	4.766	0.014
3	0.0115	2.252	2.3	0.2	0.053	4.752	4.805	1.01	4.778	0.026
4	0.0146	5.427	5.4	0.3	0.127	4.752	4.879	1.03	4.816	0.064
5	0.0196	9.904	9.9	0.3	0.232	4.752	4.984	1.05	4.868	0.116
6	0.0241	14.364	14.4	0.4	0.336	4.752	5.088	1.07	4.920	0.168
7	0.0285	18.602	18.6	0.5	0.434	4.752	5.186	1.09	4.969	0.217
8	0.0330	22.581	22.6	0.6	0.527	4.752	5.279	1.11	5.015	0.263
9	0.0373	26.198	26.2	0.6	0.611	4.752	5.363	1.13	5.057	0.305
10	0.0417	29.438	29.4	0.7	0.686	4.752	5.438	1.14	5.095	0.343
11	0.0478	33.295	33.3	0.8	0.775	4.752	5.527	1.16	5.139	0.387
12	0.0536	36.477	36.5	0.9	0.848	4.752	5.600	1.18	5.176	0.424
13	0.0656	41.390	41.4	1.1	0.960	4.752	5.712	1.20	5.232	0.480
14	0.0773	45.077	45.1	1.3	1.044	4.752	5.796	1.22	5.274	0.522
15	0.0953	49.232	49.2	1.7	1.136	4.752	5.888	1.24	5.320	0.568
16	0.1182	52.895	52.9	2.1	1.216	4.752	5.968	1.26	5.360	0.608
17	0.1476	55.995	56.0	2.6	1.281	4.752	6.033	1.27	5.392	0.640
18	0.1942	59.059	59.1	3.4	1.339	4.752	6.091	1.28	5.422	0.670
19	0.2471	60.483	60.5	4.3	1.359	4.752	6.111	1.29	5.431	0.679
20	0.2651	60.758	60.8	4.6	1.360	4.752	6.112	1.29	5.432	0.680
21	0.2707	60.747	60.7	4.7	1.359	4.752	6.111	1.29	5.431	0.679
22	0.3231	60.364	60.4	5.6	1.337	4.752	6.089	1.28	5.421	0.669
23	0.3815	60.119	60.1	6.6	1.318	4.752	6.070	1.28	5.411	0.659
24	0.4397	58.471	58.5	7.6	1.268	4.752	6.020	1.27	5.386	0.634
25	0.4981	55.403	55.4	8.6	1.188	4.752	5.940	1.25	5.346	0.594
26	0.5559	52.097	52.1	9.6	1.105	4.752	5.857	1.23	5.304	0.552
27	0.6144	49.637	49.6	10.7	1.041	4.752	5.793	1.22	5.272	0.520
28	0.6723	45.439	45.4	11.7	0.942	4.752	5.694	1.20	5.223	0.471
29	0.7016	42.394	42.4	12.2	0.874	4.752	5.626	1.18	5.189	0.437
30	0.7453	38.626	38.6	12.9	0.789	4.752	5.541	1.17	5.147	0.395
31	0.8031	35.706	35.7	13.9	0.721	4.752	5.473	1.15	5.113	0.361

