Hole No. 07-239

BORING LOG	DISTRICT	INSTALLATION	SHEET 1 OF 1 SHEETS

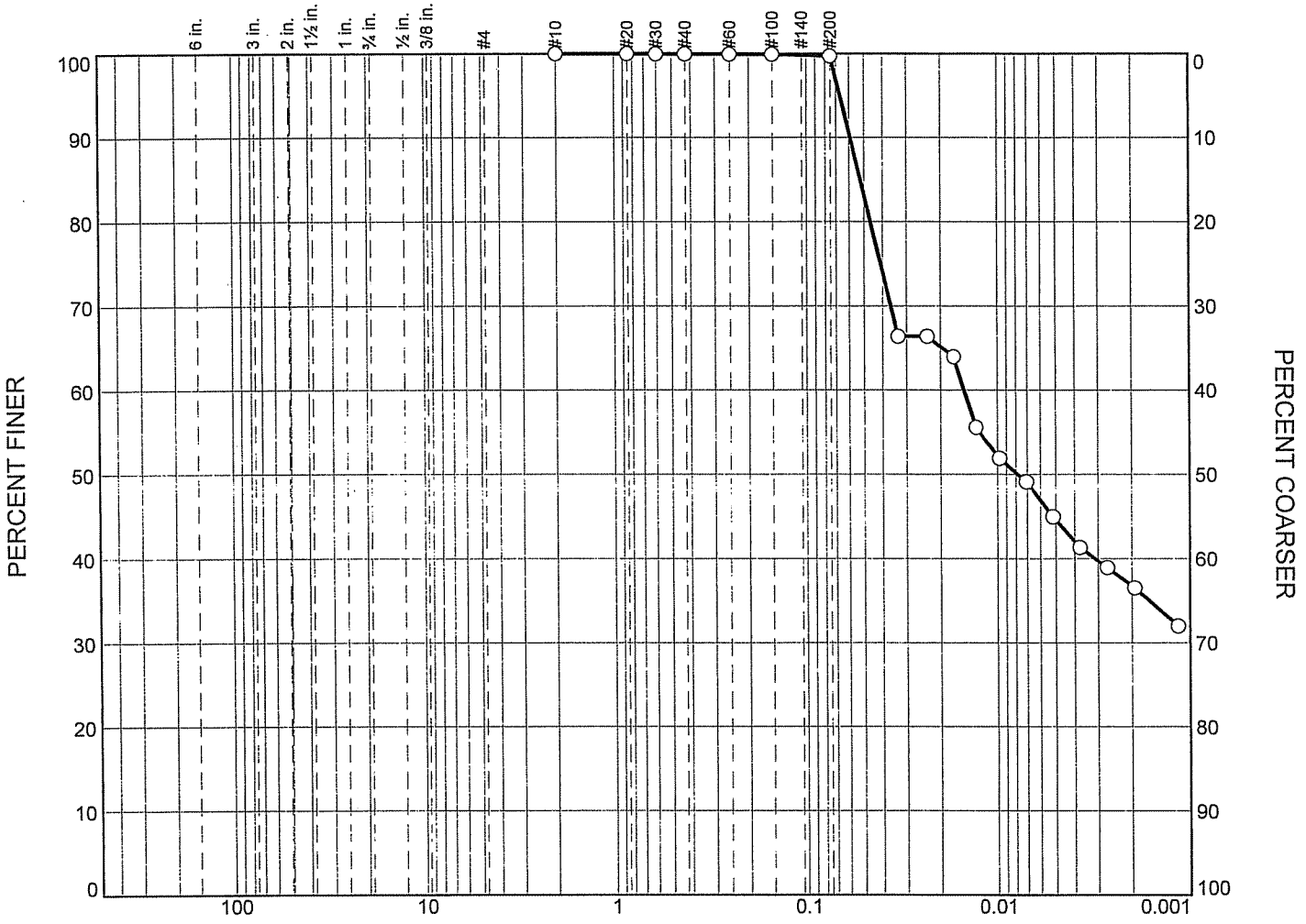
1. PROJECT Galveston Channel and Pelican Island PA	7. ELEVATION OF HOLE
2. LOCATION (Coordinates or Station) N=13683693 E=3303853	8. DATUM FOR ELEVATION
3. DRILLING AGENCY Dempsey (Geotest Engineering, Inc.)	9. ELEVATION OF GROUNDWATER ▽ TOD: ▼ 24-HR:
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.	10. DRILLING DATE and TIME STARTED: COMPLETED:
5. DEPTH OF WATER ▽ TOD: ▼ 24-HR:	11. CLASSIFICATION REFERENCE
6. DEPTH OF HOLE 30 ft	12. ENGINEER

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY (%)	SPT (N)	PENETROMETER (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	FINES CONTENT (% <200)
			FAT CLAY(CH), soft to firm, reddish brown & gray	X	1		3							
				X	2		5			35.6	67	21	46	98.4
5					3			0.75	90.2	31.0				
			LEAN CLAY(CL), firm, tan & gray, w/ silt seams		4			0.75	94.4	29.4	35	16	19	99.7
			SILTY CLAY(CL-ML), firm, brown, w/ silt seams		5			1.25	95.1	28.3				
10			**LEAN CLAY(CL)**, firm, gray		6			1.25	101.1	24.9	36	16	20	99.5
			FAT CLAY WITH SAND(CH), firm, light gray & tan, w/ silt seams		7			1.25	91.8	31.2				
15			**LEAN CLAY(CL)**, firm, gray, w/ silt seams		8			1.25		54.1				
			LEAN CLAY WITH SAND(CL), stiff, gray, w/ silt seams		9			2.50	93.5	28.4				
			LEAN CLAY(CL), firm to stiff, gray, w/ silt seams		10			1.25	96.1	29.2	33	16	17	99.8
20			-w/ sand seams @ 20' - 22'		11			2.00	88.9	33.2				
			LEAN CLAY WITH SAND(CL), stiff, gray, w/ silt seams		12			1.50	91.5	29.8				
25			**FAT CLAY(CH)**, firm to stiff, brown & gray, w/ silt seams		13			2.25	91.7	31.2	50	20	30	99.9
			-gray below 26'		14			1.25	82.1	39.1				
					15			1.25	81.9	35.7				
30														

SWG 1836 BOR 08.18.918.GPJ TOLUNAY-WONG ENGINEERS.GDT 10/2/08

ENG FORM: SWG 1836 BOR

Particle Size Analysis - ASTM D 422



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	0.3	62.9	36.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-239	4	6-8	Tan and brown LEAN CLAY	CL

Tolunay-Wong Engineers, Inc.
Houston, Texas

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/27/2008

Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project Number: 08.18.918
Location: 07-239
Depth: 6-8 **Sample Number:** 4
Material Description: Tan and brown LEAN CLAY
USCS: CL
Material specification: (no specification envelope)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
298.80	216.86	216.86	3"					
			3/4"					
			#4					
			#10	216.86	100.0			
			#20	216.87	100.0			
			#30	216.88	100.0			
			#40	216.89	100.0			
			#60	216.91	99.9			
			#100	216.93	99.9			
			#200	217.08	99.7			

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =81.94
Table of composite correction values:

Temp., deg. C:	22.0	21.0
Comp. corr.:	-5.0	-6.5

Meniscus correction only = 0.5
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	22.0	60.0	55.0	0.0131	60.5	6.4	0.0331	66.4
2.00	22.0	60.0	55.0	0.0131	60.5	6.4	0.0234	66.4
4.00	22.0	58.0	53.0	0.0131	58.5	6.7	0.0170	64.0
8.00	22.0	51.0	46.0	0.0131	51.5	7.8	0.0130	55.5
15.00	22.0	48.0	43.0	0.0131	48.5	8.3	0.0098	51.9
30.00	21.8	46.0	40.7	0.0131	46.5	8.7	0.0071	49.1
60.00	21.5	43.0	37.3	0.0132	43.5	9.2	0.0052	45.0
120.00	21.5	40.0	34.3	0.0132	40.5	9.7	0.0037	41.3
240.00	21.5	38.0	32.3	0.0132	38.5	10.0	0.0027	38.9
480.00	21.5	36.0	30.3	0.0132	36.5	10.3	0.0019	36.5
1440.00	21.0	33.0	26.5	0.0133	33.5	10.8	0.0011	32.0

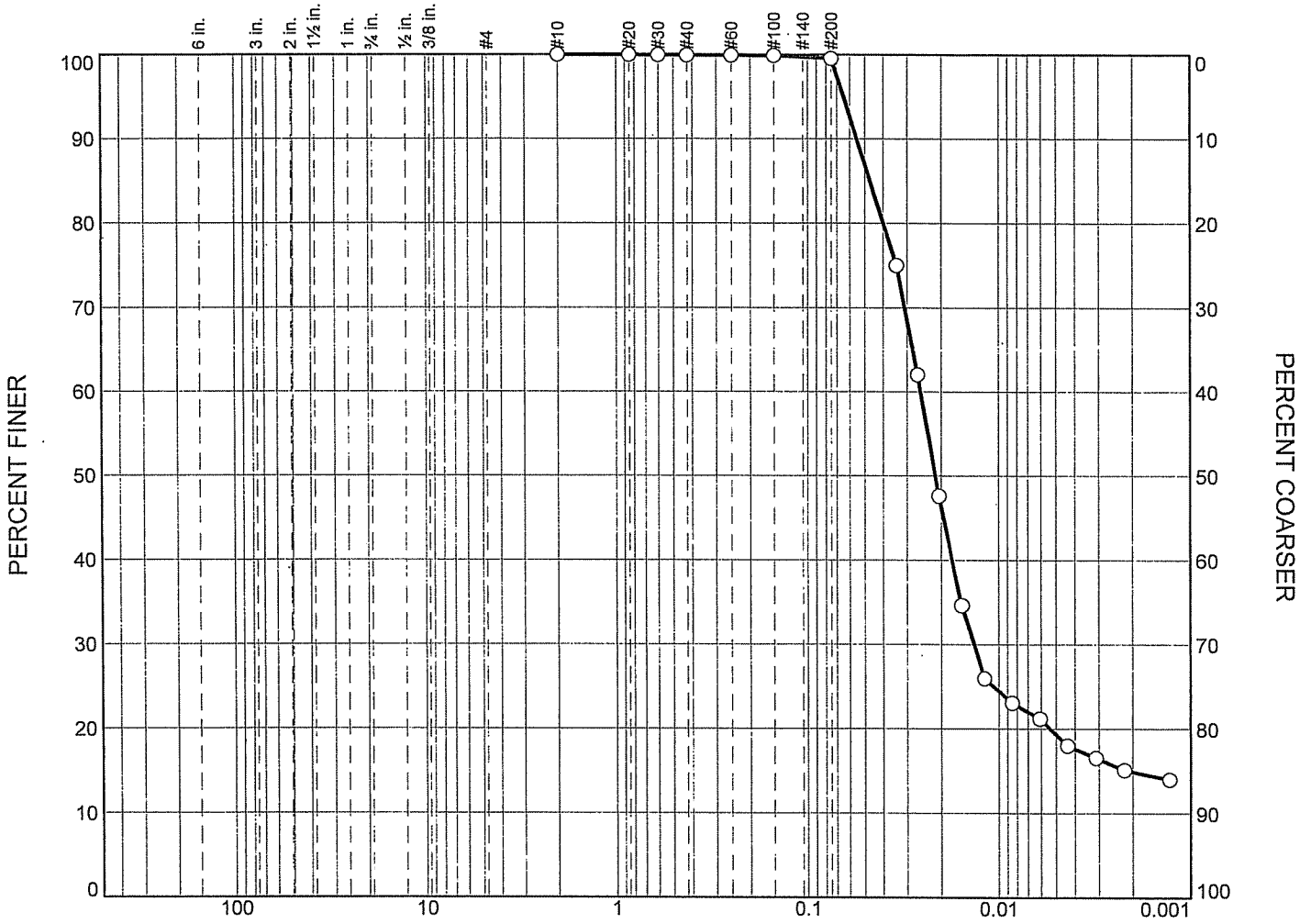
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	62.9	36.8	99.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0078	0.0150	0.0462	0.0523	0.0591	0.0668

Fineness Modulus
0.00

Particle Size Analysis - ASTM D 422



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	0.4	84.6	14.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-239	6	10-12	Gray LEAN CLAY	CL

Tolunay-Wong Engineers, Inc.
Houston, Texas

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/27/2008

Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project Number: 08.18.918
Location: 07-239
Depth: 10-12 **Sample Number:** 6
Material Description: Gray LEAN CLAY
USCS: CL
Material specification: (no specification envelope)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Lower Spec. Limit, %	Upper Spec. Limit, %	Deviation From Spec., %
277.30	208.72	208.72	3"					
			3/4"					
			#4					
			#10	208.72	100.0			
			#20	208.73	100.0			
			#30	208.75	100.0			
			#40	208.76	99.9			
			#60	208.77	99.9			
			#100	208.80	99.9			
			#200	209.03	99.5			

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =89.98
Hygroscopic moisture correction:
Moist weight and tare = 152.42
Dry weight and tare = 123.79
Tare weight = 32.15
Hygroscopic moisture = 31.2%
Table of composite correction values:

Temp., deg. C:	22.0	21.3
Comp. corr.:	-6.0	-6.5

Meniscus correction only = 0.5
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 x Rm

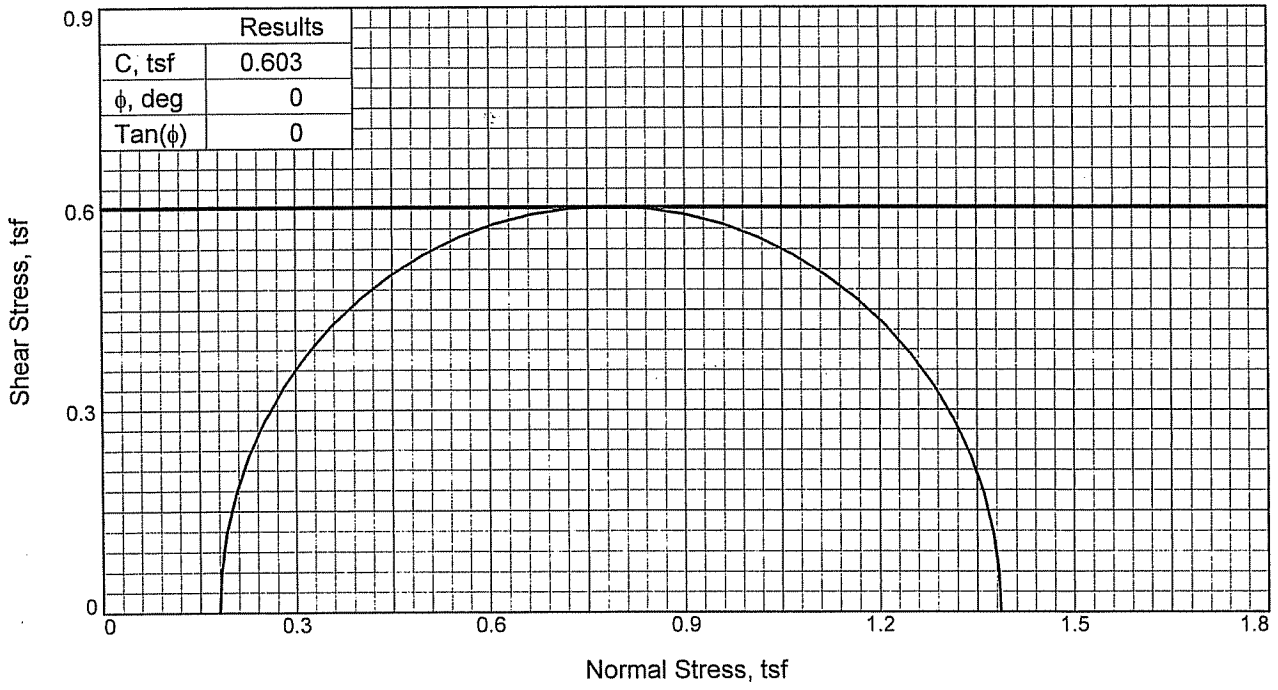
Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	22.0	58.0	52.0	0.0131	58.5	6.7	0.0340	75.0
2.00	22.0	49.0	43.0	0.0131	49.5	8.2	0.0265	62.0
4.00	22.0	39.0	33.0	0.0131	39.5	9.8	0.0205	47.6
8.00	22.0	30.0	24.0	0.0131	30.5	11.3	0.0156	34.6
15.00	22.0	24.0	18.0	0.0131	24.5	12.3	0.0119	26.0
30.00	22.0	22.0	16.0	0.0131	22.5	12.6	0.0085	23.1
60.00	21.6	21.0	14.7	0.0132	21.5	12.8	0.0061	21.2
120.00	21.3	19.0	12.5	0.0132	19.5	13.1	0.0044	18.0
240.00	21.3	18.0	11.5	0.0132	18.5	13.3	0.0031	16.6
480.00	21.3	17.0	10.5	0.0132	17.5	13.4	0.0022	15.1
1440.00	21.6	16.0	9.7	0.0132	16.5	13.6	0.0013	14.0

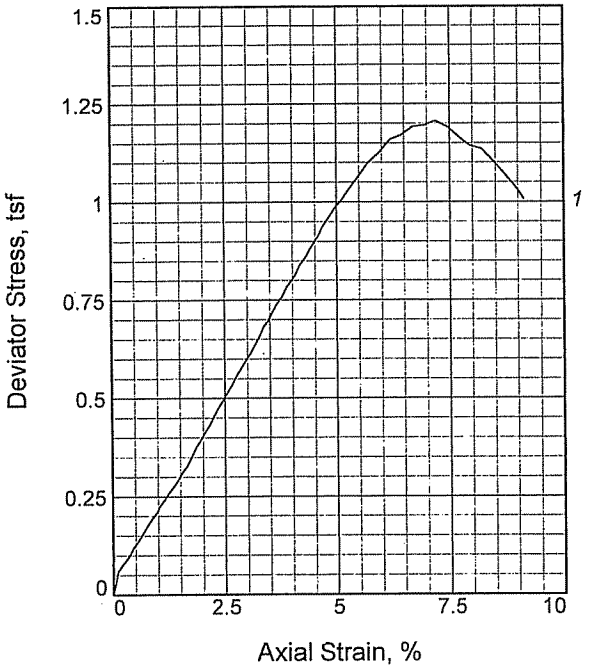
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.5	84.6	14.9	99.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0021	0.0054	0.0135	0.0214	0.0256	0.0399	0.0469	0.0551	0.0648

Fineness Modulus
0.00





Sample No.		1
Initial	Water Content, %	29.4
	Dry Density, pcf	94.4
	Saturation, %	98.8
	Void Ratio	0.8194
	Diameter, in.	2.77
	Height, in.	6.00
At Test	Water Content, %	23.8
	Dry Density, pcf	94.4
	Saturation, %	79.7
	Void Ratio	0.8194
	Diameter, in.	2.77
	Height, in.	6.00
Strain rate, %/min.		1.00
Back Pressure, tsf		0.00
Cell Pressure, tsf		0.18
Fail. Stress, tsf		1.21
Ult. Stress, tsf		
σ_1 Failure, tsf		1.39
σ_3 Failure, tsf		0.18

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Tan and brown SILTY CLAY

Assumed Specific Gravity= 2.75

Remarks:
Test method: ASTM D 2850
Pocket pen; tsf: 1.50
Failure type: Vertical shear

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-239 **Depth:** 6-8

Sample Number: 4

Proj. No.: 08.18.918 **Date Sampled:** 7/18/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/24/2008
1:37 PM

Date:	7/18/08
Client:	United States Army Corps of Engineers
Project:	Galveston Channel and Pelican Island PA
	Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.:	08.18.918
Location:	07-239
Depth:	6-8 **Sample Number:** 4
Description:	Tan and brown SILTY CLAY
Remarks:	
	Test method: ASTM D 2850
	Pocket pen; tsf: 1.50
	Failure type: Vertical shear
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.	130.810	108.240
Moisture content: Dry soil+tare, gms.	108.230	93.520
Moisture content: Tare, gms.	31.550	31.550
Moisture, %	29.4	23.8
Moist specimen weight, gms.	1163.5	
Diameter, in.	2.77	
Area, in.²	6.05	
Height, in.	6.00	
Wet Density, pcf	122.1	
Dry density, pcf	94.4	
Void ratio	0.8194	
Saturation, %	98.8	

Test Readings for Specimen No. 1

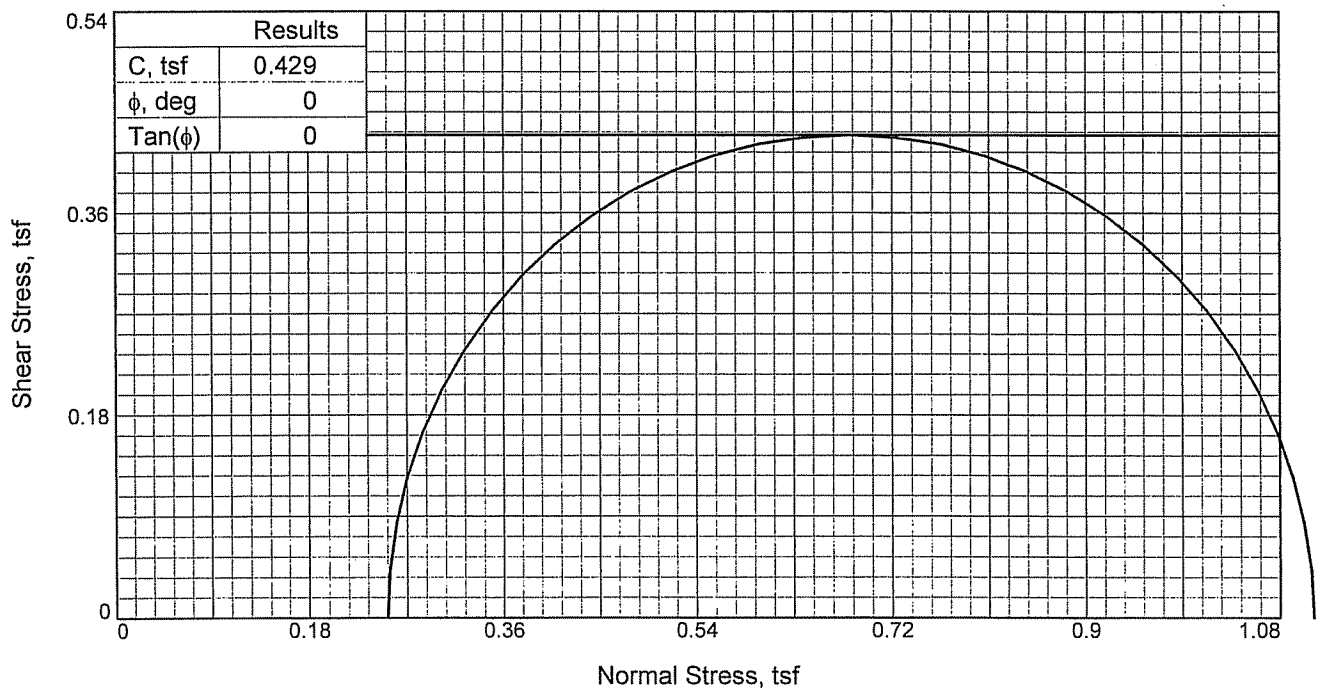
Membrane modulus = .130 kN/cm²
Membrane thickness = .031 cm
Cell pressure = 2.50 psi (0.180 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 1.00
Fail. Stress = 1.206 tsf **at reading no.** 60

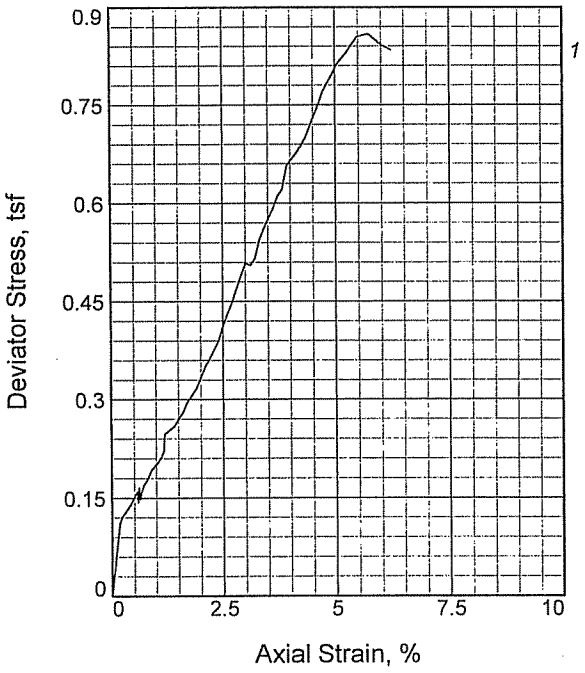
Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0312	0.000	0.0	0.0	0.000	0.180	0.180	1.00	0.180	0.000
1	0.0377	4.875	4.9	0.1	0.058	0.180	0.238	1.32	0.209	0.029
2	0.0427	6.176	6.2	0.2	0.073	0.180	0.253	1.41	0.217	0.037
3	0.0491	7.365	7.4	0.3	0.087	0.180	0.267	1.49	0.224	0.044
4	0.0537	8.468	8.5	0.4	0.100	0.180	0.280	1.56	0.230	0.050
5	0.0583	9.958	10.0	0.5	0.118	0.180	0.298	1.66	0.239	0.059
6	0.0642	11.309	11.3	0.6	0.134	0.180	0.314	1.74	0.247	0.067
7	0.0688	12.578	12.6	0.6	0.149	0.180	0.329	1.83	0.254	0.074
8	0.0734	13.797	13.8	0.7	0.163	0.180	0.343	1.91	0.262	0.082
9	0.0780	15.079	15.1	0.8	0.178	0.180	0.358	1.99	0.269	0.089
10	0.0826	16.228	16.2	0.9	0.192	0.180	0.372	2.06	0.276	0.096
11	0.0891	17.719	17.7	1.0	0.209	0.180	0.389	2.16	0.284	0.104
12	0.0937	19.162	19.2	1.0	0.226	0.180	0.406	2.25	0.293	0.113
13	0.0996	20.382	20.4	1.1	0.240	0.180	0.420	2.33	0.300	0.120
14	0.1054	21.873	21.9	1.2	0.257	0.180	0.437	2.43	0.309	0.129
15	0.1119	23.265	23.3	1.3	0.273	0.180	0.453	2.52	0.317	0.137
16	0.1177	24.660	24.7	1.4	0.289	0.180	0.469	2.61	0.325	0.145
17	0.1241	26.598	26.6	1.5	0.312	0.180	0.492	2.73	0.336	0.156
18	0.1299	27.708	27.7	1.6	0.324	0.180	0.504	2.80	0.342	0.162
19	0.1363	30.024	30.0	1.8	0.351	0.180	0.531	2.95	0.356	0.176
20	0.1420	32.073	32.1	1.8	0.375	0.180	0.555	3.08	0.367	0.187
21	0.1485	33.743	33.7	2.0	0.394	0.180	0.574	3.19	0.377	0.197
22	0.1543	35.408	35.4	2.1	0.413	0.180	0.593	3.29	0.386	0.206
23	0.1607	37.087	37.1	2.2	0.432	0.180	0.612	3.40	0.396	0.216
24	0.1664	38.939	38.9	2.3	0.453	0.180	0.633	3.52	0.407	0.227
25	0.1729	41.074	41.1	2.4	0.477	0.180	0.657	3.65	0.419	0.239
26	0.1786	42.441	42.4	2.5	0.493	0.180	0.673	3.74	0.426	0.246
27	0.1844	44.257	44.3	2.6	0.513	0.180	0.693	3.85	0.437	0.257
28	0.1909	46.018	46.0	2.7	0.533	0.180	0.713	3.96	0.447	0.267
29	0.1967	48.081	48.1	2.8	0.557	0.180	0.737	4.09	0.458	0.278
30	0.2088	51.425	51.4	3.0	0.594	0.180	0.774	4.30	0.477	0.297
31	0.2152	53.145	53.1	3.1	0.613	0.180	0.793	4.41	0.487	0.307
32	0.2210	55.009	55.0	3.2	0.634	0.180	0.814	4.52	0.497	0.317
33	0.2268	56.895	56.9	3.3	0.655	0.180	0.835	4.64	0.508	0.328
34	0.2333	59.268	59.3	3.4	0.682	0.180	0.862	4.79	0.521	0.341
35	0.2391	60.733	60.7	3.5	0.698	0.180	0.878	4.88	0.529	0.349
36	0.2455	62.989	63.0	3.6	0.723	0.180	0.903	5.02	0.542	0.362
37	0.2513	64.598	64.6	3.7	0.741	0.180	0.921	5.12	0.550	0.370
38	0.2577	66.235	66.2	3.8	0.759	0.180	0.939	5.22	0.559	0.379
39	0.2635	68.362	68.4	3.9	0.782	0.180	0.962	5.35	0.571	0.391
40	0.2699	69.877	69.9	4.0	0.799	0.180	0.979	5.44	0.579	0.399
41	0.2757	71.445	71.4	4.1	0.816	0.180	0.996	5.53	0.588	0.408
42	0.2814	73.513	73.5	4.2	0.839	0.180	1.019	5.66	0.599	0.419
43	0.2879	75.127	75.1	4.3	0.856	0.180	1.036	5.76	0.608	0.428
44	0.2937	77.141	77.1	4.4	0.878	0.180	1.058	5.88	0.619	0.439
45	0.3001	78.923	78.9	4.5	0.897	0.180	1.077	5.99	0.629	0.449
46	0.3059	80.383	80.4	4.6	0.913	0.180	1.093	6.07	0.637	0.457

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
47	0.3123	82.674	82.7	4.7	0.938	0.180	1.118	6.21	0.649	0.469
48	0.3181	84.072	84.1	4.8	0.953	0.180	1.133	6.29	0.656	0.476
49	0.3245	85.845	85.8	4.9	0.972	0.180	1.152	6.40	0.666	0.486
50	0.3303	87.407	87.4	5.0	0.989	0.180	1.169	6.49	0.674	0.494
51	0.3367	88.556	88.6	5.1	1.001	0.180	1.181	6.56	0.680	0.500
52	0.3425	90.310	90.3	5.2	1.019	0.180	1.199	6.66	0.690	0.510
53	0.3579	93.846	93.8	5.4	1.056	0.180	1.236	6.87	0.708	0.528
54	0.3726	97.716	97.7	5.7	1.097	0.180	1.277	7.09	0.729	0.549
55	0.3880	100.463	100.5	5.9	1.125	0.180	1.305	7.25	0.742	0.562
56	0.4028	103.721	103.7	6.2	1.158	0.180	1.338	7.44	0.759	0.579
57	0.4181	105.100	105.1	6.4	1.170	0.180	1.350	7.50	0.765	0.585
58	0.4329	107.302	107.3	6.7	1.192	0.180	1.372	7.62	0.776	0.596
59	0.4482	107.833	107.8	7.0	1.194	0.180	1.374	7.64	0.777	0.597
60	0.4630	109.192	109.2	7.2	1.206	0.180	1.386	7.70	0.783	0.603
61	0.4783	108.038	108.0	7.5	1.190	0.180	1.370	7.61	0.775	0.595
62	0.4931	106.146	106.1	7.7	1.166	0.180	1.346	7.48	0.763	0.583
63	0.5072	104.398	104.4	7.9	1.144	0.180	1.324	7.36	0.752	0.572
64	0.5235	103.837	103.8	8.2	1.135	0.180	1.315	7.30	0.747	0.567
65	0.5382	101.305	101.3	8.5	1.104	0.180	1.284	7.13	0.732	0.552
66	0.5536	98.568	98.6	8.7	1.071	0.180	1.251	6.95	0.716	0.536
67	0.5684	95.728	95.7	9.0	1.038	0.180	1.218	6.76	0.699	0.519
68	0.5786	93.154	93.2	9.1	1.008	0.180	1.188	6.60	0.684	0.504





Sample No.		1
Initial	Water Content, %	28.3
	Dry Density, pcf	95.1
	Saturation, %	98.8
	Void Ratio	0.7730
	Diameter, in.	2.00
	Height, in.	4.03
At Test	Water Content, %	27.3
	Dry Density, pcf	95.1
	Saturation, %	95.3
	Void Ratio	0.7730
	Diameter, in.	2.00
	Height, in.	4.03
Strain rate, %/min.		1.00
Back Pressure, tsf		0.00
Cell Pressure, tsf		0.25
Fail. Stress, tsf		0.86
Ult. Stress, tsf		
σ_1 Failure, tsf		1.11
σ_3 Failure, tsf		0.25

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Brown SILTY CLAY

Assumed Specific Gravity= 2.70

Remarks:
Test method: ASTM D 2850
Pocket pen; tsf: 0.25
Failure type: Bulge

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-239 **Depth:** 8-10

Sample Number: 5

Proj. No.: 08.18.918 **Date Sampled:** 7/18/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/24/2008
1:45 PM

Date: 7/18/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-239
Depth: 8-10 **Sample Number:** 5
Description: Brown SILTY CLAY
Remarks:
Test method: ASTM D 2850
Pocket pen; tsf: 0.25
Failure type: Bulge
Type of Sample: Undisturbed
Assumed Specific Gravity=2.70 **LL=** **PL=** **PI=**
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	133.520	100.300
Moisture content: Dry soil+tare, gms.	110.950	85.450
Moisture content: Tare, gms.	31.190	31.020
Moisture, %	28.3	27.3
Moist specimen weight, gms.	405.4	
Diameter, in.	2.00	
Area, in.^{2}	3.14	
Height, in.	4.03	
Wet Density, pcf	122.0	
Dry density, pcf	95.1	
Void ratio	0.7730	
Saturation, %	98.8	

Test Readings for Specimen No. 1

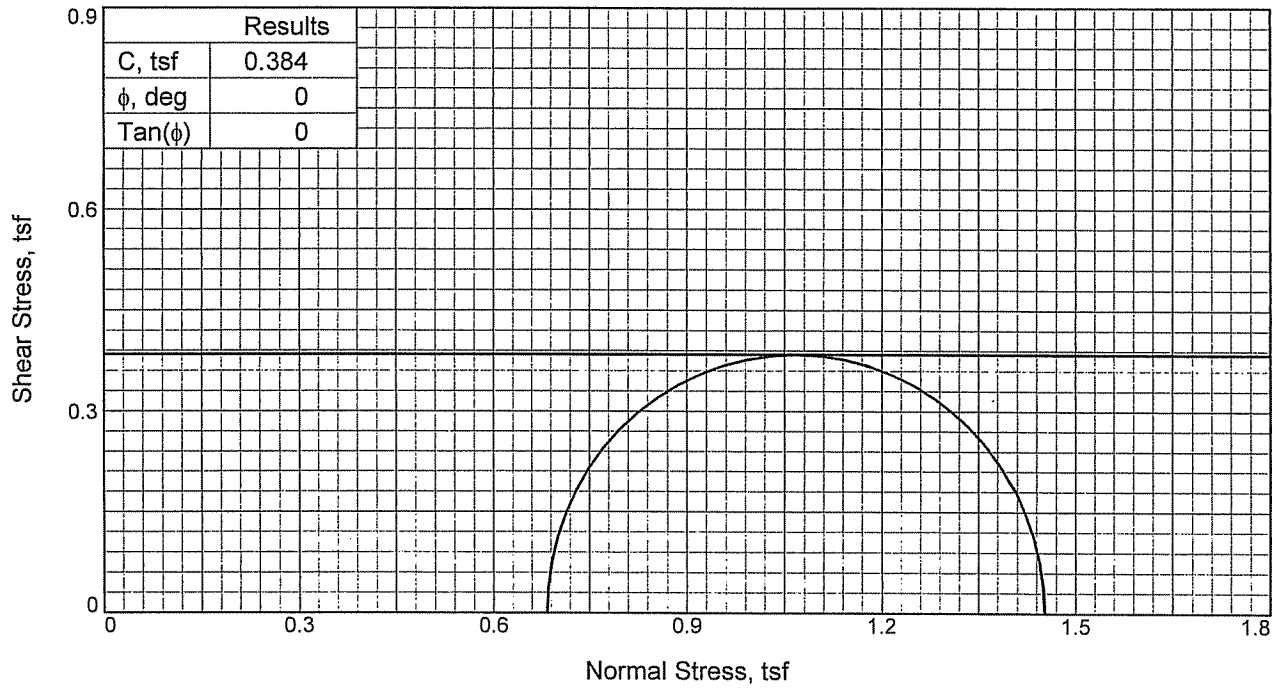
Membrane modulus = .130 kN/cm^2
Membrane thickness = .031 cm
Cell pressure = 3.50 psi (0.252 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 1.00
Fail. Stress = 0.859 tsf **at reading no.** 49

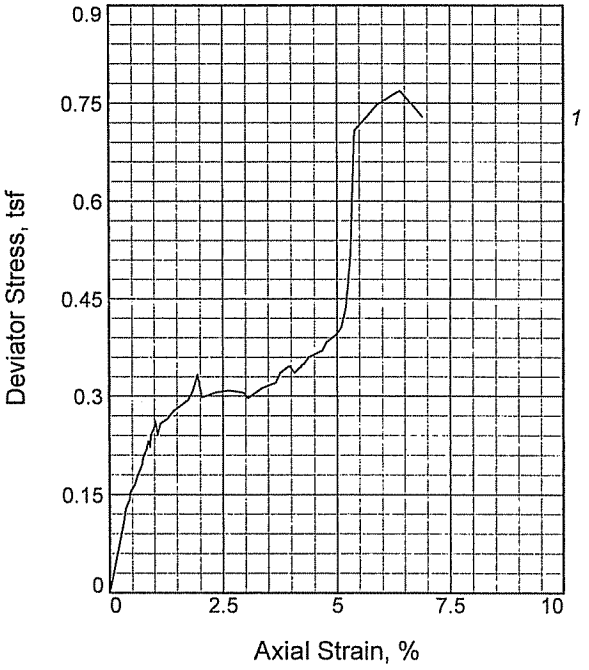
Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0630	0.000	0.0	0.0	0.000	0.252	0.252	1.00	0.252	0.000
1	0.0700	4.818	4.8	0.2	0.110	0.252	0.362	1.44	0.307	0.055
2	0.0721	5.265	5.3	0.2	0.120	0.252	0.372	1.48	0.312	0.060
3	0.0795	6.060	6.1	0.4	0.138	0.252	0.390	1.55	0.321	0.069
4	0.0857	6.990	7.0	0.6	0.159	0.252	0.411	1.63	0.332	0.080
5	0.0865	6.305	6.3	0.6	0.144	0.252	0.396	1.57	0.324	0.072
6	0.0874	7.227	7.2	0.6	0.165	0.252	0.417	1.65	0.334	0.082
7	0.0887	6.493	6.5	0.6	0.148	0.252	0.400	1.59	0.326	0.074
8	0.0896	6.949	6.9	0.7	0.158	0.252	0.410	1.63	0.331	0.079
9	0.0918	7.432	7.4	0.7	0.169	0.252	0.421	1.67	0.337	0.085
10	0.0958	7.924	7.9	0.8	0.180	0.252	0.432	1.71	0.342	0.090
11	0.0989	8.454	8.5	0.9	0.192	0.252	0.444	1.76	0.348	0.096
12	0.1042	8.898	8.9	1.0	0.202	0.252	0.454	1.80	0.353	0.101
13	0.1082	9.301	9.3	1.1	0.211	0.252	0.463	1.84	0.357	0.105
14	0.1104	9.766	9.8	1.2	0.221	0.252	0.473	1.88	0.363	0.111
15	0.1112	10.916	10.9	1.2	0.247	0.252	0.499	1.98	0.376	0.124
16	0.1194	11.430	11.4	1.4	0.258	0.252	0.510	2.02	0.381	0.129
17	0.1277	12.433	12.4	1.6	0.280	0.252	0.532	2.11	0.392	0.140
18	0.1316	13.100	13.1	1.7	0.295	0.252	0.547	2.17	0.400	0.148
19	0.1399	14.075	14.1	1.9	0.316	0.252	0.568	2.26	0.410	0.158
20	0.1437	14.812	14.8	2.0	0.333	0.252	0.585	2.32	0.418	0.166
21	0.1480	15.632	15.6	2.1	0.351	0.252	0.603	2.39	0.427	0.175
22	0.1519	16.193	16.2	2.2	0.363	0.252	0.615	2.44	0.433	0.181
23	0.1601	17.457	17.5	2.4	0.390	0.252	0.642	2.55	0.447	0.195
24	0.1640	18.466	18.5	2.5	0.413	0.252	0.665	2.64	0.458	0.206
25	0.1722	20.172	20.2	2.7	0.450	0.252	0.702	2.78	0.477	0.225
26	0.1761	21.155	21.2	2.8	0.471	0.252	0.723	2.87	0.488	0.236
27	0.1805	22.093	22.1	2.9	0.492	0.252	0.744	2.95	0.498	0.246
28	0.1844	22.901	22.9	3.0	0.509	0.252	0.761	3.02	0.507	0.255
29	0.1887	22.769	22.8	3.1	0.506	0.252	0.758	3.01	0.505	0.253
30	0.1926	23.225	23.2	3.2	0.515	0.252	0.767	3.04	0.510	0.258
31	0.1965	24.520	24.5	3.3	0.543	0.252	0.795	3.16	0.524	0.272
32	0.2009	25.419	25.4	3.4	0.563	0.252	0.815	3.23	0.533	0.281
33	0.2048	26.125	26.1	3.5	0.578	0.252	0.830	3.29	0.541	0.289
34	0.2087	26.792	26.8	3.6	0.592	0.252	0.844	3.35	0.548	0.296
35	0.2130	27.679	27.7	3.7	0.611	0.252	0.863	3.42	0.557	0.305
36	0.2169	28.161	28.2	3.8	0.621	0.252	0.873	3.46	0.562	0.310
37	0.2208	29.807	29.8	3.9	0.656	0.252	0.908	3.60	0.580	0.328
38	0.2290	30.701	30.7	4.1	0.675	0.252	0.927	3.68	0.589	0.337
39	0.2334	31.298	31.3	4.2	0.687	0.252	0.939	3.73	0.595	0.343
40	0.2372	31.911	31.9	4.3	0.700	0.252	0.952	3.78	0.602	0.350
41	0.2415	32.764	32.8	4.4	0.718	0.252	0.970	3.85	0.611	0.359
42	0.2454	33.483	33.5	4.5	0.733	0.252	0.985	3.91	0.618	0.366
43	0.2497	34.337	34.3	4.6	0.750	0.252	1.002	3.98	0.627	0.375
44	0.2536	35.255	35.3	4.7	0.770	0.252	1.022	4.05	0.637	0.385
45	0.2618	36.521	36.5	4.9	0.796	0.252	1.048	4.16	0.650	0.398
46	0.2661	37.307	37.3	5.0	0.812	0.252	1.064	4.22	0.658	0.406

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
47	0.2743	38.220	38.2	5.2	0.830	0.252	1.082	4.29	0.667	0.415
48	0.2842	39.444	39.4	5.5	0.854	0.252	1.106	4.39	0.679	0.427
49	0.2941	39.746	39.7	5.7	0.859	0.252	1.111	4.41	0.681	0.429
50	0.3043	39.133	39.1	6.0	0.843	0.252	1.095	4.35	0.674	0.422
51	0.3139	38.813	38.8	6.2	0.834	0.252	1.086	4.31	0.669	0.417





Sample No.		1
Initial	Water Content, %	31.2
	Dry Density, pcf	91.7
	Saturation, %	98.4
	Void Ratio	0.8718
	Diameter, in.	2.03
	Height, in.	4.05
At Test	Water Content, %	30.2
	Dry Density, pcf	91.7
	Saturation, %	95.3
	Void Ratio	0.8718
	Diameter, in.	2.03
	Height, in.	4.05
Strain rate, %/min.		1.00
Back Pressure, tsf		0.00
Cell Pressure, tsf		0.68
Fail. Stress, tsf		0.77
Ult. Stress, tsf		
σ_1 Failure, tsf		1.45
σ_3 Failure, tsf		0.68

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Brown and gray FAT CLAY

LL= 50 **PL=** 20 **PI=** 30

Assumed Specific Gravity= 2.75

Remarks:
Test method: ASTM D 2850
Pocket pen; tsf: 0.75
Failure type: 60 degree

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-239 **Depth:** 24-26

Sample Number: 13

Proj. No.: 08.18.918 **Date Sampled:** 7/18/08

TRIAXIAL SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/25/2008
7:32 AM

Date:	7/18/08
Client:	United States Army Corps of Engineers
Project:	Galveston Channel and Pelican Island PA
	Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.:	08.18.918
Location:	07-239
Depth:	24-26 **Sample Number:** 13
Description:	Brown and gray FAT CLAY
Remarks:	
	Test method: ASTM D 2850
	Pocket pen; tsf: 0.75
	Failure type: 60 degree
Type of Sample:	Undisturbed

Assumed Specific Gravity=2.75 **LL=**50 **PL=**20 **PI=**30

Test Method: ASTM D 2850

Parameters for Specimen No. 1

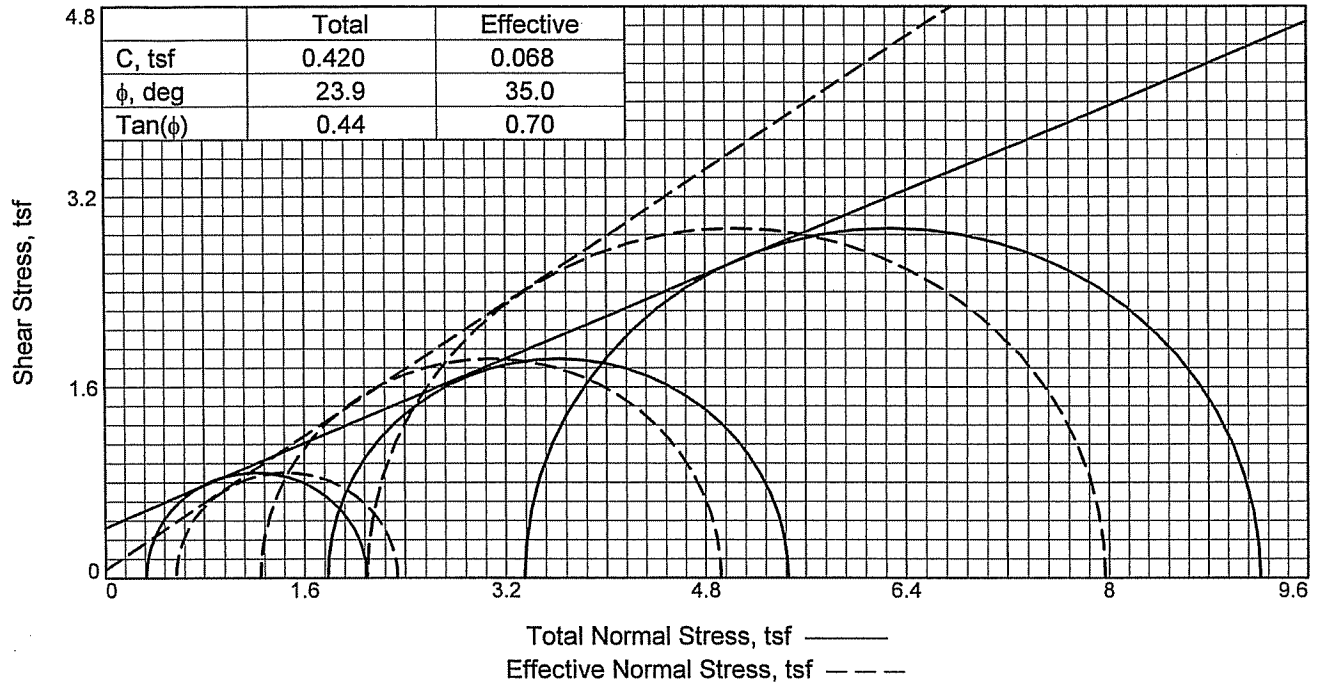
Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	130.230	93.490
Moisture content: Dry soil+tare, gms.	106.810	78.990
Moisture content: Tare, gms.	31.720	30.990
Moisture, %	31.2	30.2
Moist specimen weight, gms.	414.0	
Diameter, in.	2.03	
Area, in.²	3.24	
Height, in.	4.05	
Wet Density, pcf	120.3	
Dry density, pcf	91.7	
Void ratio	0.8718	
Saturation, %	98.4	

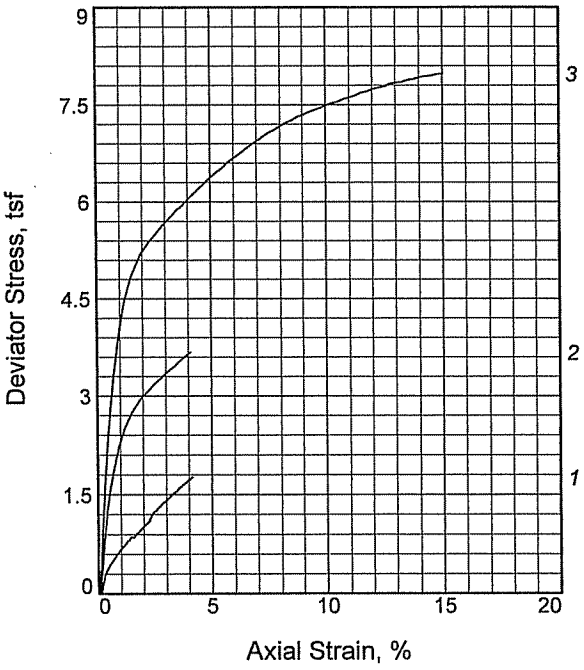
Test Readings for Specimen No. 1

Membrane modulus = .130 kN/cm²
Membrane thickness = .031 cm
Cell pressure = 9.50 psi (0.684 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 1.00
Fail. Stress = 0.769 tsf **at reading no.** 43

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0339	0.000	0.0	0.0	0.000	0.684	0.684	1.00	0.684	0.000
1	0.0465	4.846	4.8	0.3	0.107	0.684	0.791	1.16	0.738	0.054
2	0.0486	5.828	5.8	0.4	0.129	0.684	0.813	1.19	0.749	0.065
3	0.0517	6.355	6.4	0.4	0.141	0.684	0.825	1.21	0.754	0.070
4	0.0526	6.913	6.9	0.5	0.153	0.684	0.837	1.22	0.761	0.077
5	0.0565	7.434	7.4	0.6	0.164	0.684	0.848	1.24	0.766	0.082
6	0.0588	8.028	8.0	0.6	0.177	0.684	0.861	1.26	0.773	0.089
7	0.0627	8.759	8.8	0.7	0.193	0.684	0.877	1.28	0.781	0.097
8	0.0641	9.286	9.3	0.7	0.205	0.684	0.889	1.30	0.787	0.103
9	0.0672	9.897	9.9	0.8	0.218	0.684	0.902	1.32	0.793	0.109
10	0.0689	10.476	10.5	0.9	0.231	0.684	0.915	1.34	0.800	0.116
11	0.0703	10.085	10.1	0.9	0.222	0.684	0.906	1.33	0.795	0.111
12	0.0712	10.883	10.9	0.9	0.240	0.684	0.924	1.35	0.804	0.120
13	0.0743	11.435	11.4	1.0	0.252	0.684	0.936	1.37	0.810	0.126
14	0.0752	11.893	11.9	1.0	0.262	0.684	0.946	1.38	0.815	0.131
15	0.0774	10.993	11.0	1.1	0.242	0.684	0.926	1.35	0.805	0.121
16	0.0797	11.689	11.7	1.1	0.257	0.684	0.941	1.38	0.813	0.129
17	0.0867	12.099	12.1	1.3	0.266	0.684	0.950	1.39	0.817	0.133
18	0.0919	12.634	12.6	1.4	0.277	0.684	0.961	1.41	0.823	0.139
19	0.1045	13.431	13.4	1.7	0.294	0.684	0.978	1.43	0.831	0.147
20	0.1084	14.073	14.1	1.8	0.307	0.684	0.991	1.45	0.838	0.154
21	0.1127	15.258	15.3	1.9	0.333	0.684	1.017	1.49	0.850	0.166
22	0.1166	13.673	13.7	2.0	0.298	0.684	0.982	1.44	0.833	0.149
23	0.1291	14.072	14.1	2.4	0.306	0.684	0.990	1.45	0.837	0.153
24	0.1412	14.253	14.3	2.6	0.309	0.684	0.993	1.45	0.838	0.154
25	0.1534	14.156	14.2	3.0	0.306	0.684	0.990	1.45	0.837	0.153
26	0.1577	13.760	13.8	3.1	0.297	0.684	0.981	1.43	0.832	0.148
27	0.1699	14.511	14.5	3.4	0.312	0.684	0.996	1.46	0.840	0.156
28	0.1824	14.959	15.0	3.7	0.321	0.684	1.005	1.47	0.844	0.160
29	0.1863	15.687	15.7	3.8	0.336	0.684	1.020	1.49	0.852	0.168
30	0.1946	16.226	16.2	4.0	0.347	0.684	1.031	1.51	0.857	0.173
31	0.1989	15.731	15.7	4.1	0.336	0.684	1.020	1.49	0.852	0.168
32	0.2028	16.055	16.1	4.2	0.342	0.684	1.026	1.50	0.855	0.171
33	0.2071	16.433	16.4	4.3	0.350	0.684	1.034	1.51	0.859	0.175
34	0.2110	16.916	16.9	4.4	0.360	0.684	1.044	1.53	0.864	0.180
35	0.2236	17.464	17.5	4.7	0.370	0.684	1.054	1.54	0.869	0.185
36	0.2275	18.095	18.1	4.8	0.383	0.684	1.067	1.56	0.876	0.192
37	0.2357	18.678	18.7	5.0	0.395	0.684	1.079	1.58	0.881	0.197
38	0.2401	19.206	19.2	5.1	0.406	0.684	1.090	1.59	0.887	0.203
39	0.2440	20.714	20.7	5.2	0.437	0.684	1.121	1.64	0.902	0.218
40	0.2483	24.645	24.6	5.3	0.519	0.684	1.203	1.76	0.944	0.260
41	0.2522	33.603	33.6	5.4	0.707	0.684	1.391	2.03	1.038	0.354
42	0.2726	35.704	35.7	5.9	0.747	0.684	1.431	2.09	1.058	0.374
43	0.2930	36.912	36.9	6.4	0.769	0.684	1.453	2.12	1.068	0.384
44	0.3133	35.198	35.2	6.9	0.729	0.684	1.413	2.07	1.048	0.364





Sample No.		1	2	3
Initial	Water Content, %	24.9	24.9	24.9
	Dry Density, pcf	101.1	101.1	101.1
	Saturation, %	98.0	98.0	98.0
	Void Ratio	0.6986	0.6986	0.6986
	Diameter, in.	2.67	2.67	2.67
	Height, in.	5.47	5.47	5.47
At Test	Water Content, %	24.7	24.7	24.7
	Dry Density, pcf	102.2	102.2	102.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6791	0.6791	0.6791
	Diameter, in.	2.66	2.70	2.74
	Height, in.	5.48	5.30	5.14
Strain rate, %/min.		0.05	0.05	0.05
Back Pressure, tsf		2.17	2.17	2.17
Cell Pressure, tsf		2.50	3.95	5.52
Fail. Stress, tsf		1.77	3.67	5.87
Excess Pore Pr., tsf		-0.24	0.54	1.25
Ult. Stress, tsf		1.76	3.67	7.98
Excess Pore Pr., tsf		-0.24	0.54	0.11
$\bar{\sigma}_1$ Failure, tsf		2.34	4.92	7.97
$\bar{\sigma}_3$ Failure, tsf		0.57	1.25	2.10

Type of Test:
CU with Pore Pressures
Sample Type: Undisturbed
Description: Gray LEAN CLAY

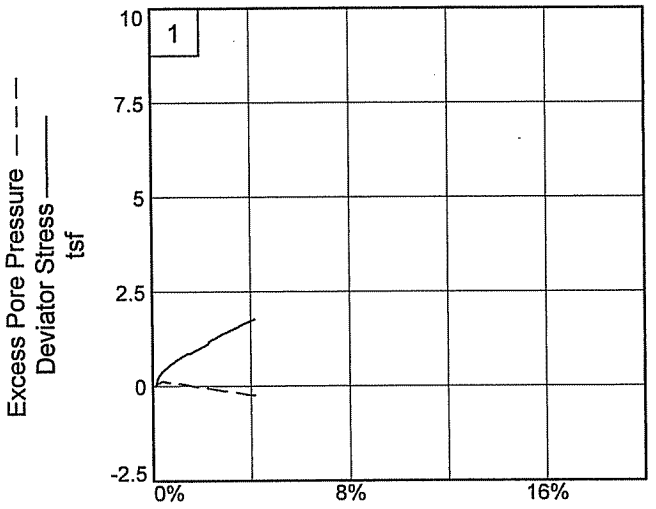
LL= 36 **PL=** 16 **PI=** 20
Assumed Specific Gravity= 2.75
Remarks:
Test method: ASTM D 4767
Pocket pen; tsf: 0.75
Failure type: Bulge

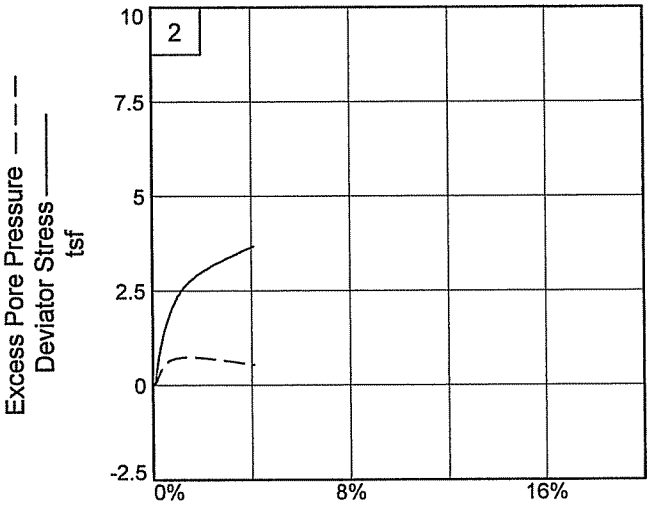
Client: United States Army Corps of Engineers

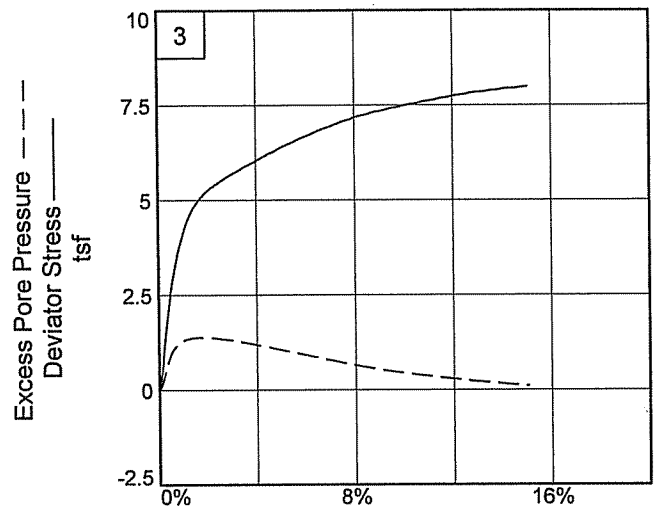
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Source of Sample: 07-239 **Depth:** 10-12
Sample Number: 6
Proj. No.: 08.18.918 **Date Sampled:** 8/8/08

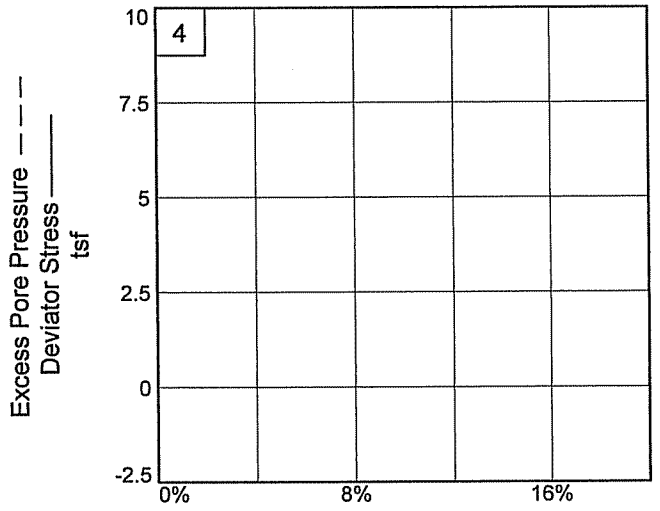
TRIAXIAL SHEAR TEST REPORT

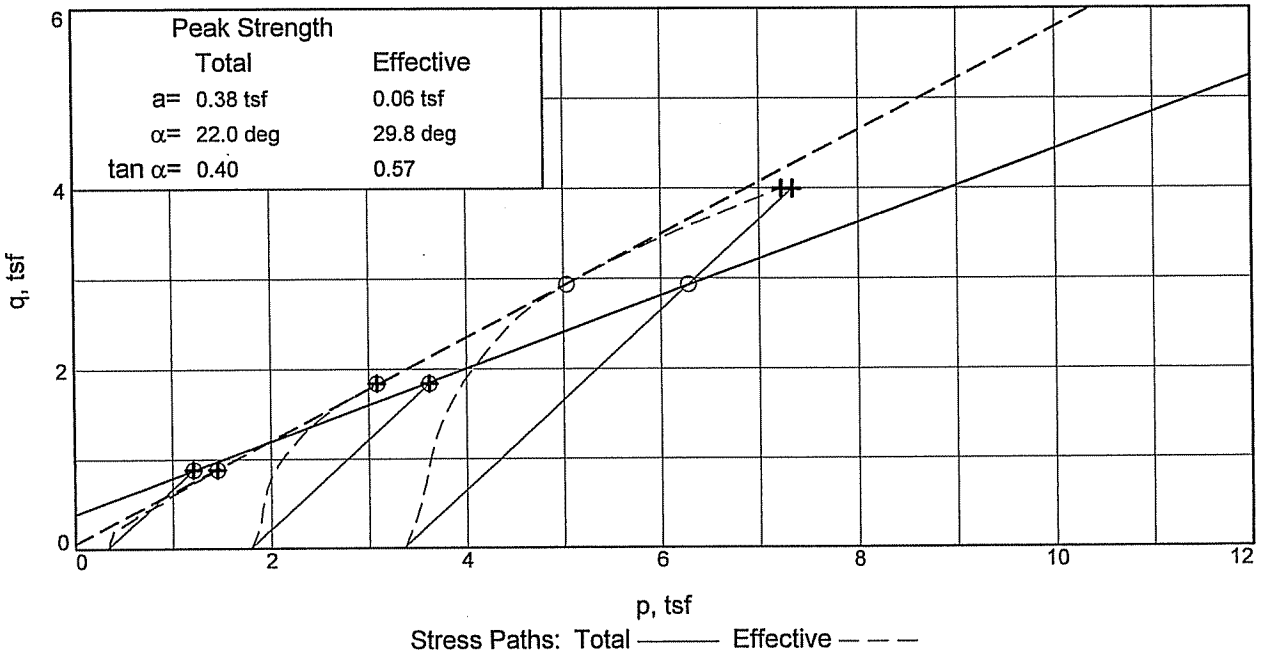
Tolunay-Wong Engineers, Inc.











Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Source of Sample: 07-239 **Depth:** 10-12 **Sample Number:** 6

Project No.: 08.18.918

TOLUNAY-WONG ENGINEERS, INC.

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

8/19/2008
3:14 PM

Date: 8/8/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-239
Depth: 10-12 **Sample Number:** 6
Description: Gray LEAN CLAY
Remarks:
Test method: ASTM D 4767
Pocket pen; tsf: 0.75
Failure type: Bulge
Type of Sample: Undisturbed
Assumed Specific Gravity=2.75 **LL=**36 **PL=**16 **PI=**20
Test Method: ASTM D 4767 Method B

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.010			104.090
Moisture content: Dry soil+tare, gms.	86.210			89.550
Moisture content: Tare, gms.	30.800			30.670
Moisture, %	24.9	25.3	24.7	24.7
Moist specimen weight, gms.	1019.2			
Diameter, in.	2.67	2.67	2.66	
Area, in.^{2}	5.62	5.59	5.55	
Height, in.	5.47	5.49	5.48	
Net decrease in height, in.		-0.02	0.01	
Net decrease in water volume, cc.			4.60	
Wet Density, pcf	126.2	126.9	127.5	
Dry density, pcf	101.1	101.3	102.2	
Void ratio	0.6986	0.6946	0.6791	
Saturation, %	98.0	100.0	100.0	

Test Readings for Specimen No. 1

Membrane modulus = .130 kN/cm^2
Membrane thickness = .031 cm
Filter paper coefficient = 0.0019 kN/cm
Filter paper coverage = 50%
Consolidation cell pressure = 34.70 psi (2.498 tsf)
Consolidation back pressure = 30.10 psi (2.167 tsf)
Consolidation effective confining stress = 0.331 tsf
Strain rate, %/min. = 0.05
Fail. Stress = 1.766 tsf **at reading no.** 55
Ult. Stress = 1.761 tsf **at reading no.** 56

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.2630	0.000	0.0	0.0	0.000	0.331	0.331	1.00	30.10	0.331	0.000
1	0.2696	0.000	0.0	0.1	0.000	0.331	0.331	1.00	30.10	0.331	0.000
2	0.2714	4.780	4.8	0.2	0.057	0.331	0.389	1.17	30.10	0.360	0.029
3	0.2728	8.406	8.4	0.2	0.109	0.300	0.409	1.36	30.54	0.354	0.054
4	0.2741	12.826	12.8	0.2	0.166	0.278	0.444	1.60	30.84	0.361	0.083
5	0.2755	15.812	15.8	0.2	0.205	0.265	0.470	1.77	31.02	0.367	0.102
6	0.2769	19.186	19.2	0.3	0.248	0.252	0.500	1.99	31.20	0.376	0.124
7	0.2782	21.321	21.3	0.3	0.276	0.243	0.519	2.13	31.32	0.381	0.138
8	0.2796	23.189	23.2	0.3	0.300	0.237	0.537	2.26	31.40	0.387	0.150
9	0.2810	25.053	25.1	0.3	0.324	0.227	0.551	2.43	31.55	0.389	0.162
10	0.2837	27.922	27.9	0.4	0.361	0.212	0.572	2.71	31.76	0.392	0.180
11	0.2865	30.081	30.1	0.4	0.389	0.207	0.596	2.88	31.82	0.401	0.194
12	0.2878	31.675	31.7	0.5	0.409	0.206	0.615	2.98	31.84	0.411	0.205
13	0.2906	33.915	33.9	0.5	0.438	0.210	0.648	3.08	31.78	0.429	0.219
14	0.2933	35.917	35.9	0.6	0.464	0.217	0.680	3.14	31.69	0.449	0.232
15	0.2960	37.937	37.9	0.6	0.489	0.226	0.715	3.16	31.56	0.471	0.245
16	0.2988	39.940	39.9	0.7	0.515	0.233	0.748	3.21	31.46	0.491	0.257
17	0.3015	41.866	41.9	0.7	0.539	0.238	0.777	3.27	31.40	0.507	0.270
18	0.3043	44.185	44.2	0.8	0.569	0.243	0.813	3.34	31.32	0.528	0.285
19	0.3070	46.036	46.0	0.8	0.593	0.250	0.843	3.37	31.22	0.547	0.296
20	0.3098	47.640	47.6	0.9	0.613	0.257	0.870	3.39	31.13	0.563	0.306
21	0.3125	49.211	49.2	0.9	0.633	0.263	0.896	3.40	31.04	0.580	0.316
22	0.3152	51.510	51.5	1.0	0.662	0.269	0.931	3.47	30.97	0.600	0.331
23	0.3180	53.204	53.2	1.0	0.684	0.275	0.958	3.49	30.88	0.617	0.342
24	0.3207	54.819	54.8	1.1	0.704	0.281	0.985	3.51	30.80	0.633	0.352
25	0.3248	56.798	56.8	1.1	0.729	0.266	0.995	3.74	31.00	0.630	0.364
26	0.3317	61.354	61.4	1.3	0.786	0.277	1.063	3.84	30.86	0.670	0.393
27	0.3371	63.689	63.7	1.4	0.815	0.289	1.104	3.82	30.69	0.696	0.408
28	0.3426	67.511	67.5	1.5	0.863	0.304	1.167	3.84	30.48	0.735	0.432
29	0.3481	70.223	70.2	1.6	0.851	0.315	1.166	3.70	30.32	0.741	0.426
30	0.3536	73.765	73.8	1.7	0.893	0.326	1.219	3.74	30.17	0.772	0.446
31	0.3591	76.475	76.5	1.8	0.923	0.341	1.264	3.71	29.96	0.803	0.462
32	0.3645	79.607	79.6	1.9	0.959	0.354	1.313	3.71	29.79	0.833	0.480
33	0.3700	82.402	82.4	2.0	0.991	0.366	1.357	3.71	29.62	0.861	0.495
34	0.3755	85.601	85.6	2.1	1.029	0.380	1.409	3.71	29.43	0.894	0.514
35	0.3810	87.999	88.0	2.2	1.058	0.375	1.433	3.83	29.50	0.904	0.529
36	0.3864	91.252	91.3	2.3	1.098	0.384	1.482	3.86	29.37	0.933	0.549
37	0.3919	93.420	93.4	2.4	1.184	0.394	1.578	4.01	29.23	0.986	0.592
38	0.3974	97.115	97.1	2.5	1.229	0.404	1.634	4.04	29.08	1.019	0.615
39	0.4029	99.269	99.3	2.6	1.255	0.418	1.673	4.01	28.90	1.045	0.628
40	0.4083	102.601	102.6	2.7	1.296	0.429	1.725	4.02	28.75	1.077	0.648
41	0.4138	105.113	105.1	2.8	1.327	0.442	1.768	4.00	28.56	1.105	0.663
42	0.4193	108.204	108.2	2.9	1.364	0.454	1.818	4.00	28.39	1.136	0.682
43	0.4247	110.665	110.7	3.0	1.394	0.468	1.861	3.98	28.21	1.164	0.697
44	0.4302	113.245	113.2	3.1	1.425	0.466	1.891	4.06	28.23	1.178	0.712
45	0.4357	116.056	116.1	3.2	1.459	0.475	1.933	4.07	28.11	1.204	0.729
46	0.4412	118.464	118.5	3.3	1.487	0.484	1.971	4.07	27.98	1.227	0.744

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
47	0.4466	121.370	121.4	3.4	1.522	0.494	2.016	4.08	27.84	1.255	0.761
48	0.4521	123.212	123.2	3.5	1.544	0.505	2.048	4.06	27.69	1.277	0.772
49	0.4576	126.685	126.7	3.6	1.586	0.516	2.101	4.07	27.54	1.308	0.793
50	0.4630	128.796	128.8	3.7	1.610	0.528	2.139	4.05	27.36	1.333	0.805
51	0.4685	131.844	131.8	3.8	1.647	0.540	2.187	4.05	27.19	1.364	0.823
52	0.4740	133.969	134.0	3.9	1.672	0.553	2.225	4.02	27.02	1.389	0.836
53	0.4795	136.931	136.9	4.0	1.707	0.565	2.272	4.02	26.86	1.418	0.853
54	0.4850	138.797	138.8	4.1	1.728	0.561	2.289	4.08	26.91	1.425	0.864
55	0.4904	142.000	142.0	4.1	1.766	0.572	2.339	4.09	26.75	1.455	0.883
56	0.4908	141.550	141.6	4.2	1.761	0.575	2.335	4.06	26.72	1.455	0.880

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.010			104.090
Moisture content: Dry soil+tare, gms.	86.210			89.550
Moisture content: Tare, gms.	30.800			30.670
Moisture, %	24.9	26.3	24.7	24.7
Moist specimen weight, gms.	1019.2			
Diameter, in.	2.67	2.69	2.70	
Area, in.²	5.62	5.68	5.73	
Height, in.	5.47	5.49	5.30	
Net decrease in height, in.		-0.02	0.19	
Net decrease in water volume, cc.			12.80	
Wet Density, pcf	126.2	125.9	127.5	
Dry density, pcf	101.1	99.7	102.2	
Void ratio	0.6986	0.7222	0.6791	
Saturation, %	98.0	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = .130 kN/cm²

Membrane thickness = .031 cm

Filter paper coefficient = 0.0019 kN/cm

Filter paper coverage = 50%

Consolidation cell pressure = 54.90 psi (3.953 tsf)

Consolidation back pressure = 30.10 psi (2.167 tsf)

Consolidation effective confining stress = 1.786 tsf

Strain rate, %/min. = 0.05

Fail. Stress = 3.674 tsf **at reading no.** 58

Ult. Stress = 3.674 tsf **at reading no.** 58

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0100	0.000	0.0	0.0	0.000	1.782	1.782	1.00	30.15	1.782	0.000
1	0.0147	0.000	0.0	0.1	0.000	1.782	1.782	1.00	30.15	1.782	0.000
2	0.0148	3.576	3.6	0.1	0.042	1.782	1.825	1.02	30.15	1.803	0.021
3	0.0162	8.927	8.9	0.1	0.112	1.759	1.871	1.06	30.46	1.815	0.056
4	0.0175	19.732	19.7	0.1	0.247	1.719	1.967	1.14	31.02	1.843	0.124
5	0.0188	29.705	29.7	0.2	0.372	1.680	2.052	1.22	31.57	1.866	0.186
6	0.0202	38.531	38.5	0.2	0.483	1.639	2.122	1.29	32.13	1.881	0.241

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
7	0.0215	47.892	47.9	0.2	0.600	1.594	2.194	1.38	32.76	1.894	0.300
8	0.0228	56.468	56.5	0.2	0.707	1.547	2.254	1.46	33.42	1.900	0.354
9	0.0241	64.296	64.3	0.3	0.805	1.505	2.311	1.53	33.99	1.908	0.403
10	0.0255	70.859	70.9	0.3	0.887	1.468	2.355	1.60	34.51	1.912	0.444
11	0.0268	78.631	78.6	0.3	0.984	1.431	2.416	1.69	35.02	1.924	0.492
12	0.0281	84.908	84.9	0.3	1.062	1.398	2.461	1.76	35.48	1.929	0.531
13	0.0295	90.658	90.7	0.4	1.134	1.367	2.501	1.83	35.91	1.934	0.567
14	0.0308	97.207	97.2	0.4	1.216	1.338	2.554	1.91	36.31	1.946	0.608
15	0.0321	102.522	102.5	0.4	1.282	1.313	2.595	1.98	36.67	1.954	0.641
16	0.0335	107.505	107.5	0.4	1.344	1.288	2.632	2.04	37.02	1.960	0.672
17	0.0348	112.935	112.9	0.5	1.411	1.266	2.678	2.11	37.31	1.972	0.706
18	0.0361	117.781	117.8	0.5	1.472	1.246	2.718	2.18	37.59	1.982	0.736
19	0.0375	121.710	121.7	0.5	1.520	1.229	2.749	2.24	37.83	1.989	0.760
20	0.0388	126.731	126.7	0.5	1.583	1.211	2.794	2.31	38.08	2.003	0.791
21	0.0401	130.909	130.9	0.6	1.634	1.197	2.831	2.37	38.28	2.014	0.817
22	0.0414	134.195	134.2	0.6	1.675	1.184	2.859	2.41	38.45	2.022	0.837
23	0.0428	138.198	138.2	0.6	1.724	1.173	2.897	2.47	38.61	2.035	0.862
24	0.0441	142.032	142.0	0.6	1.772	1.161	2.933	2.53	38.77	2.047	0.886
25	0.0454	145.613	145.6	0.7	1.816	1.151	2.967	2.58	38.91	2.059	0.908
26	0.0467	148.696	148.7	0.7	1.854	1.142	2.996	2.62	39.04	2.069	0.927
27	0.0481	152.859	152.9	0.7	1.905	1.133	3.039	2.68	39.16	2.086	0.953
28	0.0507	158.747	158.7	0.8	1.978	1.118	3.096	2.77	39.37	2.107	0.989
29	0.0521	162.380	162.4	0.8	2.023	1.112	3.135	2.82	39.45	2.123	1.011
30	0.0547	168.184	168.2	0.8	2.094	1.101	3.195	2.90	39.60	2.148	1.047
31	0.0574	173.583	173.6	0.9	2.160	1.093	3.253	2.98	39.72	2.173	1.080
32	0.0587	176.936	176.9	0.9	2.201	1.089	3.290	3.02	39.77	2.190	1.101
33	0.0614	181.876	181.9	1.0	2.261	1.082	3.343	3.09	39.87	2.213	1.131
34	0.0640	186.817	186.8	1.0	2.322	1.076	3.398	3.16	39.95	2.237	1.161
35	0.0667	190.542	190.5	1.1	2.367	1.073	3.439	3.21	40.00	2.256	1.183
36	0.0733	201.664	201.7	1.2	2.502	1.058	3.559	3.37	40.21	2.308	1.251
37	0.0786	208.455	208.5	1.3	2.583	1.053	3.636	3.45	40.28	2.344	1.292
38	0.0839	214.707	214.7	1.4	2.658	1.051	3.709	3.53	40.30	2.380	1.329
39	0.0892	220.548	220.5	1.5	2.728	1.051	3.778	3.60	40.31	2.414	1.364
40	0.0945	225.194	225.2	1.6	2.782	1.052	3.834	3.65	40.29	2.443	1.391
41	0.0998	230.386	230.4	1.7	2.844	1.055	3.899	3.70	40.25	2.477	1.422
42	0.1051	234.882	234.9	1.8	2.896	1.060	3.956	3.73	40.18	2.508	1.448
43	0.1104	239.123	239.1	1.9	2.945	1.065	4.010	3.77	40.11	2.537	1.473
44	0.1157	242.649	242.6	2.0	2.986	1.070	4.056	3.79	40.04	2.563	1.493
45	0.1210	246.086	246.1	2.1	3.025	1.072	4.097	3.82	40.02	2.584	1.513
46	0.1264	249.232	249.2	2.2	3.061	1.077	4.138	3.84	39.94	2.607	1.530
47	0.1316	252.611	252.6	2.3	3.099	1.084	4.183	3.86	39.84	2.633	1.549
48	0.1370	256.148	256.1	2.4	3.139	1.092	4.231	3.87	39.73	2.661	1.570
49	0.1423	259.390	259.4	2.5	3.176	1.101	4.277	3.88	39.61	2.689	1.588
50	0.1476	262.734	262.7	2.6	3.213	1.109	4.322	3.90	39.50	2.716	1.607
51	0.1582	267.840	267.8	2.8	3.269	1.129	4.398	3.90	39.22	2.763	1.634
52	0.1688	274.448	274.4	3.0	3.343	1.142	4.485	3.93	39.04	2.813	1.671
53	0.1794	280.070	280.1	3.2	3.404	1.160	4.564	3.93	38.79	2.862	1.702

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
54	0.1900	285.229	285.2	3.4	3.460	1.180	4.639	3.93	38.51	2.910	1.730
55	0.2006	291.255	291.3	3.6	3.525	1.202	4.727	3.93	38.21	2.965	1.763
56	0.2059	294.321	294.3	3.7	3.559	1.213	4.772	3.93	38.05	2.992	1.779
57	0.2165	299.575	299.6	3.9	3.615	1.229	4.843	3.94	37.84	3.036	1.807
58	0.2271	305.122	305.1	4.1	3.674	1.247	4.921	3.95	37.58	3.084	1.837

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	100.010			104.090
Moisture content: Dry soil+tare, gms.	86.210			89.550
Moisture content: Tare, gms.	30.800			30.670
Moisture, %	24.9	26.8	24.7	24.7
Moist specimen weight, gms.	1019.2			
Diameter, in.	2.67	2.70	2.74	
Area, in.²	5.62	5.73	5.91	
Height, in.	5.47	5.49	5.14	
Net decrease in height, in.		-0.02	0.34	
Net decrease in water volume, cc.			16.90	
Wet Density, pcf	126.2	125.4	127.5	
Dry density, pcf	101.1	98.9	102.2	
Void ratio	0.6986	0.7360	0.6791	
Saturation, %	98.0	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = .130 kN/cm²
Membrane thickness = .031 cm
Filter paper coefficient = 0.0019 kN/cm
Filter paper coverage = 50%
Consolidation cell pressure = 76.60 psi (5.515 tsf)
Consolidation back pressure = 30.10 psi (2.167 tsf)
Consolidation effective confining stress = 3.348 tsf
Strain rate, %/min. = 0.05
Fail. Stress = 5.871 tsf **at reading no.** 47
Ult. Stress = 7.984 tsf **at reading no.** 94

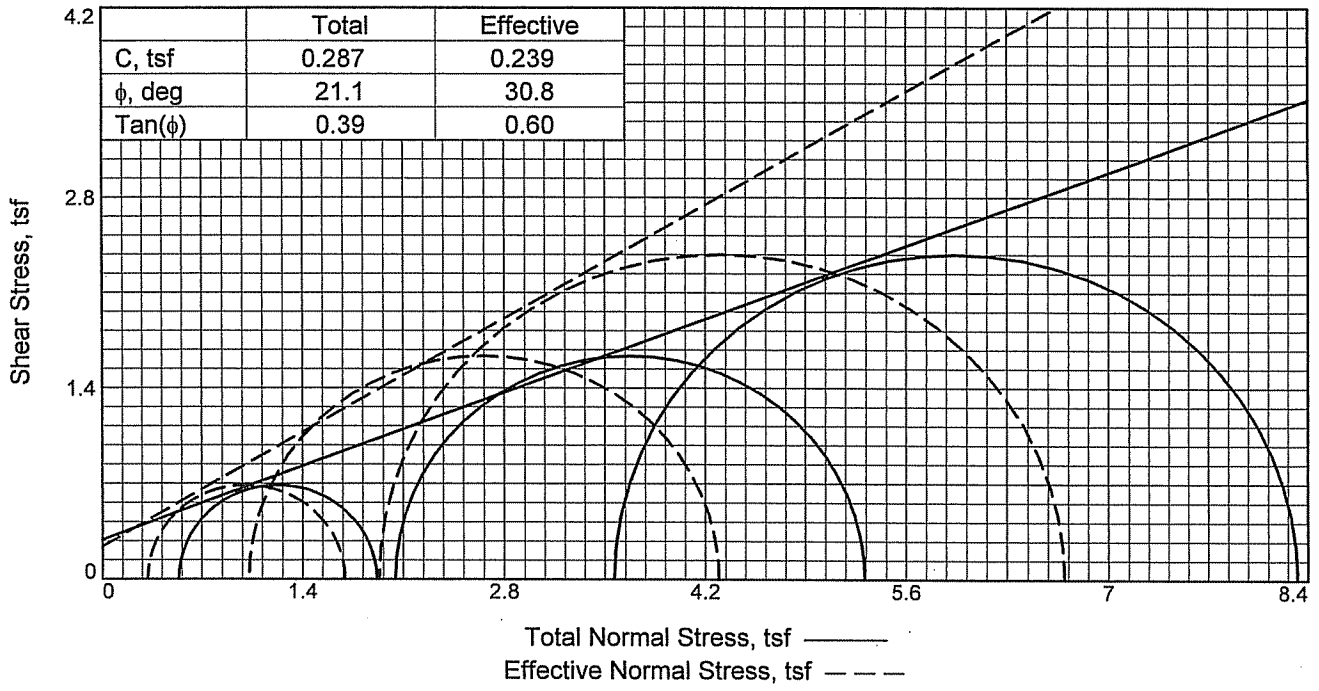
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0026	0.000	0.0	0.0	0.000	3.349	3.349	1.00	30.08	3.349	0.000
1	0.0035	0.000	0.0	0.0	0.000	3.349	3.349	1.00	30.08	3.349	0.000
2	0.0036	3.681	3.7	0.0	0.045	3.350	3.394	1.01	30.08	3.372	0.022
3	0.0061	15.960	16.0	0.1	0.194	3.301	3.495	1.06	30.76	3.398	0.097
4	0.0074	25.629	25.6	0.1	0.312	3.264	3.576	1.10	31.26	3.420	0.156
5	0.0087	36.509	36.5	0.1	0.444	3.223	3.667	1.14	31.84	3.445	0.222
6	0.0100	49.064	49.1	0.1	0.597	3.173	3.770	1.19	32.53	3.472	0.298
7	0.0113	62.161	62.2	0.2	0.756	3.117	3.873	1.24	33.31	3.495	0.378
8	0.0126	76.056	76.1	0.2	0.925	3.058	3.982	1.30	34.13	3.520	0.462
9	0.0139	89.161	89.2	0.2	1.084	2.998	4.082	1.36	34.96	3.540	0.542
10	0.0152	101.441	101.4	0.2	1.233	2.937	4.170	1.42	35.81	3.553	0.616
11	0.0165	114.730	114.7	0.3	1.394	2.876	4.270	1.48	36.65	3.573	0.697

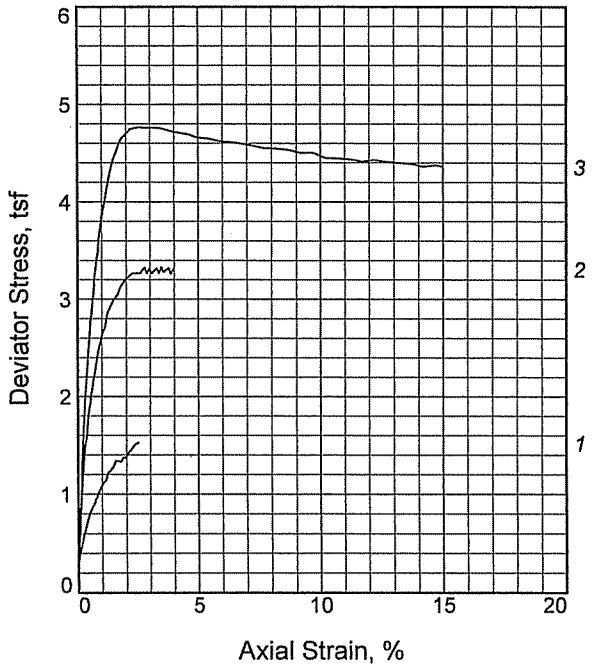
Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
12	0.0178	126.725	126.7	0.3	1.539	2.818	4.357	1.55	37.46	3.588	0.770
13	0.0190	138.599	138.6	0.3	1.683	2.759	4.443	1.61	38.27	3.601	0.842
14	0.0203	149.677	149.7	0.3	1.817	2.705	4.522	1.67	39.04	3.613	0.909
15	0.0216	160.307	160.3	0.4	1.946	2.653	4.599	1.73	39.76	3.626	0.973
16	0.0229	171.642	171.6	0.4	2.083	2.602	4.685	1.80	40.47	3.643	1.041
17	0.0242	181.752	181.8	0.4	2.205	2.555	4.760	1.86	41.11	3.658	1.103
18	0.0255	191.606	191.6	0.4	2.324	2.511	4.835	1.93	41.73	3.673	1.162
19	0.0268	200.682	200.7	0.5	2.434	2.469	4.903	1.99	42.30	3.686	1.217
20	0.0281	209.439	209.4	0.5	2.539	2.432	4.971	2.04	42.82	3.702	1.270
21	0.0294	218.961	219.0	0.5	2.654	2.395	5.049	2.11	43.34	3.722	1.327
22	0.0307	227.715	227.7	0.5	2.759	2.362	5.121	2.17	43.80	3.741	1.380
23	0.0320	235.619	235.6	0.6	2.854	2.332	5.186	2.22	44.22	3.759	1.427
24	0.0345	249.923	249.9	0.6	3.026	2.279	5.306	2.33	44.94	3.793	1.513
25	0.0358	257.774	257.8	0.6	3.120	2.255	5.375	2.38	45.28	3.815	1.560
26	0.0384	271.697	271.7	0.7	3.287	2.214	5.501	2.49	45.86	3.857	1.644
27	0.0410	284.173	284.2	0.7	3.436	2.179	5.615	2.58	46.34	3.897	1.718
28	0.0436	296.230	296.2	0.8	3.580	2.148	5.728	2.67	46.77	3.938	1.790
29	0.0461	306.842	306.8	0.8	3.707	2.116	5.823	2.75	47.21	3.970	1.853
30	0.0487	317.865	317.9	0.9	3.838	2.094	5.932	2.83	47.51	4.013	1.919
31	0.0513	327.293	327.3	0.9	3.950	2.074	6.024	2.90	47.79	4.049	1.975
32	0.0539	337.084	337.1	1.0	4.066	2.057	6.123	2.98	48.03	4.090	2.033
33	0.0603	358.255	358.3	1.1	4.316	2.023	6.339	3.13	48.50	4.181	2.158
34	0.0655	371.956	372.0	1.2	4.476	2.004	6.481	3.23	48.76	4.243	2.238
35	0.0706	384.852	384.9	1.3	4.627	1.990	6.617	3.32	48.96	4.304	2.313
36	0.0758	395.175	395.2	1.4	4.746	1.980	6.726	3.40	49.10	4.353	2.373
37	0.0809	404.650	404.6	1.5	4.855	1.968	6.823	3.47	49.26	4.396	2.428
38	0.0913	419.724	419.7	1.7	5.026	1.960	6.986	3.56	49.37	4.473	2.513
39	0.1016	433.070	433.1	1.9	5.175	1.961	7.136	3.64	49.36	4.549	2.587
40	0.1119	443.633	443.6	2.1	5.290	1.971	7.261	3.68	49.23	4.616	2.645
41	0.1222	452.733	452.7	2.3	5.388	1.978	7.366	3.72	49.13	4.672	2.694
42	0.1325	460.733	460.7	2.5	5.472	1.994	7.465	3.74	48.91	4.730	2.736
43	0.1428	468.935	468.9	2.7	5.558	2.014	7.571	3.76	48.63	4.792	2.779
44	0.1531	477.198	477.2	2.9	5.644	2.030	7.674	3.78	48.40	4.852	2.822
45	0.1634	484.628	484.6	3.1	5.720	2.053	7.773	3.79	48.09	4.913	2.860
46	0.1737	491.827	491.8	3.3	5.793	2.077	7.870	3.79	47.75	4.974	2.896
47	0.1840	499.470	499.5	3.5	5.871	2.099	7.969	3.80	47.45	5.034	2.935
48	0.1944	505.287	505.3	3.7	5.927	2.123	8.050	3.79	47.12	5.086	2.963
49	0.2047	512.315	512.3	3.9	5.997	2.149	8.146	3.79	46.75	5.148	2.998
50	0.2150	520.209	520.2	4.1	6.076	2.177	8.254	3.79	46.36	5.216	3.038
51	0.2253	527.067	527.1	4.3	6.144	2.199	8.342	3.79	46.06	5.270	3.072
52	0.2356	534.434	534.4	4.5	6.217	2.226	8.443	3.79	45.68	5.334	3.108
53	0.2459	540.721	540.7	4.7	6.276	2.255	8.532	3.78	45.28	5.393	3.138
54	0.2562	548.226	548.2	4.9	6.350	2.278	8.629	3.79	44.95	5.454	3.175
55	0.2742	559.420	559.4	5.3	6.456	2.329	8.785	3.77	44.25	5.557	3.228
56	0.2871	566.642	566.6	5.5	6.522	2.363	8.885	3.76	43.78	5.624	3.261
57	0.3000	575.658	575.7	5.8	6.608	2.397	9.005	3.76	43.31	5.701	3.304
58	0.3129	583.225	583.2	6.0	6.677	2.434	9.112	3.74	42.79	5.773	3.339

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
59	0.3258	590.347	590.3	6.3	6.741	2.467	9.208	3.73	42.34	5.837	3.370
60	0.3387	598.535	598.5	6.5	6.816	2.502	9.318	3.72	41.85	5.910	3.408
61	0.3515	606.159	606.2	6.8	6.884	2.538	9.422	3.71	41.36	5.980	3.442
62	0.3644	612.577	612.6	7.0	6.939	2.568	9.507	3.70	40.93	6.038	3.469
63	0.3773	620.306	620.3	7.3	7.007	2.603	9.610	3.69	40.45	6.106	3.504
64	0.3902	627.358	627.4	7.5	7.068	2.639	9.707	3.68	39.95	6.173	3.534
65	0.4031	633.022	633.0	7.8	7.112	2.668	9.781	3.67	39.54	6.225	3.556
66	0.4159	640.515	640.5	8.0	7.177	2.700	9.877	3.66	39.10	6.289	3.588
67	0.4288	646.067	646.1	8.3	7.219	2.730	9.950	3.64	38.68	6.340	3.610
68	0.4417	651.404	651.4	8.5	7.259	2.760	10.019	3.63	38.27	6.390	3.630
69	0.4546	658.077	658.1	8.8	7.313	2.790	10.103	3.62	37.85	6.446	3.657
70	0.4675	662.314	662.3	9.0	7.340	2.816	10.156	3.61	37.49	6.486	3.670
71	0.4804	668.276	668.3	9.3	7.386	2.842	10.228	3.60	37.13	6.535	3.693
72	0.4932	673.384	673.4	9.5	7.422	2.869	10.291	3.59	36.75	6.580	3.711
73	0.5061	677.718	677.7	9.8	7.449	2.888	10.337	3.58	36.49	6.612	3.725
74	0.5190	683.566	683.6	10.0	7.492	2.911	10.404	3.57	36.17	6.658	3.746
75	0.5319	688.633	688.6	10.3	7.527	2.931	10.458	3.57	35.89	6.695	3.764
76	0.5448	692.026	692.0	10.5	7.543	2.952	10.495	3.56	35.60	6.724	3.772
77	0.5576	698.215	698.2	10.8	7.589	2.973	10.562	3.55	35.31	6.768	3.795
78	0.5705	702.578	702.6	11.0	7.615	2.990	10.605	3.55	35.08	6.797	3.808
79	0.5834	706.915	706.9	11.3	7.641	3.009	10.650	3.54	34.80	6.830	3.820
80	0.5963	713.166	713.2	11.5	7.686	3.029	10.716	3.54	34.53	6.872	3.843
81	0.6092	716.911	716.9	11.8	7.705	3.044	10.749	3.53	34.32	6.897	3.852
82	0.6221	722.409	722.4	12.0	7.742	3.063	10.805	3.53	34.05	6.934	3.871
83	0.6349	726.873	726.9	12.3	7.768	3.080	10.848	3.52	33.82	6.964	3.884
84	0.6478	730.251	730.3	12.5	7.781	3.098	10.879	3.51	33.58	6.988	3.891
85	0.6607	736.309	736.3	12.8	7.824	3.117	10.940	3.51	33.31	7.028	3.912
86	0.6736	740.063	740.1	13.0	7.841	3.130	10.971	3.50	33.13	7.051	3.920
87	0.6865	743.210	743.2	13.3	7.852	3.145	10.997	3.50	32.92	7.071	3.926
88	0.6993	748.378	748.4	13.5	7.883	3.163	11.047	3.49	32.67	7.105	3.942
89	0.7122	751.492	751.5	13.8	7.893	3.173	11.066	3.49	32.53	7.120	3.947
90	0.7251	757.097	757.1	14.0	7.929	3.188	11.117	3.49	32.32	7.153	3.964
91	0.7380	760.541	760.5	14.3	7.942	3.201	11.143	3.48	32.14	7.172	3.971
92	0.7509	763.456	763.5	14.5	7.949	3.215	11.163	3.47	31.95	7.189	3.974
93	0.7637	768.138	768.1	14.8	7.974	3.229	11.203	3.47	31.75	7.216	3.987
94	0.7766	771.298	771.3	15.0	7.984	3.239	11.223	3.46	31.61	7.231	3.992





Sample No.		1	2	3
Initial	Water Content, %	29.2	29.2	29.2
	Dry Density, pcf	96.1	96.1	96.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.8186	0.8186	0.8186
	Diameter, in.	1.98	1.98	1.98
	Height, in.	3.90	3.90	3.90
At Test	Water Content, %	27.0	27.0	27.0
	Dry Density, pcf	99.5	99.5	99.5
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7573	0.7573	0.7573
	Diameter, in.	1.94	1.95	1.98
	Height, in.	3.94	3.87	3.75
Strain rate, %/min.		0.05	0.05	0.05
Back Pressure, tsf		2.16	2.17	2.17
Cell Pressure, tsf		2.70	4.22	5.74
Fail. Stress, tsf		1.38	3.27	4.76
Excess Pore Pr., tsf		0.22	1.02	1.63
Ult. Stress, tsf		1.52	3.31	4.36
Excess Pore Pr., tsf		0.17	0.90	1.45
$\bar{\sigma}_1$ Failure, tsf		1.70	4.29	6.69
$\bar{\sigma}_3$ Failure, tsf		0.32	1.03	1.93

Type of Test:
CU with Pore Pressures

Sample Type: Undisturbed

Description: Gray LEAN CLAY

LL= 33 **PL=** 16 **PI=** 17

Assumed Specific Gravity= 2.80

Remarks:
Test method: ASTM D 4767
Pocket pen; tsf: 2.00
Failure type: Bulge

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

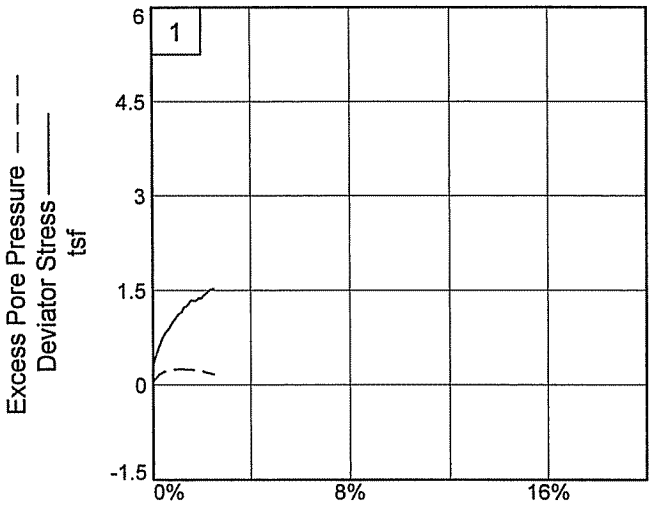
Source of Sample: 07-239 **Depth:** 18-20

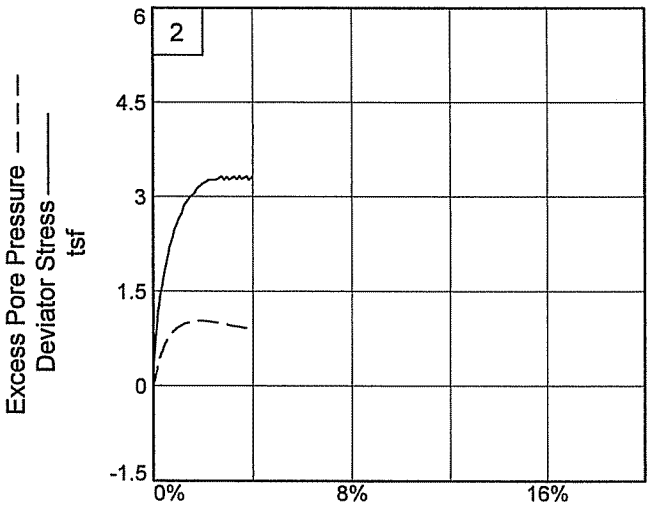
Sample Number: 10

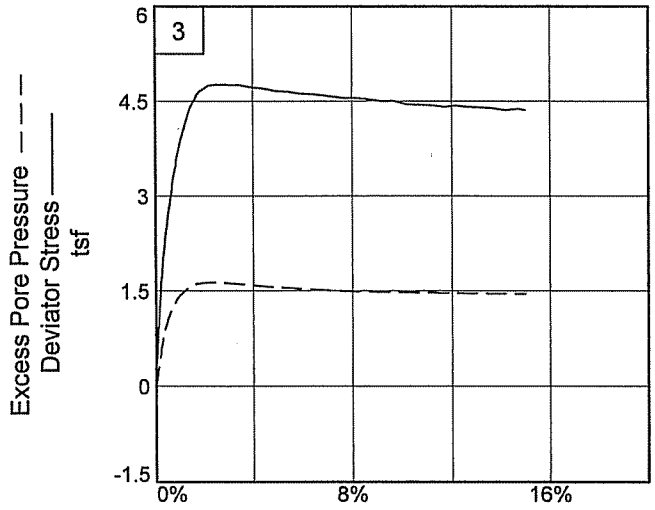
Proj. No.: 08.18.918 **Date Sampled:** 8/3/08

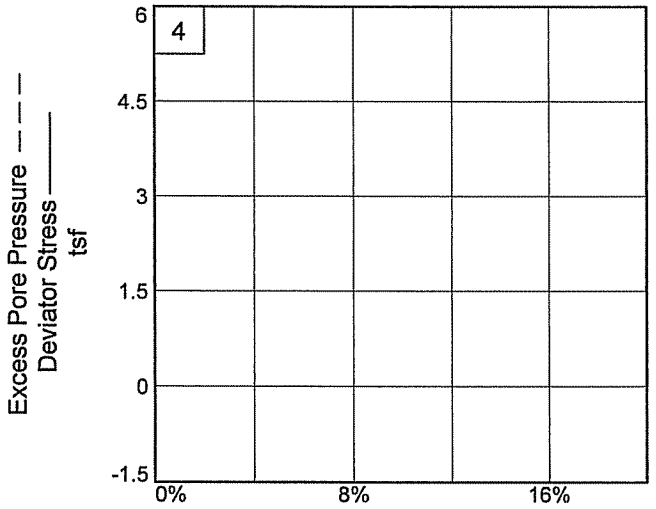
TRIAXIAL SHEAR TEST REPORT

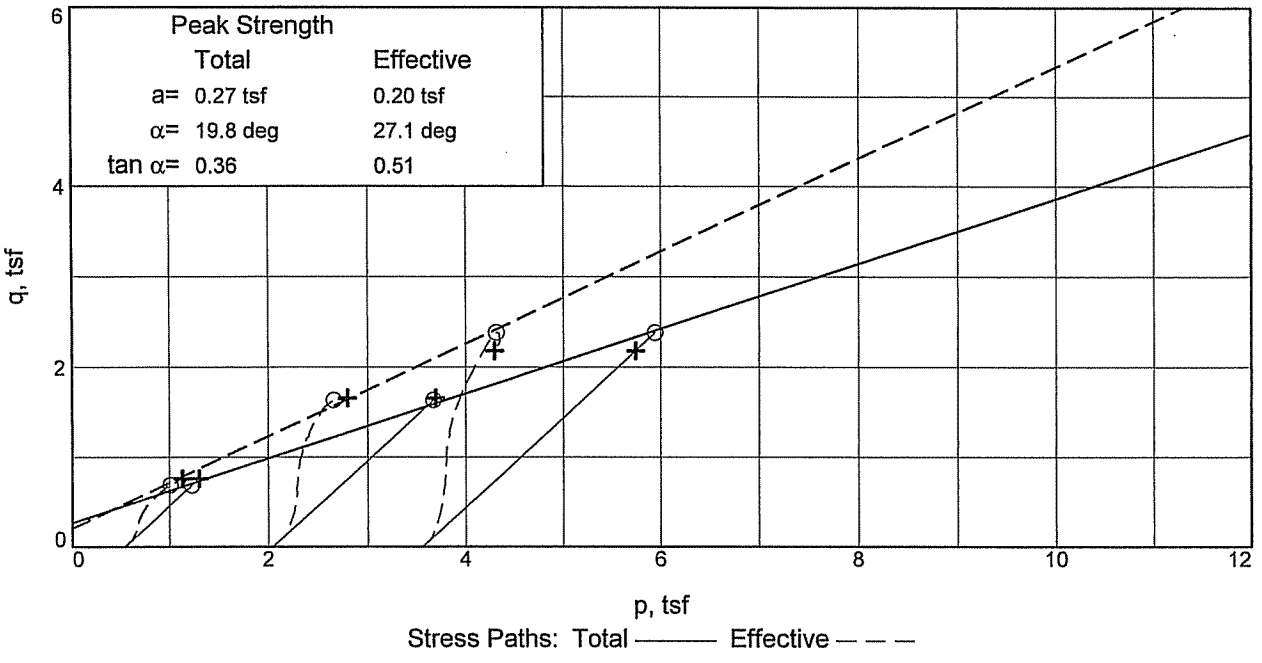
Tolunay-Wong Engineers, Inc.











Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Source of Sample: 07-239 **Depth:** 18-20 **Sample Number:** 10
Project No.: 08.18.918

TOLUNAY-WONG ENGINEERS, INC.

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

8/14/2008
1:23 PM

Date: 8/3/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-239
Depth: 18-20 **Sample Number:** 10
Description: Gray LEAN CLAY
Remarks:
Test method: ASTM D 4767
Pocket pen; tsf: 2.00
Failure type: Bulge
Type of Sample: Undisturbed
Assumed Specific Gravity=2.80 **LL=**33 **PL=**16 **PI=**17
Test Method: ASTM D 4767 Method B

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	114.770			114.380
Moisture content: Dry soil+tare, gms.	95.760			96.590
Moisture content: Tare, gms.	30.740			30.810
Moisture, %	29.2	27.7	27.0	27.0
Moist specimen weight, gms.	391.4			
Diameter, in.	1.98	1.94	1.94	
Area, in.^{2}	3.08	2.97	2.94	
Height, in.	3.90	3.95	3.94	
Net decrease in height, in.		-0.05	0.01	
Net decrease in water volume, cc.			2.10	
Wet Density, pcf	124.2	125.7	126.4	
Dry density, pcf	96.1	98.4	99.5	
Void ratio	0.8186	0.7767	0.7573	
Saturation, %	100.0	100.0	100.0	

Test Readings for Specimen No. 1

Membrane modulus = .130 kN/cm^2
Membrane thickness = .031 cm
Filter paper coefficient = 0.0019 kN/cm
Filter paper coverage = 50%
Consolidation cell pressure = 37.50 psi (2.700 tsf)
Consolidation back pressure = 30.00 psi (2.160 tsf)
Consolidation effective confining stress = 0.540 tsf
Strain rate, %/min. = 0.05
Fail. Stress = 1.376 tsf **at reading no.** 29
Ult. Stress = 1.524 tsf **at reading no.** 34

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0007	0.000	0.0	0.0	0.000	0.540	0.540	1.00	30.00	0.540	0.000
1	0.0008	6.637	6.6	0.0	0.162	0.540	0.702	1.30	30.00	0.621	0.081
2	0.0009	9.782	9.8	0.0	0.239	0.514	0.754	1.47	30.36	0.634	0.120
3	0.0014	13.036	13.0	0.0	0.319	0.493	0.812	1.65	30.65	0.653	0.159
4	0.0033	15.964	16.0	0.1	0.390	0.463	0.853	1.84	31.07	0.658	0.195
5	0.0046	17.379	17.4	0.1	0.425	0.448	0.873	1.95	31.28	0.660	0.212
6	0.0064	19.800	19.8	0.1	0.484	0.427	0.911	2.13	31.57	0.669	0.242
7	0.0074	21.055	21.1	0.2	0.514	0.417	0.932	2.23	31.70	0.674	0.257
8	0.0095	22.967	23.0	0.2	0.561	0.398	0.959	2.41	31.97	0.679	0.280
9	0.0104	24.038	24.0	0.2	0.587	0.390	0.976	2.51	32.09	0.683	0.293
10	0.0127	26.069	26.1	0.3	0.636	0.374	1.010	2.70	32.31	0.692	0.318
11	0.0150	28.553	28.6	0.4	0.696	0.358	1.054	2.94	32.53	0.706	0.348
12	0.0176	31.017	31.0	0.4	0.756	0.341	1.097	3.21	32.76	0.719	0.378
13	0.0211	33.552	33.6	0.5	0.817	0.325	1.142	3.51	32.98	0.734	0.408
14	0.0245	35.514	35.5	0.6	0.864	0.319	1.183	3.71	33.07	0.751	0.432
15	0.0272	36.741	36.7	0.7	0.893	0.308	1.201	3.90	33.22	0.754	0.446
16	0.0289	37.631	37.6	0.7	0.914	0.304	1.218	4.01	33.28	0.761	0.457
17	0.0297	38.987	39.0	0.7	0.947	0.301	1.248	4.15	33.32	0.775	0.473
18	0.0317	39.671	39.7	0.8	0.963	0.301	1.264	4.20	33.32	0.782	0.481
19	0.0330	41.060	41.1	0.8	0.996	0.297	1.293	4.36	33.38	0.795	0.498
20	0.0351	41.851	41.9	0.9	1.015	0.297	1.312	4.42	33.37	0.805	0.508
21	0.0376	43.537	43.5	0.9	1.055	0.295	1.350	4.58	33.41	0.822	0.528
22	0.0429	46.198	46.2	1.1	1.118	0.294	1.412	4.80	33.41	0.853	0.559
23	0.0468	47.270	47.3	1.2	1.143	0.294	1.437	4.89	33.42	0.865	0.572
24	0.0504	50.468	50.5	1.3	1.219	0.294	1.513	5.15	33.42	0.904	0.610
25	0.0546	51.425	51.4	1.4	1.241	0.296	1.537	5.19	33.38	0.917	0.620
26	0.0580	53.058	53.1	1.5	1.279	0.298	1.578	5.29	33.36	0.938	0.640
27	0.0629	55.715	55.7	1.6	1.342	0.299	1.641	5.48	33.34	0.970	0.671
28	0.0701	58.206	58.2	1.8	1.326	0.316	1.642	5.20	33.11	0.979	0.663
29	0.0751	60.563	60.6	1.9	1.376	0.319	1.695	5.31	33.06	1.007	0.688
30	0.0785	60.340	60.3	2.0	1.366	0.329	1.695	5.15	32.93	1.012	0.683
31	0.0823	62.370	62.4	2.1	1.412	0.329	1.741	5.29	32.93	1.035	0.706
32	0.0860	63.717	63.7	2.2	1.443	0.340	1.783	5.24	32.78	1.061	0.721
33	0.0937	66.489	66.5	2.4	1.506	0.358	1.864	5.21	32.53	1.111	0.753
34	0.0989	67.322	67.3	2.5	1.524	0.373	1.896	5.09	32.33	1.134	0.762

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	114.770			114.380
Moisture content: Dry soil+tare, gms.	95.760			96.590
Moisture content: Tare, gms.	30.740			30.810
Moisture, %	29.2	29.0	27.0	27.0
Moist specimen weight, gms.	391.4			
Diameter, in.	1.98	1.96	1.95	
Area, in.^{2}	3.08	3.03	3.00	
Height, in.	3.90	3.95	3.87	
Net decrease in height, in.		-0.05	0.08	
Net decrease in water volume, cc.			6.00	
Wet Density, pcf	124.2	124.4	126.4	
Dry density, pcf	96.1	96.4	99.5	
Void ratio	0.8186	0.8127	0.7573	
Saturation, %	100.0	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = .130 kN/cm^2

Membrane thickness = .031 cm

Filter paper coefficient = 0.0019 kN/cm

Filter paper coverage = 50%

Consolidation cell pressure = 58.60 psi (4.219 tsf)

Consolidation back pressure = 30.20 psi (2.174 tsf)

Consolidation effective confining stress = 2.045 tsf

Strain rate, %/min. = 0.05

Fail. Stress = 3.268 tsf **at reading no.** 37

Ult. Stress = 3.312 tsf **at reading no.** 49

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0008	0.000	0.0	0.0	0.000	2.046	2.046	1.00	30.19	2.046	0.000
1	0.0009	8.119	8.1	0.0	0.195	2.045	2.240	1.10	30.19	2.143	0.097
2	0.0010	11.263	11.3	0.0	0.270	2.044	2.314	1.13	30.21	2.179	0.135
3	0.0020	16.721	16.7	0.0	0.401	2.001	2.402	1.20	30.81	2.202	0.201
4	0.0030	21.535	21.5	0.1	0.517	1.962	2.479	1.26	31.34	2.221	0.258
5	0.0042	26.624	26.6	0.1	0.639	1.920	2.559	1.33	31.93	2.240	0.319
6	0.0046	32.044	32.0	0.1	0.769	1.877	2.646	1.41	32.53	2.261	0.384
7	0.0055	35.803	35.8	0.1	0.859	1.835	2.693	1.47	33.11	2.264	0.429
8	0.0064	41.217	41.2	0.1	0.988	1.791	2.779	1.55	33.72	2.285	0.494
9	0.0073	43.973	44.0	0.2	1.054	1.750	2.804	1.60	34.30	2.277	0.527
10	0.0078	48.091	48.1	0.2	1.152	1.711	2.864	1.67	34.83	2.287	0.576
11	0.0093	51.595	51.6	0.2	1.236	1.671	2.907	1.74	35.39	2.289	0.618
12	0.0102	53.852	53.9	0.2	1.290	1.638	2.927	1.79	35.86	2.282	0.645
13	0.0108	57.691	57.7	0.3	1.381	1.603	2.985	1.86	36.33	2.294	0.691
14	0.0127	62.900	62.9	0.3	1.505	1.544	3.050	1.97	37.15	2.297	0.753
15	0.0153	66.980	67.0	0.4	1.602	1.496	3.098	2.07	37.82	2.297	0.801
16	0.0159	69.589	69.6	0.4	1.664	1.462	3.126	2.14	38.29	2.294	0.832
17	0.0176	74.565	74.6	0.4	1.782	1.419	3.201	2.26	38.89	2.310	0.891
18	0.0193	78.162	78.2	0.5	1.867	1.379	3.247	2.35	39.44	2.313	0.934
19	0.0211	81.149	81.1	0.5	1.938	1.348	3.286	2.44	39.88	2.317	0.969
20	0.0222	84.341	84.3	0.6	2.014	1.325	3.339	2.52	40.20	2.332	1.007

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
21	0.0247	88.159	88.2	0.6	2.103	1.293	3.396	2.63	40.65	2.344	1.052
22	0.0255	90.835	90.8	0.6	2.167	1.263	3.430	2.72	41.06	2.347	1.083
23	0.0270	92.800	92.8	0.7	2.213	1.249	3.462	2.77	41.25	2.355	1.106
24	0.0292	96.240	96.2	0.7	2.293	1.225	3.519	2.87	41.58	2.372	1.147
25	0.0310	98.506	98.5	0.8	2.346	1.203	3.550	2.95	41.89	2.377	1.173
26	0.0322	100.807	100.8	0.8	2.400	1.180	3.581	3.03	42.21	2.381	1.200
27	0.0335	103.309	103.3	0.8	2.459	1.178	3.637	3.09	42.24	2.408	1.230
28	0.0361	106.006	106.0	0.9	2.522	1.152	3.674	3.19	42.60	2.413	1.261
29	0.0375	107.593	107.6	0.9	2.559	1.136	3.695	3.25	42.82	2.415	1.279
30	0.0412	111.862	111.9	1.0	2.657	1.110	3.767	3.40	43.19	2.438	1.329
31	0.0453	114.634	114.6	1.1	2.720	1.090	3.810	3.50	43.46	2.450	1.360
32	0.0488	120.446	120.4	1.2	2.856	1.068	3.924	3.67	43.76	2.496	1.428
33	0.0570	126.024	126.0	1.5	2.982	1.039	4.020	3.87	44.17	2.529	1.491
34	0.0648	129.193	129.2	1.7	3.050	1.018	4.068	4.00	44.46	2.543	1.525
35	0.0686	132.391	132.4	1.8	3.123	1.015	4.138	4.08	44.50	2.576	1.561
36	0.0767	135.848	135.8	2.0	3.197	1.018	4.215	4.14	44.47	2.616	1.599
37	0.0882	139.282	139.3	2.3	3.268	1.026	4.294	4.19	44.35	2.660	1.634
38	0.0998	139.644	139.6	2.6	3.267	1.046	4.313	4.12	44.07	2.680	1.633
39	0.1075	142.388	142.4	2.8	3.324	1.062	4.386	4.13	43.85	2.724	1.662
40	0.1117	140.117	140.1	2.9	3.267	1.071	4.339	4.05	43.72	2.705	1.634
41	0.1152	142.076	142.1	3.0	3.310	1.078	4.388	4.07	43.63	2.733	1.655
42	0.1196	140.379	140.4	3.1	3.267	1.087	4.353	4.01	43.51	2.720	1.633
43	0.1272	142.768	142.8	3.3	3.315	1.101	4.416	4.01	43.31	2.758	1.658
44	0.1312	140.992	141.0	3.4	3.271	1.107	4.378	3.95	43.22	2.742	1.635
45	0.1351	143.597	143.6	3.5	3.328	1.114	4.441	3.99	43.13	2.778	1.664
46	0.1388	141.623	141.6	3.6	3.279	1.120	4.399	3.93	43.04	2.759	1.639
47	0.1470	143.709	143.7	3.8	3.320	1.131	4.451	3.94	42.89	2.791	1.660
48	0.1500	141.474	141.5	3.9	3.265	1.136	4.402	3.87	42.82	2.769	1.633
49	0.1548	143.698	143.7	4.0	3.312	1.142	4.455	3.90	42.73	2.799	1.656

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	114.770			114.380
Moisture content: Dry soil+tare, gms.	95.760			96.590
Moisture content: Tare, gms.	30.740			30.810
Moisture, %	29.2	29.6	27.0	27.0
Moist specimen weight, gms.	391.4			
Diameter, in.	1.98	1.97	1.98	
Area, in.²	3.08	3.05	3.09	
Height, in.	3.90	3.95	3.75	
Net decrease in height, in.		-0.05	0.20	
Net decrease in water volume, cc.			7.70	
Wet Density, pcf	124.2	123.9	126.4	
Dry density, pcf	96.1	95.6	99.5	
Void ratio	0.8186	0.8284	0.7573	
Saturation, %	100.0	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = .130 kN/cm²

Membrane thickness = .031 cm

Filter paper coefficient = 0.0019 kN/cm

Filter paper coverage = 50%

Consolidation cell pressure = 79.70 psi (5.738 tsf)

Consolidation back pressure = 30.20 psi (2.174 tsf)

Consolidation effective confining stress = 3.564 tsf

Strain rate, %/min. = 0.05

Fail. Stress = 4.763 tsf **at reading no.** 50

Ult. Stress = 4.359 tsf **at reading no.** 79

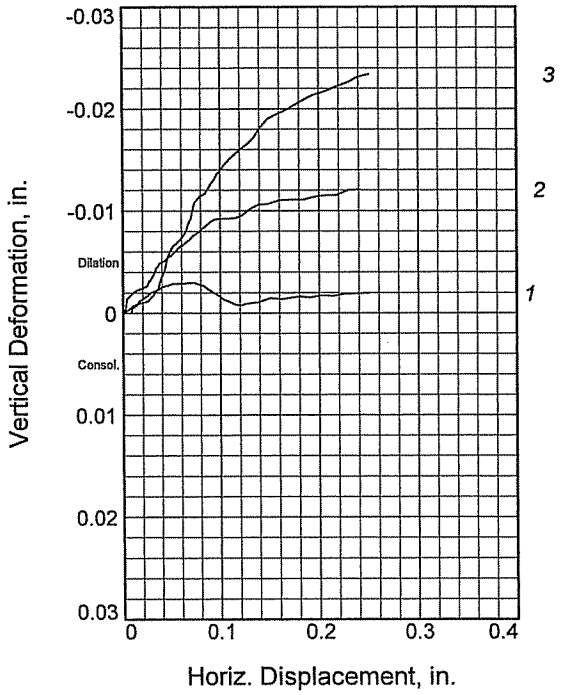
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0012	0.000	0.0	0.0	0.000	3.565	3.565	1.00	30.19	3.565	0.000
1	0.0013	7.494	7.5	0.0	0.175	3.565	3.739	1.05	30.19	3.652	0.087
2	0.0014	12.780	12.8	0.0	0.298	3.526	3.824	1.08	30.72	3.675	0.149
3	0.0027	18.398	18.4	0.0	0.428	3.483	3.911	1.12	31.32	3.697	0.214
4	0.0031	24.188	24.2	0.1	0.563	3.436	3.999	1.16	31.98	3.717	0.281
5	0.0037	30.174	30.2	0.1	0.702	3.384	4.086	1.21	32.70	3.735	0.351
6	0.0045	35.880	35.9	0.1	0.835	3.332	4.167	1.25	33.42	3.749	0.417
7	0.0060	42.240	42.2	0.1	0.982	3.275	4.258	1.30	34.21	3.766	0.491
8	0.0066	48.118	48.1	0.1	1.119	3.217	4.336	1.35	35.01	3.777	0.559
9	0.0073	53.562	53.6	0.2	1.245	3.158	4.403	1.39	35.84	3.781	0.623
10	0.0082	59.590	59.6	0.2	1.385	3.100	4.485	1.45	36.64	3.793	0.693
11	0.0090	64.501	64.5	0.2	1.499	3.043	4.542	1.49	37.44	3.792	0.749
12	0.0094	69.948	69.9	0.2	1.625	2.988	4.613	1.54	38.20	3.801	0.813
13	0.0105	74.254	74.3	0.2	1.725	2.936	4.661	1.59	38.93	3.798	0.862
14	0.0117	78.934	78.9	0.3	1.833	2.886	4.719	1.64	39.61	3.803	0.916
15	0.0121	83.866	83.9	0.3	1.947	2.839	4.786	1.69	40.27	3.813	0.974
16	0.0128	86.979	87.0	0.3	2.019	2.794	4.813	1.72	40.89	3.804	1.010
17	0.0140	90.985	91.0	0.3	2.112	2.752	4.863	1.77	41.48	3.807	1.056
18	0.0149	94.897	94.9	0.4	2.202	2.711	4.913	1.81	42.05	3.812	1.101
19	0.0159	98.694	98.7	0.4	2.289	2.672	4.962	1.86	42.58	3.817	1.145
20	0.0168	102.743	102.7	0.4	2.383	2.635	5.017	1.90	43.11	3.826	1.191

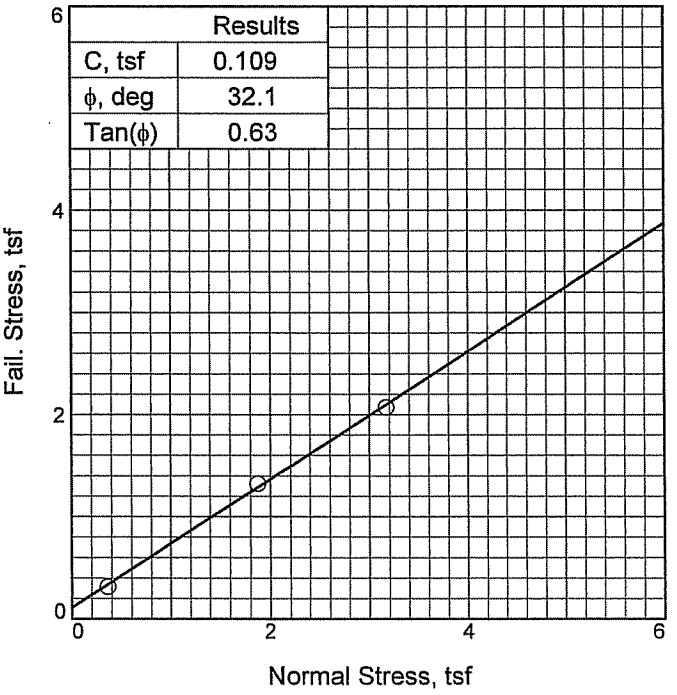
Test Readings for Specimen No. 3

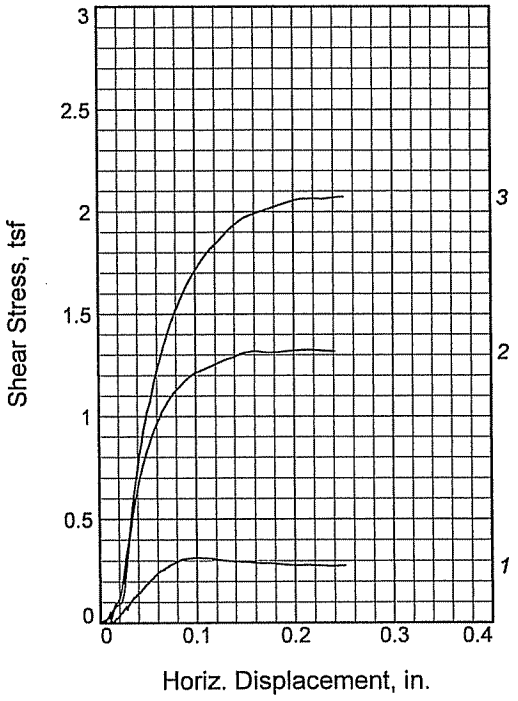
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
21	0.0180	107.026	107.0	0.4	2.481	2.600	5.081	1.95	43.59	3.841	1.241
22	0.0189	109.728	109.7	0.5	2.543	2.567	5.110	1.99	44.05	3.839	1.272
23	0.0194	112.717	112.7	0.5	2.612	2.535	5.147	2.03	44.49	3.841	1.306
24	0.0203	116.324	116.3	0.5	2.695	2.505	5.200	2.08	44.90	3.853	1.348
25	0.0208	119.316	119.3	0.5	2.764	2.479	5.243	2.12	45.27	3.861	1.382
26	0.0226	122.024	122.0	0.6	2.825	2.453	5.278	2.15	45.63	3.866	1.413
27	0.0235	124.889	124.9	0.6	2.891	2.427	5.318	2.19	45.99	3.872	1.446
28	0.0241	128.014	128.0	0.6	2.963	2.404	5.367	2.23	46.31	3.885	1.481
29	0.0256	130.807	130.8	0.6	3.026	2.381	5.407	2.27	46.64	3.894	1.513
30	0.0262	133.822	133.8	0.7	3.096	2.358	5.453	2.31	46.95	3.906	1.548
31	0.0267	137.005	137.0	0.7	3.169	2.337	5.506	2.36	47.24	3.921	1.584
32	0.0272	139.862	139.9	0.7	3.234	2.317	5.551	2.40	47.52	3.934	1.617
33	0.0292	144.215	144.2	0.7	3.333	2.281	5.614	2.46	48.02	3.948	1.667
34	0.0303	146.675	146.7	0.8	3.389	2.263	5.652	2.50	48.27	3.957	1.695
35	0.0326	150.823	150.8	0.8	3.483	2.231	5.714	2.56	48.71	3.972	1.741
36	0.0330	153.718	153.7	0.8	3.549	2.216	5.765	2.60	48.92	3.991	1.775
37	0.0339	156.307	156.3	0.9	3.608	2.202	5.810	2.64	49.12	4.006	1.804
38	0.0358	160.126	160.1	0.9	3.694	2.175	5.869	2.70	49.49	4.022	1.847
39	0.0397	168.310	168.3	1.0	3.879	2.127	6.006	2.82	50.16	4.066	1.940
40	0.0435	174.345	174.3	1.1	4.014	2.086	6.101	2.92	50.72	4.094	2.007
41	0.0476	181.083	181.1	1.2	4.165	2.050	6.215	3.03	51.23	4.132	2.082
42	0.0509	186.475	186.5	1.3	4.285	2.021	6.306	3.12	51.64	4.163	2.142
43	0.0543	191.086	191.1	1.4	4.387	1.997	6.383	3.20	51.97	4.190	2.193
44	0.0584	194.824	194.8	1.5	4.468	1.977	6.445	3.26	52.24	4.211	2.234
45	0.0618	197.604	197.6	1.6	4.527	1.963	6.491	3.31	52.43	4.227	2.264
46	0.0651	200.917	200.9	1.7	4.599	1.952	6.551	3.36	52.59	4.251	2.300
47	0.0689	203.187	203.2	1.8	4.646	1.944	6.590	3.39	52.70	4.267	2.323
48	0.0760	205.678	205.7	2.0	4.694	1.934	6.628	3.43	52.84	4.281	2.347
49	0.0835	208.433	208.4	2.2	4.747	1.930	6.678	3.46	52.89	4.304	2.374
50	0.0951	209.782	209.8	2.5	4.763	1.931	6.694	3.47	52.88	4.312	2.381
51	0.1059	210.325	210.3	2.8	4.761	1.937	6.699	3.46	52.79	4.318	2.381
52	0.1178	210.929	210.9	3.1	4.759	1.948	6.707	3.44	52.65	4.327	2.380
53	0.1290	211.530	211.5	3.4	4.758	1.955	6.713	3.43	52.54	4.334	2.379
54	0.1401	211.310	211.3	3.7	4.739	1.967	6.705	3.41	52.38	4.336	2.369
55	0.1513	211.039	211.0	4.0	4.718	1.979	6.696	3.38	52.22	4.338	2.359
56	0.1629	211.195	211.2	4.3	4.706	1.987	6.693	3.37	52.10	4.340	2.353
57	0.1745	211.250	211.3	4.6	4.692	1.998	6.690	3.35	51.95	4.344	2.346
58	0.1863	210.661	210.7	4.9	4.664	2.006	6.670	3.32	51.83	4.338	2.332
59	0.2051	211.134	211.1	5.4	4.649	2.019	6.668	3.30	51.66	4.343	2.325
60	0.2241	210.879	210.9	5.9	4.619	2.032	6.651	3.27	51.48	4.341	2.309
61	0.2423	211.582	211.6	6.4	4.610	2.042	6.653	3.26	51.33	4.348	2.305
62	0.2615	211.756	211.8	6.9	4.589	2.054	6.643	3.23	51.18	4.348	2.295
63	0.2795	211.774	211.8	7.4	4.566	2.060	6.625	3.22	51.09	4.343	2.283
64	0.2896	211.754	211.8	7.7	4.552	2.066	6.618	3.20	51.01	4.342	2.276
65	0.3082	212.728	212.7	8.2	4.548	2.070	6.618	3.20	50.95	4.344	2.274
66	0.3270	213.154	213.2	8.7	4.533	2.075	6.608	3.18	50.88	4.342	2.266
67	0.3463	212.894	212.9	9.2	4.502	2.080	6.582	3.16	50.81	4.331	2.251

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
68	0.3647	214.126	214.1	9.7	4.503	2.086	6.589	3.16	50.73	4.337	2.252
69	0.3843	212.794	212.8	10.2	4.449	2.088	6.537	3.13	50.70	4.313	2.225
70	0.4031	213.840	213.8	10.7	4.446	2.092	6.538	3.13	50.65	4.315	2.223
71	0.4224	214.532	214.5	11.2	4.435	2.094	6.529	3.12	50.61	4.312	2.217
72	0.4410	214.616	214.6	11.7	4.412	2.097	6.509	3.10	50.58	4.303	2.206
73	0.4589	216.561	216.6	12.2	4.428	2.099	6.527	3.11	50.54	4.313	2.214
74	0.4780	217.001	217.0	12.7	4.411	2.103	6.514	3.10	50.50	4.308	2.205
75	0.4970	217.628	217.6	13.2	4.398	2.105	6.503	3.09	50.47	4.304	2.199
76	0.5156	218.445	218.4	13.7	4.389	2.107	6.496	3.08	50.44	4.301	2.195
77	0.5345	218.317	218.3	14.2	4.361	2.108	6.470	3.07	50.42	4.289	2.181
78	0.5534	220.406	220.4	14.7	4.377	2.113	6.491	3.07	50.35	4.302	2.189
79	0.5638	220.206	220.2	15.0	4.359	2.114	6.473	3.06	50.34	4.293	2.179







Sample No.		1	2	3
Initial	Water Content, %	31.2	31.0	28.2
	Dry Density, pcf	91.8	93.3	94.2
	Saturation, %	96.6	99.5	92.2
	Void Ratio	0.9041	0.8736	0.8556
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	30.1	27.8	28.7
	Dry Density, pcf	92.2	93.9	95.2
	Saturation, %	94.0	90.2	96.1
	Void Ratio	0.8961	0.8620	0.8363
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	0.99	0.99
Normal Stress, tsf		0.360	1.872	3.170
Fail. Stress, tsf		0.315	1.325	2.073
Displacement, in.		0.10	0.22	0.25
Ult. Stress, tsf				
Displacement, in.				
Strain rate, %/min.		0.0072	0.0094	0.07

Sample Type: Undisturbed

Description: Light gray and tan FAT CLAY with SAND

Assumed Specific Gravity= 2.80

Remarks:

Test Method: ASTM D 3080

Pocket pen; tsf: 1.50

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA

Contract No. DACW64-03-D-0008, Task Order No. 0077

Source of Sample: 07-239 **Depth:** 12-14

Sample Number: 7

Proj. No.: 08.18.918 **Date Sampled:** 7/28/08

DIRECT SHEAR TEST REPORT

Tolunay-Wong Engineers, Inc.

DIRECT SHEAR TEST

8/12/2008

Date: 7/28/08
Client: United States Army Corps of Engineers
Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077
Project No.: 08.18.918
Location: 07-239
Depth: 12-14 **Sample Number:** 7
Description: Light gray and tan FAT CLAY with SAND
Remarks:
Test Method: ASTM D 3080
Pocket pen; tsf: 1.50
Type of Sample: Undisturbed
Assumed Specific Gravity=2.80 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	373.300		371.990
Moisture content: Dry soil+tare, gms.	336.340		336.340
Moisture content: Tare, gms.	217.840		217.840
Moisture, %	31.2	30.1	30.1
Moist specimen weight, gms.	155.5		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet Density, pcf	120.4	119.9	
Dry density, pcf	91.8	92.2	
Void ratio	0.9041	0.8961	
Saturation, %	96.6	94.0	

Test Readings for Specimen No. 1

Normal stress = 0.36 tsf
Strain rate, %/min. = 0.0072
Fail. Stress = 0.315 tsf **at reading no.** 57

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
0	0.0591	0.107	0.0	0.000	0.6529
1	0.0677	0.143	0.0	0.001	0.6529
2	0.0687	0.019	-0.1	-0.001	0.6534
3	0.0698	0.306	0.2	0.003	0.6534
4	0.0738	0.821	0.7	0.010	0.6537
5	0.0748	1.082	1.0	0.014	0.6539
6	0.0753	1.344	1.2	0.018	0.6540
7	0.0763	1.567	1.5	0.021	0.6541
8	0.0778	1.880	1.8	0.026	0.6541
9	0.0793	2.303	2.2	0.032	0.6542
10	0.0798	2.692	2.6	0.038	0.6543
11	0.0808	3.178	3.1	0.045	0.6543

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
12	0.0823	3.514	3.4	0.050	0.6545
13	0.0828	3.861	3.8	0.055	0.6545
14	0.0838	4.239	4.1	0.061	0.6545
15	0.0848	4.618	4.5	0.066	0.6546
16	0.0853	4.906	4.8	0.070	0.6546
17	0.0858	5.159	5.1	0.074	0.6547
18	0.0868	5.518	5.4	0.079	0.6548
19	0.0873	4.457	4.4	0.064	0.6548
20	0.0878	4.791	4.7	0.069	0.6548
21	0.0883	5.566	5.5	0.080	0.6549
22	0.0888	5.886	5.8	0.085	0.6549
23	0.0893	6.138	6.0	0.088	0.6549
24	0.0903	6.515	6.4	0.094	0.6550
25	0.0908	6.896	6.8	0.100	0.6550
26	0.0918	7.261	7.2	0.105	0.6550
27	0.0923	7.516	7.4	0.109	0.6551
28	0.0933	7.761	7.7	0.112	0.6551
29	0.0948	8.515	8.4	0.123	0.6551
30	0.0963	8.743	8.6	0.127	0.6553
31	0.0978	9.472	9.4	0.137	0.6553
32	0.0993	9.714	9.6	0.141	0.6554
33	0.1008	10.084	10.0	0.146	0.6554
34	0.1023	10.784	10.7	0.156	0.6555
35	0.1038	11.341	11.2	0.165	0.6556
36	0.1053	11.954	11.8	0.174	0.6556
37	0.1068	12.526	12.4	0.182	0.6556
38	0.1098	13.373	13.3	0.194	0.6558
39	0.1113	13.935	13.8	0.203	0.6558
40	0.1128	14.384	14.3	0.209	0.6558
41	0.1143	14.858	14.8	0.216	0.6558
42	0.1158	15.463	15.4	0.225	0.6558
43	0.1173	15.857	15.7	0.231	0.6558
44	0.1188	16.372	16.3	0.238	0.6558
45	0.1218	17.230	17.1	0.251	0.6558
46	0.1248	17.453	17.3	0.254	0.6558
47	0.1263	17.861	17.8	0.260	0.6559
48	0.1293	18.561	18.5	0.270	0.6558
49	0.1323	19.197	19.1	0.280	0.6559
50	0.1353	19.594	19.5	0.286	0.6558
51	0.1383	20.096	20.0	0.293	0.6557
52	0.1398	20.319	20.2	0.296	0.6556
53	0.1413	20.540	20.4	0.299	0.6556
54	0.1428	20.812	20.7	0.303	0.6555
55	0.1458	21.051	20.9	0.307	0.6553
56	0.1518	21.293	21.2	0.311	0.6549
57	0.1594	21.578	21.5	0.315	0.6545
58	0.1624	21.525	21.4	0.314	0.6543

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
59	0.1744	21.272	21.2	0.310	0.6538
60	0.1804	20.954	20.8	0.306	0.6537
61	0.1864	20.627	20.5	0.301	0.6538
62	0.1984	20.353	20.2	0.297	0.6539
63	0.2104	20.227	20.1	0.295	0.6544
64	0.2224	19.755	19.6	0.288	0.6543
65	0.2344	19.823	19.7	0.289	0.6545
66	0.2404	19.574	19.5	0.285	0.6545
67	0.2495	19.279	19.2	0.281	0.6544
68	0.2615	19.099	19.0	0.278	0.6546
69	0.2735	19.144	19.0	0.279	0.6546
70	0.2855	18.987	18.9	0.277	0.6548
71	0.2975	18.807	18.7	0.274	0.6548
72	0.3095	18.977	18.9	0.277	0.6549

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	375.010		371.050
Moisture content: Dry soil+tare, gms.	337.620		337.620
Moisture content: Tare, gms.	217.190		217.190
Moisture, %	31.0	27.8	27.8
Moist specimen weight, gms.	157.8		
Diameter, in.	2.50	2.50	
Area, in.²	4.91	4.91	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet Density, pcf	122.3	119.9	
Dry density, pcf	93.3	93.9	
Void ratio	0.8736	0.8620	
Saturation, %	99.5	90.2	

Test Readings for Specimen No. 2

Normal stress = 1.872 tsf

Strain rate, %/min. = 0.0094

Fail. Stress = 1.325 tsf **at reading no.** 69

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
0	0.0000	0.000	0.0	0.000	0.6525
1	0.0020	0.122	0.1	0.002	0.6525
2	0.0040	0.036	0.0	0.001	0.6539
3	0.0070	1.107	1.1	0.016	0.6541
4	0.0090	2.321	2.3	0.034	0.6543
5	0.0105	3.528	3.5	0.052	0.6545
6	0.0110	0.354	0.4	0.005	0.6545
7	0.0115	1.390	1.4	0.020	0.6545
8	0.0125	2.469	2.5	0.036	0.6546
9	0.0135	3.956	4.0	0.058	0.6547
10	0.0145	4.973	5.0	0.073	0.6547

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
11	0.0155	5.938	5.9	0.087	0.6547
12	0.0185	6.863	6.9	0.101	0.6549
13	0.0205	8.089	8.1	0.119	0.6549
14	0.0220	10.115	10.1	0.148	0.6550
15	0.0225	11.161	11.2	0.164	0.6550
16	0.0230	12.193	12.2	0.179	0.6551
17	0.0240	13.320	13.3	0.195	0.6551
18	0.0245	14.578	14.6	0.214	0.6551
19	0.0250	15.872	15.9	0.233	0.6552
20	0.0255	17.120	17.1	0.251	0.6553
21	0.0270	20.209	20.2	0.296	0.6556
22	0.0285	23.709	23.7	0.347	0.6557
23	0.0300	26.114	26.1	0.383	0.6560
24	0.0315	29.057	29.1	0.426	0.6562
25	0.0330	32.082	32.1	0.470	0.6565
26	0.0345	34.770	34.8	0.510	0.6569
27	0.0360	37.854	37.9	0.555	0.6571
28	0.0375	40.367	40.4	0.592	0.6573
29	0.0390	42.908	42.9	0.629	0.6574
30	0.0405	45.202	45.2	0.662	0.6575
31	0.0420	47.380	47.4	0.694	0.6575
32	0.0435	49.430	49.4	0.724	0.6576
33	0.0450	51.269	51.3	0.751	0.6578
34	0.0465	53.262	53.3	0.781	0.6579
35	0.0480	54.991	55.0	0.806	0.6580
36	0.0495	56.590	56.6	0.829	0.6581
37	0.0510	57.992	58.0	0.850	0.6582
38	0.0525	59.380	59.4	0.870	0.6584
39	0.0540	60.951	61.0	0.893	0.6585
40	0.0555	62.309	62.3	0.913	0.6587
41	0.0570	63.552	63.6	0.931	0.6588
42	0.0585	64.748	64.7	0.949	0.6590
43	0.0600	65.792	65.8	0.964	0.6591
44	0.0615	66.981	67.0	0.982	0.6591
45	0.0630	67.956	68.0	0.996	0.6593
46	0.0645	69.032	69.0	1.012	0.6594
47	0.0660	70.214	70.2	1.029	0.6595
48	0.0690	71.775	71.8	1.052	0.6597
49	0.0720	73.436	73.4	1.076	0.6600
50	0.0750	74.717	74.7	1.095	0.6602
51	0.0780	76.046	76.0	1.115	0.6604
52	0.0810	77.291	77.3	1.133	0.6607
53	0.0840	78.263	78.3	1.147	0.6609
54	0.0870	79.209	79.2	1.161	0.6612
55	0.0900	80.270	80.3	1.176	0.6614
56	0.0945	81.418	81.4	1.193	0.6617
57	0.0990	82.525	82.5	1.209	0.6617

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
58	0.1065	83.554	83.6	1.225	0.6617
59	0.1155	84.764	84.8	1.242	0.6618
60	0.1216	85.798	85.8	1.257	0.6620
61	0.1306	87.041	87.0	1.276	0.6627
62	0.1396	88.022	88.0	1.290	0.6631
63	0.1486	89.247	89.2	1.308	0.6631
64	0.1606	89.994	90.0	1.319	0.6635
65	0.1726	89.498	89.5	1.312	0.6636
66	0.1846	89.602	89.6	1.313	0.6636
67	0.1966	90.094	90.1	1.320	0.6639
68	0.2086	90.295	90.3	1.323	0.6640
69	0.2176	90.400	90.4	1.325	0.6640
70	0.2296	90.141	90.1	1.321	0.6645
71	0.2416	89.908	89.9	1.318	0.6646

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	372.270		372.900
Moisture content: Dry soil+tare, gms.	338.000		338.000
Moisture content: Tare, gms.	216.400		216.400
Moisture, %	28.2	28.7	28.7
Moist specimen weight, gms.	155.9		
Diameter, in.	2.50	2.50	
Area, in.^{2}	4.91	4.91	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet Density, pcf	120.8	122.5	
Dry density, pcf	94.2	95.2	
Void ratio	0.8556	0.8363	
Saturation, %	92.2	96.1	

Test Readings for Specimen No. 3

Normal stress = 3.17 tsf

Strain rate, %/min. = 0.07

Fail. Stress = 2.073 tsf **at reading no.** 64

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
0	-0.0139	0.000	0.0	0.000	0.6723
1	-0.0134	0.950	0.9	0.014	0.6723
2	-0.0129	0.308	0.3	0.005	0.6723
3	-0.0034	1.809	1.8	0.027	0.6730
4	-0.0019	3.774	3.8	0.055	0.6731
5	0.0021	5.192	5.2	0.076	0.6732
6	0.0086	6.847	6.8	0.100	0.6734
7	0.0102	8.759	8.8	0.128	0.6734
8	0.0117	11.281	11.3	0.165	0.6735
9	0.0122	12.706	12.7	0.186	0.6735
10	0.0137	18.126	18.1	0.266	0.6736

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
11	0.0152	22.420	22.4	0.329	0.6739
12	0.0167	26.872	26.9	0.394	0.6739
13	0.0182	31.403	31.4	0.460	0.6741
14	0.0197	35.469	35.5	0.520	0.6743
15	0.0212	39.854	39.9	0.584	0.6745
16	0.0227	43.575	43.6	0.639	0.6747
17	0.0242	46.671	46.7	0.684	0.6753
18	0.0257	49.962	50.0	0.732	0.6757
19	0.0272	53.583	53.6	0.785	0.6760
20	0.0287	56.728	56.7	0.831	0.6763
21	0.0302	59.614	59.6	0.874	0.6769
22	0.0317	62.672	62.7	0.919	0.6775
23	0.0347	67.520	67.5	0.990	0.6783
24	0.0362	70.092	70.1	1.027	0.6786
25	0.0377	71.607	71.6	1.049	0.6788
26	0.0392	73.099	73.1	1.071	0.6790
27	0.0407	75.798	75.8	1.111	0.6791
28	0.0422	77.817	77.8	1.140	0.6792
29	0.0437	80.468	80.5	1.179	0.6794
30	0.0452	82.369	82.4	1.207	0.6795
31	0.0467	84.192	84.2	1.234	0.6797
32	0.0482	86.058	86.1	1.261	0.6799
33	0.0512	89.293	89.3	1.309	0.6803
34	0.0527	91.056	91.1	1.335	0.6808
35	0.0542	92.629	92.6	1.358	0.6812
36	0.0557	94.394	94.4	1.383	0.6815
37	0.0587	97.222	97.2	1.425	0.6828
38	0.0602	98.705	98.7	1.447	0.6831
39	0.0632	101.316	101.3	1.485	0.6834
40	0.0647	102.741	102.7	1.506	0.6836
41	0.0677	104.824	104.8	1.536	0.6838
42	0.0707	107.452	107.5	1.575	0.6840
43	0.0737	109.374	109.4	1.603	0.6845
44	0.0767	111.372	111.4	1.632	0.6850
45	0.0797	113.141	113.1	1.658	0.6853
46	0.0827	115.012	115.0	1.686	0.6858
47	0.0858	116.651	116.7	1.710	0.6861
48	0.0903	118.978	119.0	1.744	0.6868
49	0.0963	121.778	121.8	1.785	0.6874
50	0.1023	124.064	124.1	1.818	0.6879
51	0.1083	126.156	126.2	1.849	0.6884
52	0.1143	128.206	128.2	1.879	0.6889
53	0.1203	130.274	130.3	1.909	0.6895
54	0.1263	131.985	132.0	1.934	0.6903
55	0.1353	134.207	134.2	1.967	0.6913
56	0.1443	135.629	135.6	1.988	0.6918
57	0.1563	136.871	136.9	2.006	0.6923

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Shear Stress tsf	Vertical Def. Dial in.
58	0.1683	138.285	138.3	2.027	0.6930
59	0.1803	139.654	139.7	2.047	0.6937
60	0.1923	140.667	140.7	2.062	0.6940
61	0.2043	140.943	140.9	2.066	0.6945
62	0.2164	140.676	140.7	2.062	0.6949
63	0.2254	141.095	141.1	2.068	0.6954
64	0.2366	141.440	141.4	2.073	0.6957

SUMMARY OF LABORATORY TESTS

Project No. 08.18.918

Client: United States Army Corps of Engineers

Project: Galveston Channel and Pelican Island PA
Contract No. DACW64-03-D-0008, Task Order No. 0077

Boring No.	Sample No.	Depth (ft)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	Lab Vane (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
07-239															
	2	2.5-4	Reddish-brown and gray FAT CLAY	CH	35.6		67	21	46	98.4					
	3	4-6	Reddish-brown and gray FAT CLAY; sand seams	CH	31.0	90.2									
	4	6-8	Tan and brown LEAN CLAY	CL	29.4	94.4	35	16	19	99.7		1.21	7.2	2.5	Vertical shear
	5	8-10	Brown SILTY CLAY	CL-ML	28.3	95.1						0.86	5.7	3.5	Bulge
	6	10-12	Gray LEAN CLAY	CL	24.9	101.1	36	16	20	99.5					
	7	12-14	Light gray and tan FAT CLAY with SAND	CH	31.2	91.8						0.32	4.0		
	8	14-16	Gray LEAN CLAY	CL	54.1										
	9	16-18	Gray LEAN CLAY with SAND	CL	28.4	93.5									
	10	18-20	Gray LEAN CLAY	CL	29.2	96.1	33	16	17	99.8					
	11	20-22	Gray LEAN CLAY; sand seams	CL	33.2	88.9									
	12	22-24	Gray LEAN CLAY with SAND	CL	29.8	91.5									
	13	24-26	Brown and gray FAT CLAY	CH	31.2	91.7	50	20	30	99.9		0.77	6.4	9.5	60 degree
	14	26-28	Gray FAT CLAY	CH	39.1	82.1									
	15	28-30	Gray FAT CLAY	CH	35.7	81.9						1.26	7.2		60 degree
07-240															
	2	2.5-4	Tan and gray SANDY SILTY CLAY	CL-ML	22.2										
	3	4-6	Tan and brown LEAN CLAY	CL	23.1	104.2	31	16	15	98.2		1.69	6.5	2.0	Vertical shear
	4	6-8	Tan and brown LEAN CLAY	CL	61.6										
	5	8-10	Tan and gray SANDY SILTY CLAY; ferrous nodules	CL-ML	25.3	92.1						0.43	5.5	3.5	Vertical shear
	6	10-12	Tan and gray SANDY SILTY CLAY	CL-ML	27.3	92.4									
	7	12-14	Tan and brown LEAN CLAY	CL	27.6	92.5	32	16	16	99.4		0.36	5.6	5.0	Vertical shear
	8	14-16	Tan and gray SANDY LEAN CLAY; calcareous nodules	CL	27.3	94.7									
	9	16-18	Brown SILTY CLAY with SAND	CL-ML	27.3	93.3						0.36	5.8	6.5	Bulge
	10	18-20	Tan and brown SILTY CLAY	CL-ML	29.3	94.0						0.75	5.2		Vertical shear
	11	20-22	Gray and tan SILTY CLAY with SAND	CL-ML	30.3	90.7									
	12	22-24	Tan and brown SANDY SILTY CLAY	CL-ML	33.6	91.7									
	13	24-26	Gray and brown FAT CLAY	CH	30.6	90.7	53	20	33	99.8		0.23	5.0	9.5	Bulge
	14	26-28	Gray LEAN CLAY with SAND	CL	32.3	87.2									
	15	28-30	Gray FAT CLAY	CH	47.3	77.5									
07-241															
	1	0-2	Gray FAT CLAY	CH	172.6										
	2	2-4	Gray FAT CLAY	CH	158.9		126	30	96	95.6					
	3	4-6	Reddish-brown and gray FAT CLAY	CH	30.6	87.0									
	4	6-8	Tan and gray FAT CLAY	CH	31.4	88.7	70	22	48	99.9					
	5	8-10	Tan and gray SANDY SILTY CLAY; shell fragments	CL-ML	24.7	100.6									
	6	10-12	Tan and brown LEAN CLAY	CL	27.8	93.9	42	17	25	99.3		0.83	7.2		60 degree