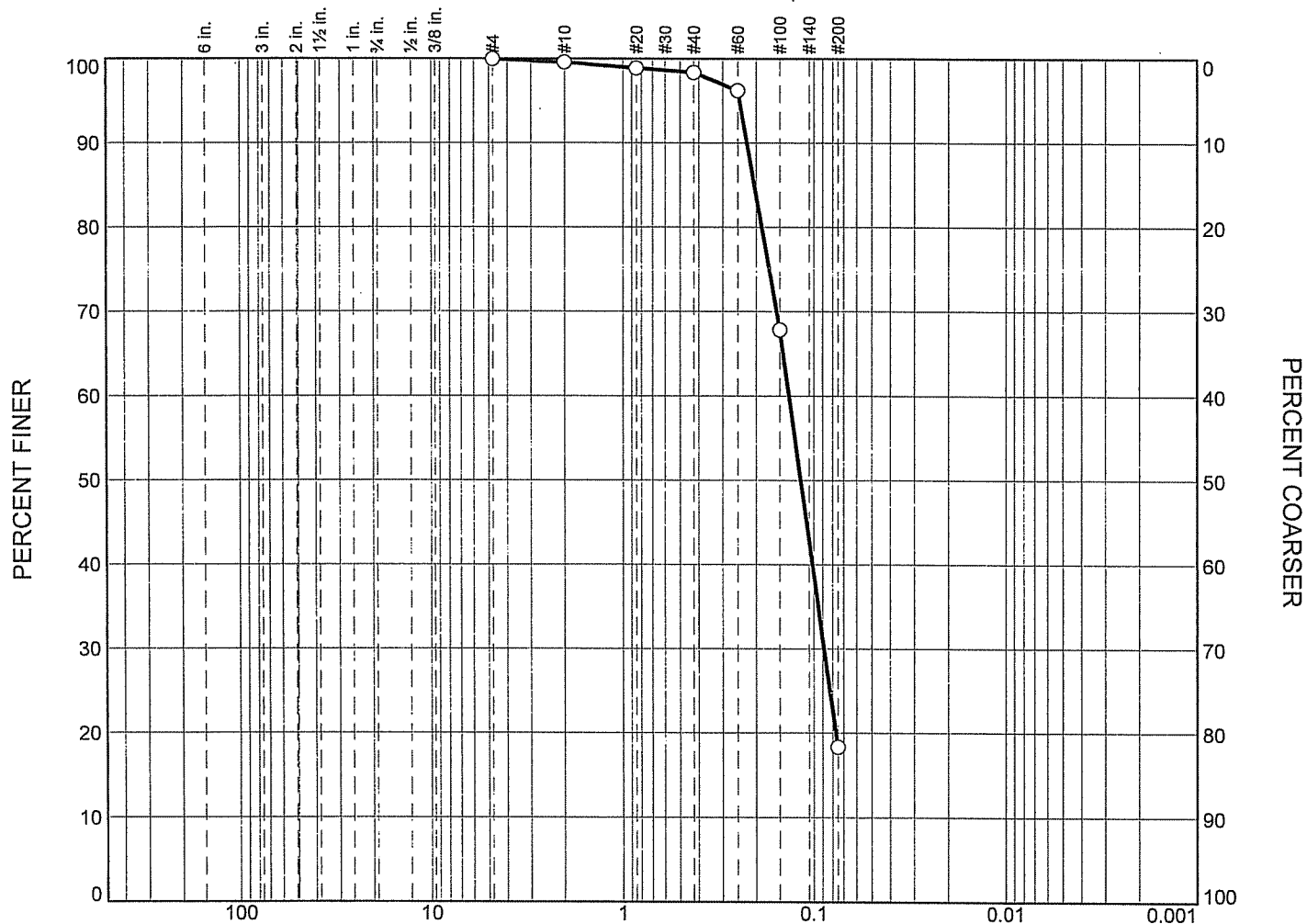


Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○			0.4	1.2	80.1	18.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-198	3	4-5.5	Tan and gray SILTY SAND; grass roots	SM

**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

7/22/2008

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: 07-198

Depth: 4-5.5

Sample Number: 3

Material Description: Tan and gray SILTY SAND; grass roots

USCS: SM

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
82.17	6.77	6.77	3"		
			0.75"		
			#4	6.80	100.0
			#10	7.10	99.6
			#20	7.63	98.9
			#40	8.01	98.4
			#60	9.64	96.2
			#100	31.05	67.8
			#200	68.34	18.3

Fractional Components

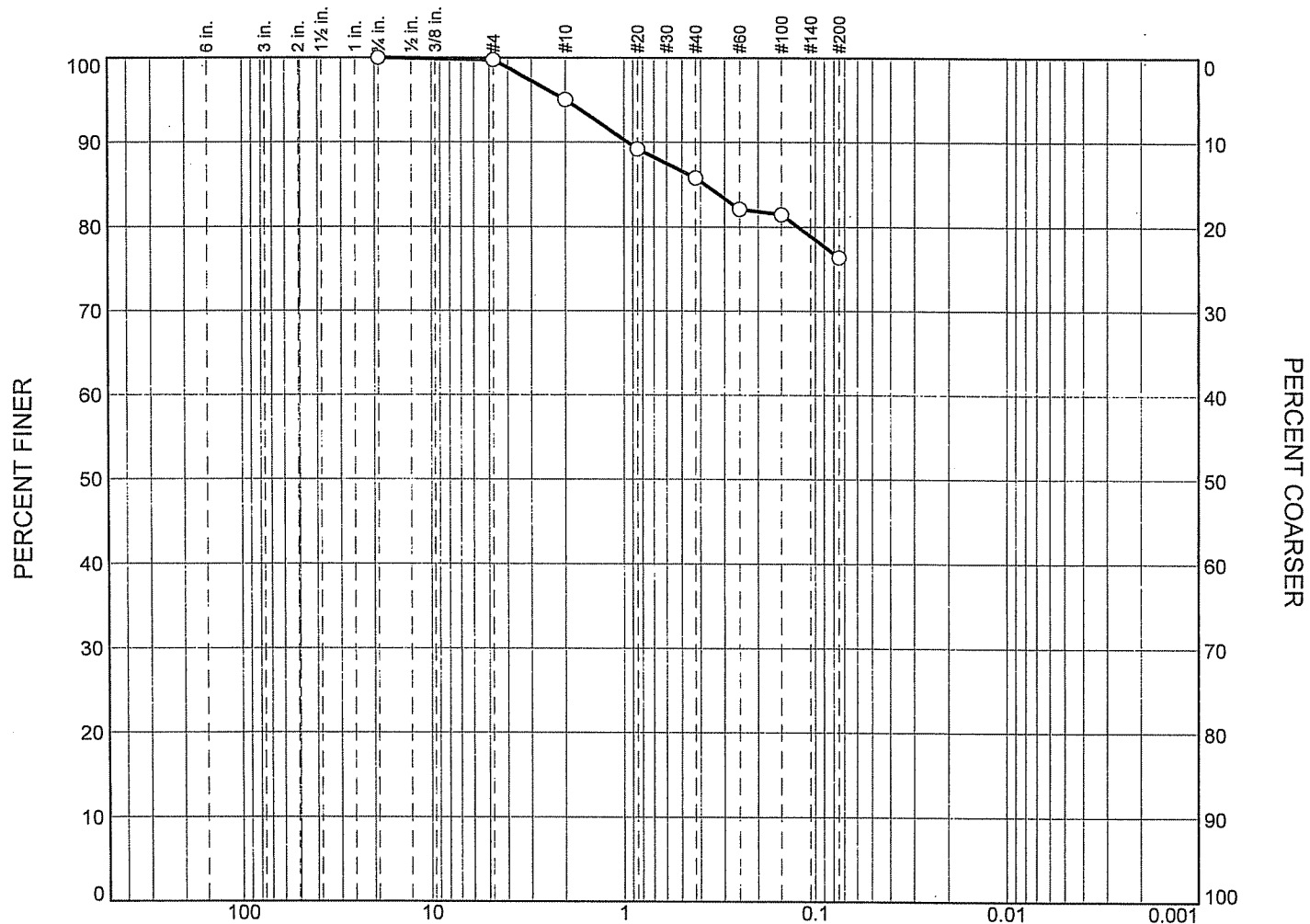
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
				0.4	1.2	80.1	81.7			18.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0768	0.0883	0.1169	0.1345	0.1868	0.2044	0.2236	0.2447

Fineness Modulus

0.38

Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	4.7	9.2	9.5	76.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-198	5	14-15.5	Tan and gray SILT with SAND; shell fragments	ML

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Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/22/2008

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: 07-198

Depth: 14-15.5

Sample Number: 5

Material Description: Tan and gray SILT with SAND; shell fragments

USCS: ML

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
270.17	217.68	217.68	3"		
			0.75"	217.68	100.0
			#4	217.82	99.7
			#10	220.30	95.0
			#20	223.35	89.2
			#40	225.14	85.8
			#60	227.07	82.1
			#100	227.40	81.5
			#200	230.10	76.3

Fractional Components

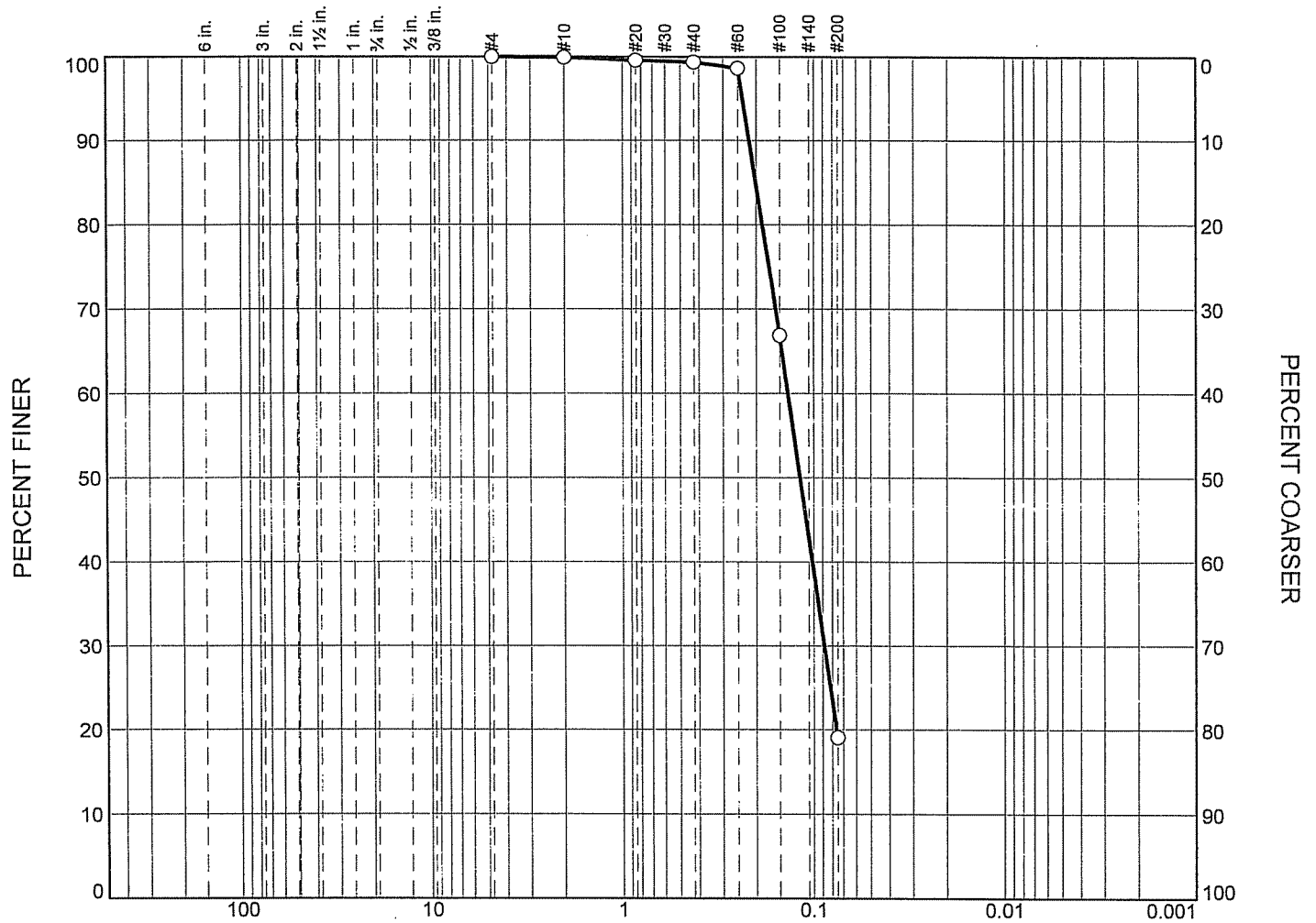
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	4.7	9.2	9.5	23.4			76.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.1228	0.3793	0.9566	1.9975

Fineness Modulus

0.61

Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.5	80.3	19.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-198	7	24-25.5	Tan and gray SILTY SAND; shell fragments	SM

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Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/22/2008

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: 07-198

Depth: 24-25.5

Sample Number: 7

Material Description: Tan and gray SILTY SAND; shell fragments

USCS: SM

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
54.44	6.74	6.74	3"		
			0.75"		
			#4	6.74	100.0
			#10	6.77	99.9
			#20	6.94	99.6
			#40	7.05	99.4
			#60	7.40	98.6
			#100	22.55	66.9
			#200	45.35	19.1

Fractional Components

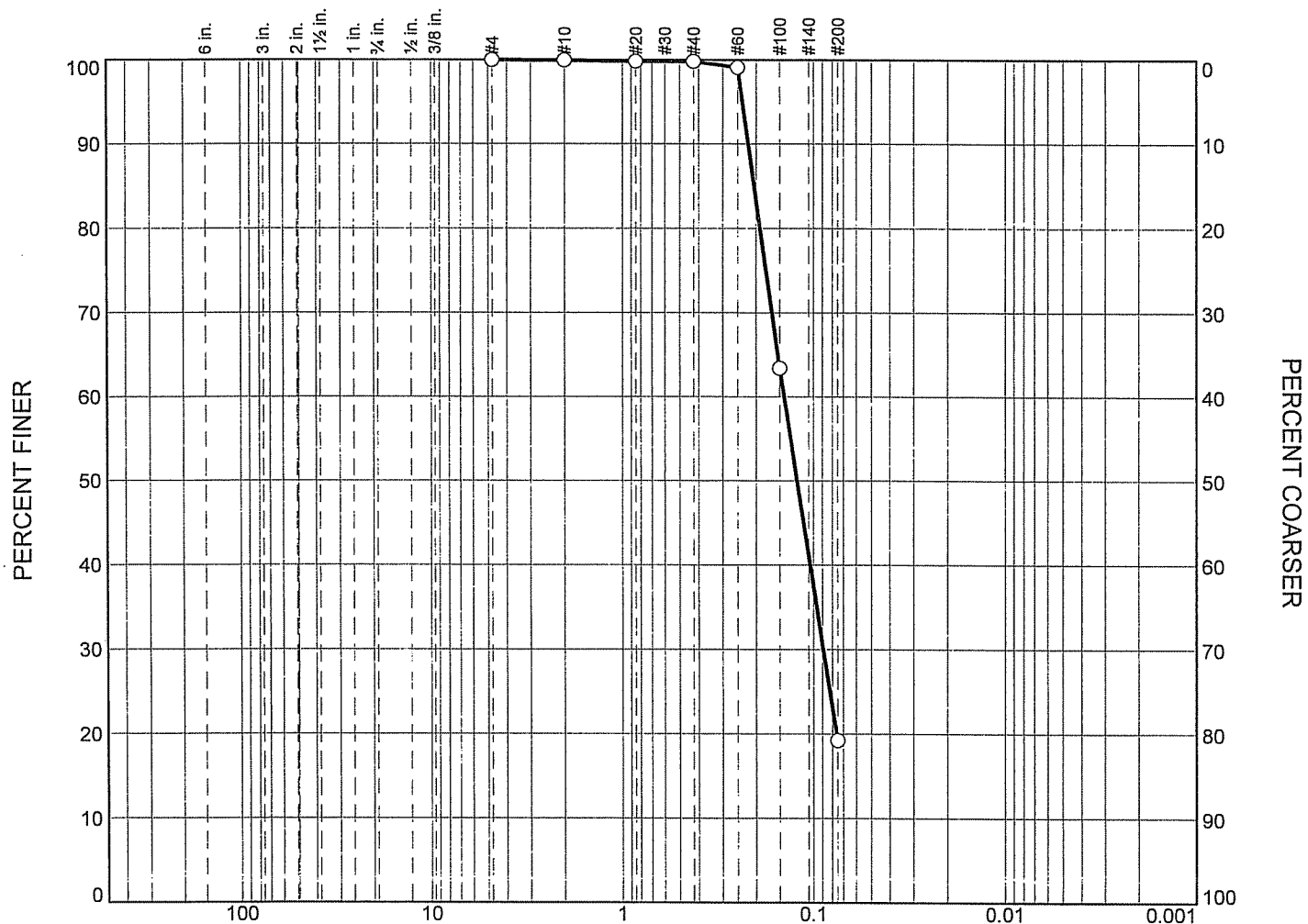
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.5	80.3	80.9			19.1

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0760	0.0879	0.1175	0.1358	0.1853	0.2008	0.2176	0.2359

Fineness
Modulus

0.35

Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.1	80.6	19.2	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-198	12	35-36.5	Gray SILTY SAND; shell fragments	SM

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Project No.: 08.18.918

GRAIN SIZE DISTRIBUTION TEST DATA

7/22/2008

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: 07-198

Depth: 35-36.5

Sample Number: 12

Material Description: Gray SILTY SAND; shell fragments

USCS: SM

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., %
258.57	179.64	179.64	3"					
			0.75"					
			#4	179.64	100.0			
			#10	179.68	99.9			
			#20	179.79	99.8			
			#40	179.79	99.8			
			#60	180.37	99.1			
			#100	208.53	63.4			
			#200	243.38	19.2			

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.1	80.6	80.8			19.2

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0759	0.0888	0.1215	0.1422	0.1903	0.2044	0.2195	0.2358

Fineness
Modulus

0.38

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
	21	40-42	Gray LEAN CLAY; sand seams	CL	48.4	68.8									
	22	42-43.5	Gray and tan POORLY GRADED SAND with SILT; shell fragments	SP-SM						11.7					
	23	47-48.5	Gray and tan POORLY GRADED SAND with SILT; shell fragments	SP-SM						8.4					
	24	48.5-50	Gray and tan CLAYEY SAND; shell fragments	SC											
07-197															
	1	0-2	Gray LEAN CLAY with SAND; grass roots	CL	27.7	89.3									
	2	2-4	Gray and brown FAT CLAY	CH	37.9	78.0	79	24	55	97.4		1.03	3.4		Vertical shear
	3	4-6	Gray and tan FAT CLAY; calcareous nodules	CH	48.8	72.1									
	4	6-8	Reddish-brown FAT CLAY	CH	34.6	82.1	96	28	68	95.8		0.92	5.0		60 degree
	5	8-10	Reddish-brown FAT CLAY; calcareous and ferrous nodules	CH	36.6	85.2									
	6	10-12	Reddish-brown FAT CLAY; shell fragments and organics	CH	37.1	84.3									
	7	12-14	Gray and brown FAT CLAY	CH	67.8	60.1	110	28	82	99.2		0.61	1.3		Slickensided
	8	14-16	Brown and gray FAT CLAY; shell fragments	CH	58.0	64.6						0.67	4.2		Slickensided
	9	16-18	Gray FAT CLAY; organics	CH	74.2	58.1									
	10	18-20	Gray SANDY LEAN CLAY; ferrous nodules	CL	30.7	90.4	40	20	20	56.1		0.34	5.4		Bulge
	11	20-22	Tan and gray SANDY SILTY CLAY	CL-ML	30.5	101.9									
	12	22-23.5	Gray CLAYEY SAND; shell fragments	SC	28.7										
	13	23.5-25.5	Gray LEAN CLAY	CL	32.8	76.3	40	20	20	93.1		0.26	8.7	15.0	60 degree
	14	25.5-27.5	Gray SILTY SAND; shell fragments	SM	30.0										
	15	27.5-29	Gray and tan SILTY SAND; shell fragments	SM						30.6					
	16	32.5-34	Gray and tan POORLY GRADED SAND with SILT; shell fragments	SP-SM						6.6					
	17	36-38	Gray LEAN CLAY with SAND; shell fragments	CL	28.5	92.4	42	18	24	82.7		0.49	9.2		Bulge
	18	38-40	Gray SANDY SILTY CLAY	CL-ML	24.1	96.4									
07-198															
	1	0-2	Gray FAT CLAY with SAND; tree roots	CH	25.5	94.3									
	2	2-4	Gray SANDY FAT CLAY	CH	35.1		93	29	64	68.8					
	3	4-5.5	Tan and gray SILTY SAND; grass roots	SM						18.3					
	4	9-10.5	Tan and gray SILTY SAND; shell fragments	SM						30.5					
	5	14-15.5	Tan and gray SILT with SAND; shell fragments	ML						76.3					
	6	19-20.5	Tan and gray SILTY SAND; shell fragments	SM						18.1					
	7	24-25.5	Tan and gray SILTY SAND; shell fragments	SM						19.1					
	8	29-30.5	Gray CLAYEY SAND; shell fragments	SC	29.1										
	9	30.5-32	Gray CLAYEY SAND; shell fragments	SC	29.3		27	18	9	46.5					
	10	32-33.5	Gray LEAN CLAY; shell fragments	CL	29.6										
	11	33.5-35	Gray FAT CLAY; shell fragments	CH	31.8										

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TOLUNAY-WONG ENGINEERS, INC.



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
	12	35-36.5	Gray SILTY SAND; shell fragments	SM						19.2					
	13	38.5-40	Gray CLAYEY SAND; shell fragments	SC											
07-233															
	2	2.5-4	Gray FAT CLAY	CH	157.0										
	3	4.5-6	Gray FAT CLAY	CH	146.2		115	30	85	93.5					
	4	6.5-8	Gray FAT CLAY	CH	139.9										
	5	8.5-10	Gray FAT CLAY	CH	125.0										
	6	10.5-12	Gray FAT CLAY	CH	136.0		119	30	89	95.4					
	7	12.5-14	Gray FAT CLAY	CH	121.0										
	8	14.5-16	Gray FAT CLAY	CH	120.3										
	9	16.5-18	Gray FAT CLAY	CH	105.5		114	28	86	90.9					
	10	18-20	Gray SANDY LEAN CLAY	CL	23.2	96.7						0.78	10.6		Bulge
	11	20-22	Gray LEAN CLAY	CL	26.1	98.5	33	16	17	96.3					Multiple shear
	12	22-24	Tan and light gray LEAN CLAY	CL	27.3	96.2						0.48	9.8		
	13	24-26	Gray LEAN CLAY	CL	28.0	92.0	33	16	17	97.3		0.40	5.8	9.5	Bulge
	14	26-28	Tan and gray SANDY SILT; clay seams	ML	27.3	93.6									
	15	28-30	Tan and gray LEAN CLAY	CL			30	16	14	98.2					
	16	30-32	Tan and gray SANDY SILT; clay seams	ML	27.1	93.8									
	17	32-34	Tan and brown LEAN CLAY	CL	36.5	85.3	43	18	25	99.5		0.81	15.0	13.0	Bulge
	18	34-35	Gray FAT CLAY; sand seams	CH	33.0	87.4									
07-234															
	2	2.5-4	Gray SANDY LEAN CLAY; shell fragments	CL	51.0										
	3	4.5-6	Gray CLAYEY SAND; shell fragments	SC	40.7		42	17	25	24.0					
	4	6.5-8	Gray SANDY LEAN CLAY; shell fragments	CL	46.5										
	5	8-10	Tan and gray FAT CLAY	CH	30.9	88.0	75	24	51	98.4		1.08	2.0	3.5	Slickensided
	6	10-12	Gray FAT CLAY; sand seams	CH	20.6	102.5									
	7	12-14	Tan and gray SANDY SILT; clay seams	ML	24.6	98.2						0.66	5.5		Vertical shear
	8	14-16	Tan and gray LEAN CLAY	CL	25.7	97.7	26	15	11	98.0					
	9	16-18	Gray and tan FAT CLAY; sand seams	CH	30.3	92.2									
	10	18-20	Brown and gray SILTY CLAY with SAND	CL-ML	24.9	103.6						0.49	5.8	7.5	Bulge
	11	20-22	Tan and brown SILTY SAND; clay pockets	SM	25.6	96.8									
	12	22-24	Gray and tan FAT CLAY; sand seams	CH	27.2	93.8						0.81	3.3		Vertical shear
	13	24-26	Tan and brown FAT CLAY	CH	34.6	85.3	52	20	32	99.6		0.77	9.7	9.5	Bulge
	14	26-28	Gray FAT CLAY; sand seams	CH	32.4	86.3									
	15	28-30	Gray FAT CLAY	CH	31.2	86.7						0.98	8.1		Vertical shear
07-235															
	2	2.5-4	Gray FAT CLAY	CH	84.9										

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