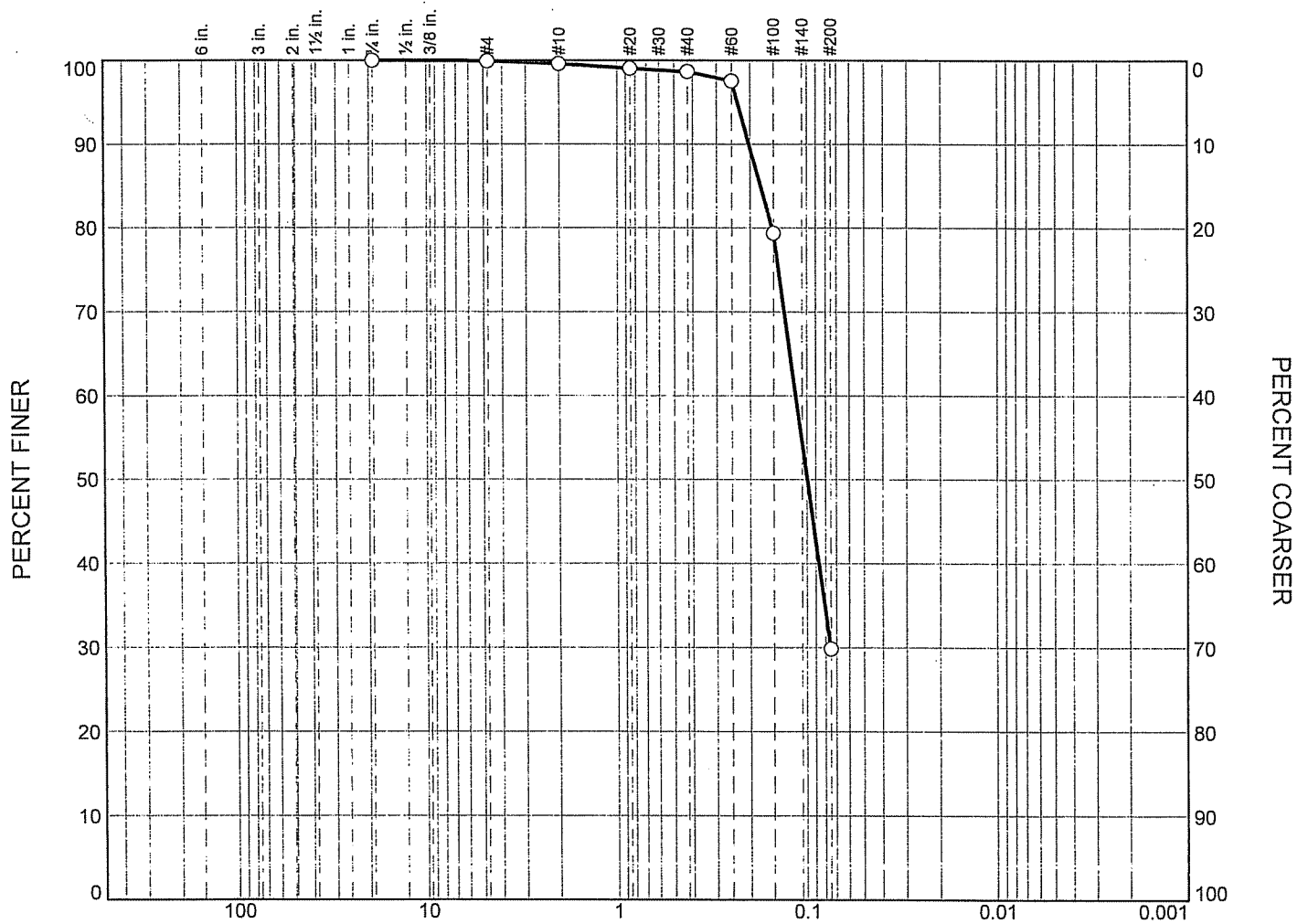


Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	0.3	1.0	68.7	29.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-187	16	32-34	Gray SILTY SAND	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

7/21/2008

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: 07-187

Depth: 32-34

Sample Number: 16

Material Description: Gray SILTY SAND

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., %
291.50	216.85	216.85	3"					
			0.75"	216.85	100.0			
			#4	216.90	99.9			
			#10	217.15	99.6			
			#20	217.57	99.0			
			#40	217.86	98.6			
			#60	218.70	97.5			
			#100	232.25	79.4			
			#200	269.21	29.9			

Fractional Components

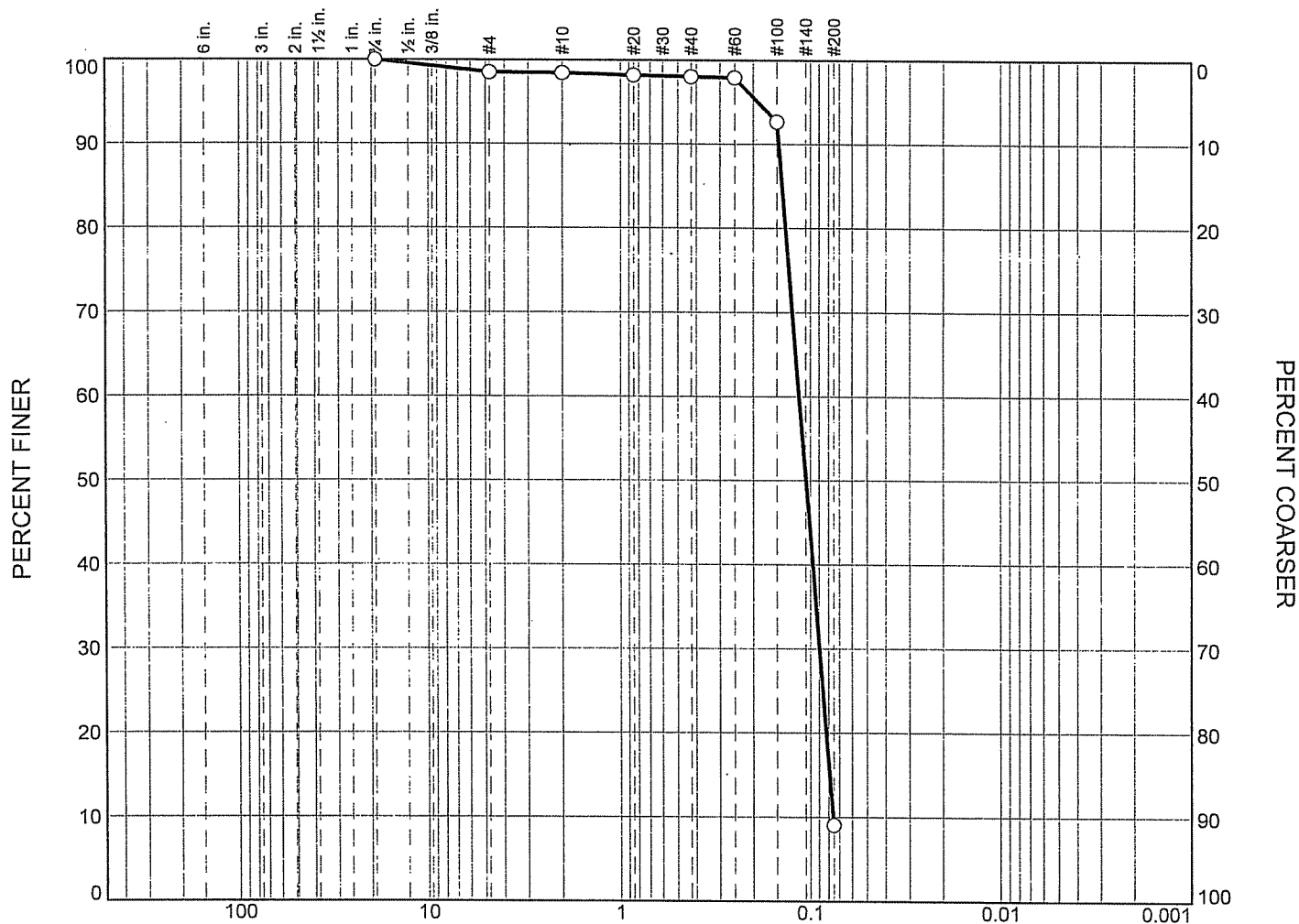
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.3	1.0	68.7	70.0			29.9

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0751	0.0994	0.1144	0.1527	0.1758	0.2023	0.2329

Fineness Modulus

0.25

Particle Size Analysis - ASTM D 422



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.5	0.0	0.5	88.9	9.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-187	21	44.5-46	Gray SAND with SILT	SP-SM

**Tolunay-Wong
Engineers, Inc.
Houston, Texas**

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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

7/18/2008

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: 07-187

Depth: 44.5-46

Sample Number: 21

Material Description: Gray SAND with SILT

USCS: SP-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., %
74.68	6.67	6.67	3"					
			0.75"	6.67	100.0			
			#4	7.67	98.5			
			#10	7.72	98.5			
			#20	7.90	98.2			
			#40	8.00	98.0			
			#60	8.09	97.9			
			#100	11.65	92.7			
			#200	68.52	9.1			

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.5	1.5	0.0	0.5	88.9	89.4			9.1

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0756	0.0788	0.0821	0.0892	0.1053	0.1144	0.1350	0.1408	0.1467	0.1882

Fineness Modulus	C _u	C _c
0.17	1.51	0.92

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
	6	10-12	Gray FAT CLAY	CH	64.1	60.6									
	7	12-14	Tan and gray FAT CLAY	CH	48.3	69.5	79	24	55	92.8		0.36	3.4		45 degree
	8	14-16	Gray FAT CLAY	CH	63.6	65.0									
	9	16-18	Tan and gray FAT CLAY	CH	59.1	64.5	94	24	70	98.6		0.41	2.0		Slickensided
	10	18-20	Gray and tan FAT CLAY	CH	50.0										
07-185															
	1	0-1	Gray FAT CLAY	CH											
	2	1-2	Gray and tan FAT CLAY	CH	70.1		101	27	74	95.9					
	3	2-3	Gray FAT CLAY	CH											
	4	3-4	Tan and gray FAT CLAY	CH	77.9										
	5	4-5	Tan and gray FAT CLAY	CH											
	6	5-6	Tan and gray FAT CLAY	CH	65.8		94	26	68	99.1					
07-186															
	1	0-1	Tan and gray FAT CLAY	CH											
	2	1-2	Gray and tan FAT CLAY	CH	66.1		70	22	48	96.3					
	3	2-3	Gray and tan FAT CLAY	CH											
	4	3-4	Tan and light gray CLAYEY SAND	SC	33.8		43	18	25	43.3					
	5	4-5	Tan and gray FAT CLAY	CH											
	6	5-6	Gray and tan FAT CLAY	CH	70.1										
07-187															
	1	0-2	Gray and tan FAT CLAY	CH	43.7	73.8									
	2	2-4	Tan and gray FAT CLAY	CH	35.7	82.2									
	3	4-6	Gray FAT CLAY	CH	43.9	75.7	80	24	56	95.1		0.66	4.3		45 degree
	4	6-8	Gray and tan FAT CLAY	CH	44.4	75.0									
	5	8-10	Gray and tan FAT CLAY	CH	52.1	66.3	93	25	68	87.7		0.49	2.2		Slickensided
	6	10-12	Tan and light gray FAT CLAY	CH	36.3	81.2									
	7	12-14	Tan and light gray FAT CLAY	CH	33.9	84.8									
	8	14-16	Gray and tan FAT CLAY with SAND	CH	19.3	95.4	58	20	38	74.2		0.81	4.5		45 degree
	9	16-18	Gray and tan FAT CLAY with SAND	CH	18.4	109.6									
	10	18-20	Tan and light gray FAT CLAY	CH	35.4	87.3	64	21	43	92.0		0.84	8.1		Multiple shear
	11	20-22	Tan and light gray FAT CLAY; calcareous nodules	CH	31.5	88.6									
	12	22-24	Gray and tan FAT CLAY	CH	46.2	69.4									
	13	24-26	Dark gray and tan FAT CLAY	CH	54.5	66.7	107	28	79	98.7		0.89	2.2		Slickensided
	14	26-27.5	Gray and tan SANDY LEAN CLAY	CL	39.9										
	15	27-29.5	Gray and tan SILTY SAND	SM						40.9					
	16	32-34	Gray SILTY SAND	SM						29.9					
	17	34-36	Gray CLAYEY SAND	SC	29.6		27	15	12	46.5					

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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
	18	36-37.5	Gray SANDY SILTY CLAY	CL-ML	29.4										
	19	37.5-39.5	Gray FAT CLAY with SAND	CH	32.9	87.9									
	20	39.5-41	Gray and tan POORLY GRADED SAND with SILT	SP-SM						8.9					
	21	44.5-46	Gray POORLY GRADED SAND with SILT	SP-SM						9.1					
	22	48-50	Gray and tan FAT CLAY with SAND	CH	19.9										
07-189															
	1	0-1	Tan and gray FAT CLAY	CH											
	2	1-2	Gray FAT CLAY	CH	112.9		92	25	67	98.3					
	3	2-3	Gray and tan FAT CLAY	CH											
	4	3-4	Gray FAT CLAY	CH	64.2										
	5	4-5	Gray FAT CLAY	CH											
	6	5-6	Gray FAT CLAY	CH	73.5		103	28	75	98.2					
07-190															
	1	0-2	Gray and tan FAT CLAY	CH	42.3	77.6									
	2	2-4	Tan SILTY SAND	SM						23.2					
	3	4-6	Gray FAT CLAY	CH	49.5	69.6						0.58	4.1		Slickensided
	4	6-8	Gray and tan SANDY FAT CLAY	CH	28.9	89.8	50	20	30	51.8		0.30	4.6		Bulge
	5	8-10	Gray FAT CLAY; sand pockets	CH	59.9	72.0									
	6	10-12	Gray FAT CLAY	CH	54.9	67.3	87	24	63	96.1					
	7	12-14	Gray and tan FAT CLAY with SAND	CH	48.8	74.7									
	8	14-15.5	Tan and gray SILTY SAND	SM						23.3					
	9	19-20.5	Tan SILTY SAND	SM						19.3					
	10	22-24	FAT CLAY with SAND	CH	44.1	75.1	66	22	44	81.3		0.36	15.0		Bulge
	11	24-26	Tan and gray SILTY SAND	SM						27.5					
	12	26-27.5	Gray and tan SILTY SAND	SM						25.2					
	13	30-31.5	Gray FAT CLAY with SAND	CH	36.3										
	14	32-33.5	Gray FAT CLAY with SAND	CH	51.2		62	21	41	83.1					
	15	34-35.5	Gray FAT CLAY	CH	41.1										
	16	35.5-37.5	Gray FAT CLAY	CH	55.5	67.3									
	17	37.5-39.5	Gray FAT CLAY	CH	56.6	66.5	68	22	46	95.7					
	18	39.5-41.5	Gray FAT CLAY; sand pockets	CH	34.8	82.7									
	19	41.5-43.5	Gray LEAN CLAY with SAND	CL	26.9	84.0	49	19	30	70.3		0.48	9.3		Vertical shear
	20	43.5-45.5	Gray FAT CLAY; sand pockets	CH	34.2	83.9									
	21	45.5-47.5	Gray FAT CLAY with SAND	CH	32.7	88.8	51	19	32	81.4		0.29	5.7		45 degree
	22	47.5-49	Gray and tan FAT CLAY; sand pockets	CH	23.9	85.9									
	23	49-50	Gray FAT CLAY; sand pockets	CH	40.9	79.6									
07-191															

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TOLUNAY-WONG ENGINEERS, INC.

