TOLUNAY-WONG ENGINEERS, INC.

Boring No.	Sample No.	Sample Depth (feet)	Elevation (feet)	Pocket Pen. (tsf)	Soil Description	USCS	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Finer than No. 200 (%)	Unit Dry Weight (pcf)	Dev./Compr. Stress (tsf)	Failure Strain (%)	Confining Pressure (psi)	Failure Type
	8	14-16	40.15	3.25	Gray and tan FAT CLAY	CH	20.6									
	9	16-18	38.15	4.50	Gray and tan FAT CLAY	CH	19.5									
	10	18-20	36.15	3.00	Gray and reddish-brown FAT CLAY	CH	22.8									
	11	20-22	34.15	4.00	Gray and reddish-brown FAT CLAY	CH	19.3									
	12	22-24	32.15	3.25	Gray and tan FAT CLAY	CH	19.8									
	13	24-25	31.15	4.50	Gray and reddish-brown FAT CLAY; calcareous nodules	CH	20.6									
07-33	N 13842900.96, E 3155618.63															
	1	0-2		4.50	Gray and reddish-brown FAT CLAY	CH	19.7									
	2	2-4		4.50	Reddish-brown and gray FAT CLAY	CH	21.2									
	3	4-6		3.75	Reddish-brown and gray FAT CLAY	CH	26.8									
	4	6-8		1.75	Reddish-brown and gray FAT CLAY	CH	32.6									
	5	8-10		1.50	Reddish-brown and gray FAT CLAY	CH	39.8	96	29	67		79.1	1.18	1.6		Slickensided
	6	10-12		2.00	Dark gray FAT CLAY	CH	24.6									
	7	12-14		2.50	Tan and gray FAT CLAY	CH	28.0									
	8	14-16		3.75	Gray and tan FAT CLAY	CH	19.8									
	9	16-18		3.50	Reddish-brown and gray FAT CLAY	CH	32.0									
	10	18-20		2.25	Dark gray and tan FAT CLAY	CH	23.3									
	11	20-22		2.75	Gray and reddish-brown FAT CLAY	CH	22.8									
	12	22-24		2.50	Tan and gray FAT CLAY	CH	20.1									
	13	24-26		4.50	Dark gray and reddish-brown FAT CLAY	CH	19.6									
	14	26-28		3.00	Reddish-brown and gray FAT CLAY	CH	29.4									
	15	28-30		2.75	Dark gray abnd tan FAT CLAY; rotten roots	CH	29.0									
	16	30-32		2.50	Reddish-brown and gray FAT CLAY	CH	30.2									
	17	32-34		2.75	Gray and reddish-brown FAT CLAY	CH	24.7	80	23	57		98.2	1.90	2.4		Vertical shear
	18	34-36		2.00	Tan and gray FAT CLAY; calcareous deposits	CH	26.1									
	19	36-38		2.00	Tan and gray FAT CLAY; calcareous nodules	CH	27.9									
	20	38-40		3.25	Reddish-brown and gray FAT CLAY	CH	23.3									
07-39	N 13839159.80, E 3155103.19		57.61													
	2	2.5-4	53.61		Tan SAND with SILT	SP-SM					8.0					
	3	4.5-6	51.61		Tan and gray SILTY SAND; organics	SM					13.9					
07-40	N 13839514.76, E 3155031.32		53.46													
	1	0-2	51.46		Tan SAND with SILT	SP-SM					8.9					
	2	2.5-4	49.46		Dark gray SILTY SAND; organics	SM					19.1					
	3	4.5-6	47.46		Tan and gray SANDY LEAN CLAY	CL					64.4					
07-41	N 13839120.75, E 3154939.15		55.50													
	1	0-2	53.50		Tan and gray SILTY SAND; grass roots	SM					12.8					
	2	2.5-4	51.50		Tan and gray SILTY SAND	SM					15.6					
	3	4.5-6	49.50		Tan and gray SILTY SAND	SM					14.2					
07-42	N 13839419.10, E 3154899.16		53.54													
	1	0-2	51.54		Dark gray SILTY SAND; rotten grass roots	SM					17.8					
	2	2.5-4	49.54		Gray and tan SANDY LEAN CLAY; organics	CL					68.4					
07-43	N 13838731.74, E 3154300.47		58.72													
	1	0-2	56.72		Tan and gray SAND with SILT; shell fragments	SP-SM					11.0					
	2	2.5-4	54.72		Tan and gray SILTY SAND; shell fragments	SM					14.5					
	3	4.5-6	52.72		Tan and gray SANDY SILT	ML					57.9					
07-44	N 13838909.79, E 3154179.82		56.46													
	1	0-2	54.46		Tan SAND with SILT	SP-SM					7.6					
	2	2.5-4	52.46		Tan and gray SILTY SAND	SM					18.4					
	3	4.5-6	50.46		Tan and gray SILTY SAND	SM					13.7					
07-45	N 13838950.20, E 3154511.58		55.37													
	1	0-2	53.37		Tan SAND with SILT	SP-SM					9.3					
	2	2.5-4	51.37		Gray and tan SILTY SAND; organics	SM					16.7					
	3	4.5-6	49.37		Tan and gray SILTY SAND	SM					21.4					
07-46	N 13839041.98, E 3154756.69		54.77													
	1	0-2	52.77		Gray and tan SILTY SAND; grass roots	SM					15.0					
	2	2.5-4	50.77		Dark gray SILTY SAND; organics	SM					34.3					

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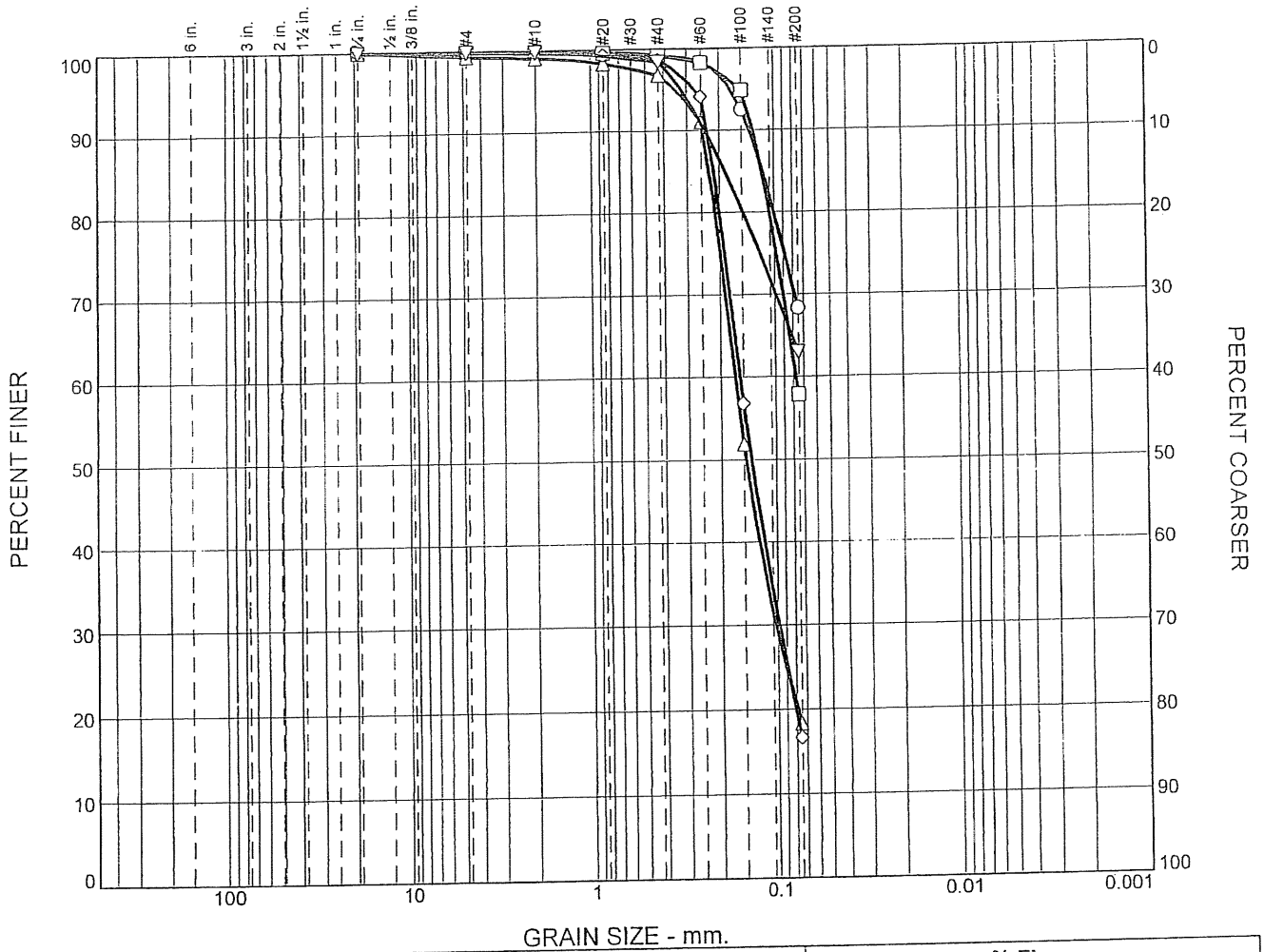
Grain Size Analysis - ASTM D 422



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	0.2	0.6	30.7	68.4	
□	0.0	0.0	0.0	0.1	0.7	41.3	57.9	
△	0.0	0.0	0.7	0.2	2.3	78.4	18.4	
◇	0.0	0.0	0.1	0.2	1.0	82.0	16.7	
▽	0.0	0.0	0.1	0.0	1.5	35.5	62.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	07-42	2	2.5-4	Gray and tan SANDY LEAN CLAY; organics	CL
□	07-43	3	4.5-6	Tan and gray SANDY SILT	ML
△	07-44	2	2.5-4	Tan and gray SILTY SAND	SM
◇	07-45	2	2.5-4	Gray and tan SILTY SAND; organics	SM
▽	07-46	3	4.5-6	Tan and gray SANDY SILT; rotten tree roots	ML

Tolunay-Wong Engineers, Inc.
Houston, Texas

Client: U. S. Army Corps of Engineers
Project: House Tract Placement Area
Contract No. DACW64-03-D-0008, Task Order 0067
Project No.: 07.18.922

Hole No. 07-45

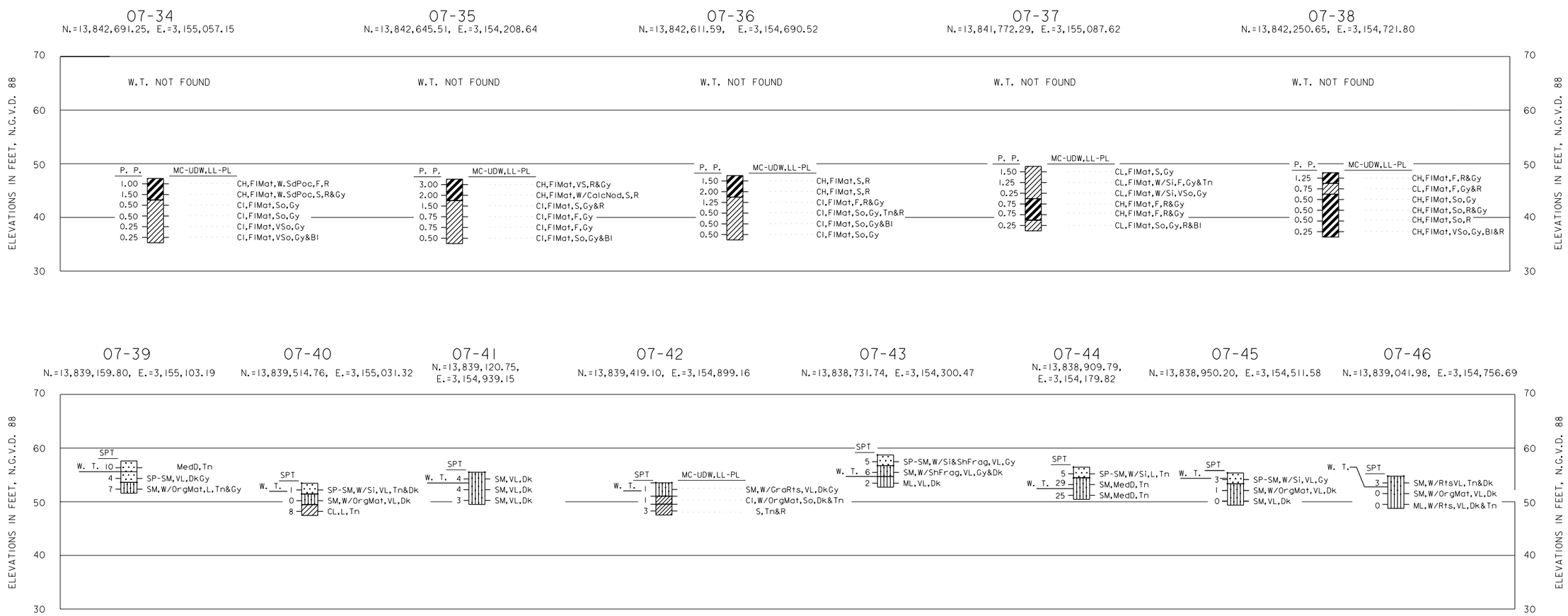
BORING LOG	DISTRICT	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT House Tract Placement Area	7. ELEVATION OF HOLE 55.40 ft
2. LOCATION (Coordinates or Station) N=13838950.20 E=3154511.58	8. DATUM FOR ELEVATION
3. DRILLING AGENCY T.R.I.	9. ELEVATION OF GROUNDWATER ▽ TOD: 54.4 ft ▼ 24-HR:
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.	10. DRILLING DATE and TIME STARTED: 4/20/07 COMPLETED: 4/20/07
5. DEPTH OF WATER ▽ TOD: 1 ft ▼ 24-HR:	11. CLASSIFICATION REFERENCE
6. DEPTH OF HOLE 6 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)
	▽ 53.4		**POORLY GRADED SAND w/ SILT(SP-SM)**, very loose, tan	X	1		3							9.3
			SILTY SAND(SM), very loose, tan & gray -w/ organics @ 2' - 4'	X	2		1							16.7
5	49.4			X	3		0							21.4
			Boring terminated at 6 ft.											
10														
15														
20														
25														
30														

SWG 1836 BOR 03.14.859-057.GPJ TOLUNAY-WONG ENGINEERS.GDT 3/4/08

ENG FORM: SWG 1836 BOR



NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH ASTM 2487-06 "CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES (UNIFIED SOILS CLASSIFICATION SYSTEM)". CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION, POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(B.L.S.)* FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED.WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABLILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.
5. THE HORIZONTAL DATUM IS NAD 83. THE VERTICAL DATUM IS NAVD 88.

VISUAL CLASSIFICATIONS:

Bl Black	El Elastic	Nod Nodules	Si Silty
Ba Ball(s)	F Firm	Org Organic	Slks Slicken Sides
Bn Brown(ish)	Frag Fragment(s)	Or Orange	Sms Seams
Calc Calcareous	Gy Gray(ish)	Poc Pocket(s)	So Soft
Cl Clay(ey)	H Hard	R Red(dish)	Tn Tan(nish)
Conc Concrete	Hcbn Hydrocarben	Rts Root(s)	V Very
D Dense	L Loose	S Stiff	W.T. Water Table
Dep Deposit(s)	Med Medium	Sd Sand(y)	W With
Dk Dark	N. Rec. No Record	Sh Shell(y)	

LABORATORY CLASSIFICATIONS:

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.

CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.

MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.

ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.

SM SILTY SANDS, SAND-SILT MIXTURES.

SW WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

SOLICITATION NO.
W912HY-
08-B-0016

US Army Corps of Engineers
Galveston District

TIME:$TIME$

Rev.	Description	Date	By

DATE:$DATE$ BY:$USER$

Drawn by:
Designed by: SK,SL,RB
Checked by: SL,RB
Submitted by: LORI K. THOMAS, P.E. Dist.Geotech & Structure Section
Approved by: PETE G. PEREZ, P.E. Chief, Engineering and Construction Division

Date: APRIL, 2008
Scale: AS SHOWN
Rev. --
Approval Recommended: HARRISON T. SUTCLIFFE, P.E. Chief, Engineering Branch

U.S. ARMY ENGINEER DISTRICT, GALVESTON
CORPS OF ENGINEERS
GALVESTON, TEXAS

PREPARED UNDER THE DIRECTION OF
DAVID C. WESTON, Col., C.E.,
DISTRICT COMMANDER

HOUSTON SHIP CHANNEL, TEXAS
HOUSE TRACT PLACEMENT AREA
INTERIOR REHABILITATION, EXTERIOR LEVEE
REHABILITATION, AND DRAINAGE DITCH REPAIR

LOGS OF BORINGS

Drawing No.:
F-46
Sheet 49 of 49

File No. HSC 401-515

File:$FILE$