

APPENDIX A LOG OF BORINGS

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UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)

MAJOR DIVISIONS			GRAPHIC LOG		TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu < 4 and/or 1 > Cc > 3		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5 to 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH >12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu < 6 and/or 1 > Cc > 3		SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5 to 12% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu < 6 and/or 1 > Cc > 3		SP-SM	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH >12% FINES			SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY,	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	SILTS AND CLAYS (Liquid limit greater than 50)			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY	
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT	
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
				OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY	



UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)
 DAD'S POINT
 STOCKTON, CALIFORNIA

PLATE

A-1

Drafted By: G. GOMEZ Project No.: 92459.G11
 Date: 12/23/2009 File Number: STO9G087

LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	TXCU	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (EM 1110-1-1906)
	SHELBY TUBE	EI	EXPANSION INDEX (UBC STANDARD 18-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)	MC	MOISTURE CONTENT (ASTM Test Method D 2216)
	SEEPAGE		

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods. Where laboratory tests were performed, the designations reflect the laboratory test results.



LOG KEY
DAD'S POINT
STOCKTON, CALIFORNIA

PLATE

A-2

Drafted By: G. GOMEZ
Date: 12/23/2009

Project No.: 92459.G11
File Number: STO9G087

Surface Conditions: Relatively level, covered by grassDate Completed: 12/22/2009Groundwater: Groundwater not encountered during drilling.Logged By: S.P.Method: Continuous flight hollow stem augerTotal Depth: 21.5 feetEquipment: CME 850 Tire mounted drill rig with automatic hammer systemBoring Diameter: 8 inches

Depth (feet)	FIELD				LABORATORY						Graphic Log	DESCRIPTION
	Sample Type	Sample No.	Blows/Foot	Pocket Penetrometer (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)		
5	1-2-1											(CL) LEAN CLAY - Dark brown, moist, soft to firm
												Mottled orange, soft
	1-6-1					30	47	27	87		Vane shear test Su = 1,399psf	
											Vane shear test Su = 979psf	(CL-ML) SILTY CLAY WITH SAND - Brown, highly moist, very soft
10											Vane shear test Su = 824psf	Mottled orange
	1-12-1					30	40	21	83			Wet
15	1-15-1					33					Organic content = 2.8% Vane shear test Su = 1,043psf Vane shear test Su = 1,276psf	(CL) SANDY SILTY CLAY - Gray, wet, soft, medium plastic
20	1-20-1		7	0.75	84	38					Organic content = 2.6%	(SM-ML) SANDY SILT/SILTY SAND - Gray, wet, with mica Completed at a depth of 21.5 feet below existing site grade.
25												



LOG OF BORING B-1
DAD'S POINT
STOCKTON, CALIFORNIA

PLATE

1 of 1

A-3

Drafted By: G. GOMEZ

Project No.: 92459.G11

Date: 1/6/2010

File Number: STO9G087

Surface Conditions: Relatively level, covered by grassDate Completed: 12/22/2009Groundwater: Groundwater not encountered during drilling.Logged By: S.P.Method: Continuous flight hollow stem augerTotal Depth: 20 feetEquipment: CME 850 Tire mounted drill rig with automatic hammer systemBoring Diameter: 8 inches

Depth (feet)	FIELD				LABORATORY						Graphic Log	DESCRIPTION
	Sample Type	Sample No.	Blows/Foot	Pocket Penetrometer (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)		
5	X	2-3-1	2-3-1									(CH) FAT CLAY - Brown to dark brown, moist, soft to firm, medium to high plastic
7	X	2-7-1	2-7-1									Highly moist, brownish gray, mottled orange and yellow, medium plastic
10	X	2-10-1	2-10-1			33	60	37	94	Vane shear test Su = 1,539psf		
15	X	2-15-1	2-15-1			32				Organic content = 2.7% Vane shear test Su = 1,539psf		
20	X	2-19-1	2-19-1			33	55	33		Organic content = 3.3% Vane shear test Su = 1,243psf		Completed at a depth of 20 feet below existing site grade.
25												



LOG OF BORING B-2
DAD'S POINT
STOCKTON, CALIFORNIA

PLATE

1 of 1

A-4

Drafted By: G. GOMEZ

Project No.: 92459.G11

Date: 1/6/2010

File Number: STO9G087

Copyright Kleinfelder, 2008

P:\LOG_2007 BLOWS PER 6 INCHES STO9G087.GPJ 1/6/10

Surface Conditions: Relatively level, covered by grassDate Completed: 12/22/2009Groundwater: Groundwater not encountered during drilling.Logged By: S.P.Method: Continuous flight hollow stem augerTotal Depth: 12 feetEquipment: CME 850 Tire mounted drill rig with automatic hammer systemBoring Diameter: 8 inches

Depth (feet)	FIELD				LABORATORY						Graphic Log	DESCRIPTION
	Sample Type	Sample No.	Blows/Foot	Pocket Penetrometer (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)		
5	X	3-3-1				50	65	38		96		(CH) FAT CLAY WITH SAND - Brownish gray, high in moisture, soft, mottled orange, medium to high plastic
	X	3-6-1										
10	X	3-9-1				42	55	33		85		
	X	3-11.5-1				40	55	34				
15												Water at the bottom of the boring Completed at a depth of 12 feet below existing site grade.
20												
25												

Organic content = 3.8%
Vane shear test
Su = 1,072psf



LOG OF BORING B-3
DAD'S POINT
STOCKTON, CALIFORNIA

PLATE

1 of 1

A-5

Drafted By: G. GOMEZ

Project No.: 92459.G11

Date: 1/6/2010

File Number: STO9G087

P-LOG_2007 BLOWS PER 6 INCHES STO9G087.GPJ 1/6/10

Copyright Kleinfelder, 2008

DATE STARTED 3/25/09	DATE COMPLETED 3/25/09	GROUND ELEVATION 10.3 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 100.0 ft
DRILLING CONTRACTOR Neil O. Anderson	DRILLER'S NAME James Young	HELPER'S NAME Sean McNeal	TOTAL DEPTH OF FILL 14 ft	
DRILLING METHOD HSA/Mud Rotary	DRILL RIG MAKE AND MODEL CME 75			CONSULTANT COMPANY Kleinfelder
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 10" HSA 5" Punch Core	DRILLING ROD TYPE AND DIAMETER NWJ-2-5/8" O.D. 3-1/2" O.D. to 20"			FIELD LOGGER M. Q. Shubert
☒ VERTICAL ☐ INCLINED	CASING TYPE, DIAMETER, INSTALLATION DEPTH HSA: 10" O.D./6" I.D. to 20"			FIELD LOG REVIEWER P. Dell
SAMPLER TYPE(S) SPT 2" O.D./1-3/8 I.D./2-1/2" P.C.	HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP CME Auto Hammer 140/30"			HAMMER EFFICIENCY 84%
BOREHOLE BACKFILL OR COMPLETION Grout	GROUNDWATER READING: DURING DRILLING AFTER DRILLING (DATE-TIME) 17 ft			

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
10	0		SILTY SAND (SM); dark brown (7.5YR 3/2); moist; 25% fines; 75% fine sand; weak cementation; with rootlets to 12 inches [FILL].		S01A	65			3.5P						S01A_000_005P
	1														
	2														
	3		SILT (ML); medium stiff; dark grayish brown (10YR 4/2); moist; low plasticity, low dry strength, slow dilatancy, low toughness fines; [FILL].		S01A	65			1.0P						
	4														
	5														
	6		LEAN CLAY (CL); dusky red (2.5YR 3/2); moist; 100% low plasticity, medium dry strength, no dilatancy, medium toughness fines; [FILL].		S02A	100	1 1 2 [3]	4		25					S02A_005_007S
	7														
	8														
	9		FAT CLAY with Sand (CH); soft; dark brown (7.5YR 3/2); moist; 80% high dry strength, no dilatancy, medium toughness fines; 20% fine sand; slight rootlets [FILL].		S03A	100			0.5P						S03A_007_010P
	10														
	11														
0	12		SILTY SAND (SM); dark brown (7.5YR 3/2); moist; 15% fines; 85% fine sand; [FILL].		S04A	79				33				UC	S04A_010_012T
	13														
	14														
	15		SANDY SILT (ML); dark brown (7.5YR 3/2); moist; 65% low to medium plasticity, low dry strength, slow dilatancy, low toughness fines; 35% fine sand; [FILL].		S05A	36				22					S05A_012_015P
	16														
	17														
	18		ORGANIC SILT (OL); very dark greenish gray (10BG 3/1); moist; 100% low plasticity, medium dry strength, slow dilatancy, low toughness fines.		S06A	100				34				OC UC	S06A_015_017T
	19														
	20														
	21		SILT (ML); medium stiff; very dark greenish gray (10BG 3/1); low plasticity, low dry strength, slow dilatancy, low toughness fines.		S07A	39			0.75P						S07A_017_020P
	22														
	23														

Draft 1 After Field Review 3/25/2009

	Borehole Location: <u>Penninsula</u> County: <u>San Joaquin</u>		LOG OF BORING WR0828_001B Sheet 1 of 5 Engineering Support Services Urban Levee Geotechnical Evaluations Program
	Coordinates: Northing: <u>2.171.584.34</u> Easting: <u>6.317.245.06</u>		
	Latitude: <u>37.95576</u> Longitude: <u>-121.34776</u>		
	Levee Station or Milepost: _____ Levee Mile: _____		
	Levee Segment: _____		
Survey Method: <u>GPS</u> Coordinate System: <u>NAD 83</u>			
Channel / River Name / Feature: <u>Smith Canal</u>			

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA						REMARKS	
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests			
-10	20		At 22 feet, lens of very dark greenish gray (10BG 3/1), 66% fine sand, 34% fines.		S08A	92				34	31	6		SG CU	S08A_020_022T		
21																	
22											2.5P						S09A_022_025P
23																	
	24				S09A	67			2.5P				34				
	25								3.0P								
-15	25		LEAN CLAY with Sand (CL); soft; dark greenish gray (10BG 4/1); moist; 80% medium dry strength, no dilatancy, medium toughness fines; 20% fine sand.		S10A	92	2 6 8 [14]	20		31	31	10			S10A_025_027S		
26																	
27																	S11A_027_030P
28								S11A	33			0.25P 0.25P					
29																	
-20	30																S12A_030_032S
31								S12A	100	6 7 10 [17]	24	0.5P		32	15		
32																	S13A_032_035P
33						At 33 feet, very stiff.		S13A	67			4.0P 3.5P					HD SG
34						CLAYEY SAND (SC); very dark greenish gray (10BG 3/1); moist; 40% fines; 60% fine to medium sand.											
-25	35		LEAN CLAY with Sand (CL); very stiff; dark greenish gray (10BG 4/1); moist; 80% low plasticity, medium dry strength, no dilatancy, medium toughness fines; 20% fine sand.		S14A	100	7 7 9 [16]	22	3.5P	27					S14A_035_037S		
36																	
37											2.0P						S15A_037_040P
38								S15A	61			4.0P					
39																	
-30	40		SANDY SILT (ML); medium dense; very dark greenish gray (10BG 3/1); moist; 60% no plasticity, no dry strength, rapid dilatancy, low toughness fines; 40% fine sand.		S16A	100	4 4 4 [8]	11	3.5P 3.5P	25					S16A_040_042S		
41																	
42											0.5P						S17A_042_045P
43								S17A	94			0.5P 3.5P					
44						At 44 feet, lens of very stiff; low plasticity, medium dry strength, no dilatancy, medium toughness lean clay.											
	45																

Draft 1 After Field Review 3/25/2009



Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2,171,584.34 Easting: 6,317,245.06
 Latitude: 37.95576 Longitude: -121.34776
 Levee Station or Milepost: _____ Levee Mile: _____
 Levee Segment _____
 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING
WR0828_001B

Sheet 2 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
-35	45				S18A	100	3 5 6 [11]	15	0.5P 0.5P						S18A_045_047S
46															
47															
48			At 48 feet, lens of 65% fine sand; 35% fines.		S19A	56			1.0P 1.0P 1.0P						S19A_047_050P
49															
50															
-40	50		LEAN CLAY (CL); stiff to very stiff; very dark greenish gray (10BG 3/1); moist; 90% medium dry strength, no dilatancy, medium toughness fines; 10% fine sand.		S20A	83	7 9 11 [20]	28	2.0P 2.0P	27	47	28			S20A_050_052S
51															
52															
53			SILT with Sand (ML); very stiff; very dark greenish gray (10BG 3/1); moist; 80% low plasticity, low dry strength, slow dilatancy, low toughness fines; 20% fine sand.		S21A	33			2.0P 2.5P 2.5P						S21A_052_055P
54															
55															
-45	55				S22A	100	6 8 10 [18]	25							S22A_055_057S
56															
57															
58			At 57 feet, medium stiff to stiff.		S23A	33			1.0P 1.0P						S23A_057_060P
59															
60															
-50	60		Poorly Graded SAND with Silt (SP-SM); medium dense; bluish black (10B 2.5/1); moist; 9% fines; 91% fine sand.		S24A	100	8 9 9 [18]	25					9		S24A_060_062S
61															
62															
63					S25A	83									S25A_062_065P
64															
65															
-55	65		Poorly Graded SAND (SP); medium dense; bluish black (10B 2.5/1); wet; 5% fines; 95% fine sand.		S26A	100	3 5 8 [13]	18					5		S26A_065_067S
66															
67															
68			Poorly Graded SAND with Silt (SP-SM); medium dense; bluish black (10B 2.5/1); wet; 12% fines; 88% fine sand.		S27A	61									S27A_067_070P
69															
70															

Draft 1 After Field Review 3/25/2009



Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2.171.584.34 Easting: 6.317.245.06
 Latitude: 37.95576 Longitude: -121.34776
 Levee Station or Milepost: _____ Levee Mile: _____
 Levee Segment: _____
 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING WR0828_001B

Sheet 3 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
-60	70														S28A_070_072S
	71				S28A	100	6 6 7 [13]	18					12		
	72		LEAN CLAY (CL); soft to medium stiff; greenish black (10BG 2.5/1); moist; 90% medium dry strength, slow dilatancy, low toughness fines; 10% fine sand.						0.5P						S29A_072_075P
	73				S29A	42				0.5P					
	74									0.5P					
-65	75								1.0P						S30A_075_077S
	76				S30A	100	5 5 6 [11]	15		36	31	1			
	77								1.0P						S31A_077_080P
	78				S31A	33			1.0P						
	79								1.0P						
-70	80								1.0P						S32A_080_082S
	81		SILT (ML); medium stiff; greenish black (10BG 2.5/1); moist; 90% low plasticity, low dry strength, slow dilatancy, low toughness fines; 10% fine sand.		S32A	83	5 8 9 [17]	24	1.0P						
	82									0.5P					S33A_082_085P
	83				S33A	39				0.5P					
	84														
-75	85		SILTY SAND (SM); dense; greenish black (10BG 2.5/1); moist; 41% fines; 59% fine sand.												S34A_085_087S
	86				S34A	96	14 14 17 [31]	43							
	87									0.5P					S35A_087_090P
	88				S35A	69			0.5P				41		
	89														
-80	90		Poorly Graded SAND (SP); medium dense; greenish black (10BG 2.5/1); moist; 5% fines; 95% fine to medium sand.												S36A_090_092S
	91				S36A	100	8 9 19 [28]	39							
	92									3.0P					S37A_092_095P
	93		SANDY LEAN CLAY (CL); very stiff; greenish black (10BG 2.5/1); moist; 65% medium dry strength, slow dilatancy, medium toughness fines; 35% fine sand.		S37A	61			3.0P						
	94									3.0P					
	95									3.0P					

Draft 1 After Field Review 3/25/2009

Draft 1 After Field Review 3/25/2009



Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2,171,584.34 Easting: 6,317,245.06
 Latitude: 37.95576 Longitude: -121.34776
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 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING WR0828_001B

Sheet 4 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
-85	95				S38A	100	10 12 15 [27]	38	2.5P 3.0P		34	15			S38A_095_097S
	96														
	97														
	98														
	99														
	100				S39A	61			3.0P						S39A_097_100P
-90	100	Total depth drilled 100 feet.													
	101														
	102														
	103														
	104														
-95	105														
	106														
	107														
	108														
	109														
-100	110														
	111														
	112														
	113														
	114														
-105	115														
	116														
	117														
	118														
	119														
	120														

Draft 1 After Field Review 3/25/2009

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Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2,171,584.34 Easting: 6,317,245.06
 Latitude: 37.95576 Longitude: -121.34776
 Levee Station or Milepost: _____ Levee Mile: _____
 Levee Segment _____
 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING
WR0828_001B

Sheet 5 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

DATE STARTED 3/26/09	DATE COMPLETED 3/26/09	GROUND ELEVATION 16.2 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 100.0 ft
DRILLING CONTRACTOR Neil O. Anderson	DRILLER'S NAME James Young	HELPER'S NAME Sean McNeal	TOTAL DEPTH OF FILL 8 ft	
DRILLING METHOD HSA/Mud Rotary	DRILL RIG MAKE AND MODEL CME 75		CONSULTANT COMPANY Kleinfelder	
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 10" HSA 5" Punch Core	DRILLING ROD TYPE AND DIAMETER NWJ-2-5/8" O.D./3" P.C. 3-1/2"		FIELD LOGGER M. Q. Shubert	
☒ VERTICAL ☐ INCLINED	CASING TYPE, DIAMETER, INSTALLATION DEPTH HSA: 10" O.D./6" I.D. to 20'		FIELD LOG REVIEWER P. Dell	
SAMPLER TYPE(S) SPT 2" O.D./1-3/8 I.D./2-1/2" P.C.	HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP CME Auto Hammer 140/30"		HAMMER EFFICIENCY 84%	
BOREHOLE BACKFILL OR COMPLETION Grout	GROUNDWATER READING: DURING DRILLING 17 ft		AFTER DRILLING (DATE-TIME)	

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
15	0		FAT CLAY (CH) ; stiff; very dark brown (10YR 2/2); moist; 90% medium plasticity, medium to high dry strength, no dilatancy, medium to high toughness fines; 10% fine sand; moderate rootlets for entire run.						1.5P						S01A_000_005P
	1														
	2				S01A	97			1.0P						
	3														
	4														
10	5														S02A_005_007S
	6		SANDY SILT (ML) ; stiff; dark brown (7.5YR 3/2); moist; 64% medium plasticity, low to medium dry strength, slow dilatancy, low toughness fines; 36% fine to medium sand.		S02A	100	3 3 4 [7]	10	2.0P		54	29			
	7														S03A_007_010P
	8								2.0P						
	9				S03A	47			2.0P				64		
	10														S04A_010_012S
5	11		FAT CLAY (CH) ; soft; very dark gray (2.5Y 3/1); moist; 100% medium to high plasticity, medium to high dry strength, no dilatancy, medium toughness fines.		S04A	83	4 4 6 [10]	14		28	53	31			
	12														S05A_012_015P
	13								0.5P						
	14				S05A	33			0.5P						
	15														S06A_015_017S
0	16		ORGANIC SILT (OH) ; soft; black (10YR 2/1); moist; 100% low to medium dry strength, slow dilatancy, low to medium toughness fines.		S06A	100	1 2 2 [4]	6	1.0P	40	80	43			
	17								1.0P						S07A_017_020P
	18								0.25P						
	19				S07A	33			0.25P					OC	
	20														

Draft 1 After Field Review 3/26/2009

	Borehole Location: <u>Penninsula</u> County: <u>San Joaquin</u>	LOG OF BORING WR0828_002B Sheet 1 of 5 Engineering Support Services Urban Levee Geotechnical Evaluations Program
	Coordinates: Northing: <u>2,172,006.08</u> Easting: <u>6,316,108.38</u>	
	Latitude: <u>37.95689</u> Longitude: <u>-121.35172</u>	
	Levee Station or Milepost: _____ Levee Mile: _____	
	Levee Segment _____	
	Survey Method: <u>GPS</u> Coordinate System: <u>NAD 83</u>	
	Channel / River Name / Feature: <u>Smith Canal</u>	

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA						REMARKS		
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests				
-5	20		LEAN CLAY (CL) ; very stiff; greenish black (10BG 2.5/1); moist; 90% medium plasticity, medium to high dry strength, slow dilatancy, medium toughness fines; 10% fine sand.		S08A	100	2 3 4 [7]	10	2.5P 2.5P							S08A_020_022S		
	21																	
	22																	
	23																	
	24		SILT with Sand (ML) ; stiff to very stiff; very dark greenish gray (10BG 3/1); moist; 80% low dry strength, slow dilatancy, medium toughness fines; 20% fine sand.		S09A	44			3.0P 2.5P 1.0P							S09A_022_025P		
25																		
-10	26				S10A	100	1 3 4 [7]	10	3.0P 3.0P	32	29	6		SG	S10A_025_027S			
	27															S11A_027_030P		
	28				S11A	39			1.0P									
	29																	
	30																	
-15	31					SANDY SILT (ML) ; medium dense; very dark greenish gray (10BG 3/1); moist; 47% low plasticity, low dry strength, rapid dilatancy, low toughness fines; 53% fine sand.		S12A	83	2 3 5 [8]	11	1.0P 1.0P					47	
	32															S13A_032_035P		
	33																	
	34																	
	35		Below 35 feet, soft.		S14A	100	3 4 8 [12]	17	0.25P 0.25P							S14A_035_037S		
-20	36																	
	37																S15A_037_040P	
	38					SILTY SAND (SM) ; medium dense; very dark greenish gray (10BG 3/1); moist; 35% fines; 65% fine sand.		S15A	83			0.25P 0.25P		24				
	39																	
	40																	S16A_040_042S
-25	41							S16A	100	3 3 6 [9]	13	0.25P 0.25P						
	42															S16A_042_045P		
	43																	
	44																	
	45		SILTY SAND (SM) ; medium dense; very dark greenish gray (10BG 3/1); wet; 14% fines; 74% fine to coarse,						0.25P 0.25P									

Draft 1 After Field Review 3/26/2009



Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2,172,006.08 Easting: 6,316,108.38
 Latitude: 37.95689 Longitude: -121.35172
 Levee Station or Milepost: _____ Levee Mile: _____
 Levee Segment _____
 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING WR0828_002B

Sheet 2 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA						REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests		
	45		angular to subangular sand; 12% fine, angular to subangular gravel.		S18A	100	4 4 6 [10]	14						14	S18A_045_047S	
-30	46															
	47		SANDY LEAN CLAY (CL); soft to stiff; very dark greenish gray (10BG 3/1); moist; 58% low to medium dry strength, slow dilatancy, low toughness fines; 42% fine sand.		S19A	83			1.0P 1.5P						S19A_047_050P	
	48															
	49															
	50															
	51				S20A	88	2 3 2 [5]	7		32	31	10	58	SG	S20A_050_052S	
-35	52															
	53															
	54															
	55				S21A	56			0.25P 0.25P						S21A_052_055P	
	56															
	57															
	58															
	59				S22A	92	2 1 2 [3]	4	1.0P						S22A_055_057S	
-40	60															
	61															
	62															
	63				S23A	56			2.0P 2.0P						S23A_057_060P	
	64															
	65															
	66															
	67		SILTY SAND (SM); dense to very dense; bluish black (10B 2.5/1); wet; 32% fines; 68% fine sand.		S24A	83	24 32 32 [64]	90	3.0P 3.0P						S24A_060_062S	
-45	68															
	69															
	70															
	71				S25A	25			3.5P	12			32		S25A_062_065P	
	72															
	73															
	74															
	75				S26A	83	16 16 17 [33]	46	1.5P 1.5P						S26A_065_067S	
-50	76															
	77															
	78															
	79				S27A	83			1.5P 0.25P						S27A_067_070P	
	80															
	81															
	82															

Draft 1 After Field Review 3/26/2009



Borehole Location: Penninsula County: San Joaquin
 Coordinates: Northing: 2,172,006.08 Easting: 6,316,108.38
 Latitude: 37.95689 Longitude: -121.35172
 Levee Station or Milepost: _____ Levee Mile: _____
 Levee Segment _____
 Survey Method: GPS Coordinate System: NAD 83
 Channel / River Name / Feature: Smith Canal

LOG OF BORING WR0828_002B

Sheet 3 of 5

Engineering Support Services
Urban Levee Geotechnical Evaluations
Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	
	70		Poorly Graded SAND with Silt (SP-SM); dense; bluish black (10B 2.5/1); wet; 8% fines; 92% fine to medium sand.		S28A	100	8 13 18 [31]	43					8		S28A_070_072S
-55	71														
	72														
	73														
	74				S29A	78									S29A_072_075P
	75		SILTY SAND (SM); dense to very dense; bluish black (10B 2.5/1); wet; 83% fine to medium sand; 17% fines.		S30A	83	18 18 19 [37]	52					17		S30A_075_077S
-60	76														
	77														
	78														
	79				S31A	56									S31A_077_080P
	80		At 83 feet, 7% fine, subrounded gravel, 74% fine to coarse, subrounded to rounded sand; 19% fines.		S32A	100	13 16 19 [35]	49							S32A_080_082S
-65	81														
	82														
	83														
	84				S33A	33							19		S33A_082_085P
	85		SANDY SILT (ML); medium dense to dense; dark bluish gray (10B 4/1); wet; 70% low plasticity, medium dry strength, slow dilatancy, low to medium toughness fines; 30% fine sand; weak reaction with HCl; weak cementation.		S34A	83	5 8 9 [17]	24							S34A_085_087S
-70	86														
	87														
	88														
	89				S35A	44									S35A_087_090P
	90				S36A	100	10 14 21 [35]	49							S36A_090_092S
-75	91														
	92														
	93														
	94				S37A	35									S37A_092_095P
	95														

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LOG OF BORING WR0828_002B

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Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N ₆₀ (ASTM)	PP or TV, tsf	LABORATORY DATA					REMARKS		
										Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests			
	95														S38A_095_097S		
-80	96				S38A	75	6 13 21 [34]	48									
	97																S39A_097_100P
	98																
	99					S39A	39										
	100	Total depth drilled 100 feet.															
-85	101																
	102																
	103																
	104																
	105																
-90	106																
	107																
	108																
	109																
	110																
-95	111																
	112																
	113																
	114																
	115																
-100	116																
	117																
	118																
	119																
	120																

Draft 1 After Field Review 3/26/2009

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Borehole Location: Penninsula County: San Joaquin
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Sheet 5 of 5

Engineering Support Services
 Urban Levee Geotechnical Evaluations
 Program