


















































GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	GW Well-graded GRAVEL Well-graded GRAVEL with SAND		CL Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	GP Poorly graded GRAVEL Poorly graded GRAVEL with SAND		CL-ML SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	GW-GM Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		ML SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	GW-GC Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	GP-GM Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND		OL ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
	GP-GC Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		OH ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	GM Silty GRAVEL Silty GRAVEL with SAND		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	GC Clayey GRAVEL Clayey GRAVEL with SAND		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	GC-GM Silty, Clayey GRAVEL Silty, Clayey GRAVEL with SAND		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SW Well-graded SAND Well-graded SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SP Poorly graded SAND Poorly graded SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SW-SM Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SW-SC Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SP-SM Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SP-SC Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SM Silty SAND Silty SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SC Clayey SAND Clayey SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SC-SM Silty, Clayey SAND Silty, Clayey SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	PT PEAT		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND

FIELD AND LABORATORY TESTS

C	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
M	Moisture Content (ASTM D 2216-05)
OC	Organic Content (ASTM D 2974-07)
P	Permeability (CTM 220 - 05)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
PL	Point Load Index (ASTM D 5731-05)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223-96 [2004])
WA	Wash Analysis (ASTM D 1140-97)




SAMPLER GRAPHIC SYMBOLS

	Standard Penetration Test (SPT)
	Standard California Sampler
	Modified California Sampler
	Shelby Tube
	Piston Sampler
	NX Rock Core
	HQ Rock Core
	Bulk Sample
	Other (see remarks)

DRILLING METHOD SYMBOLS

	Auger Drilling		Rotary Drilling		Dynamic Cone or Hand Driven		Diamond Core
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WATER LEVEL SYMBOLS

	First Water Level Reading (during drilling)
	Static Water Level Reading (short-term)
	Static Water Level Reading (long-term)



Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BORING RECORD LEGEND

UCSD Steel Pile Research.gpj

Project Number: 21-601

Date: 4-29-24

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CONSISTENCY OF COHESIVE SOILS				
Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS	
Descriptor	SPT N_{60} - Value (blows / foot)
Very Loose	0 - 4
Loose	5 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	> 50

MOISTURE	
Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS	
Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE		
Descriptor		Size
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS	
Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION	
Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

NOTE:

This legend sheet provides descriptors and associated criteria for required soil description components only. Refer to Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2022 Edition), Section 2, for tables of additional soil description components and discussion of soil description and identification.

REF = Refusal; During drilling seating interval (first 6-inch interval) is not achieved.



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Geotechnical and Earthquake Engineering

BORING RECORD LEGEND

UCSD Steel Pile Research.gpj

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SPT CAL

SPT HAMMER ENERGY MEASUREMENTS

Prepared for;
Tri-County Drilling
9631 Candida St
San Diego, CA 92126

Prepared by;

(858) 271-0099

SPT CAL
5512 Belem Dr
Chino Hills, CA 91709

Energy Measurement Test for Dynamic Penetrometers
Standard Penetration Tests (SPT)

Date: 10/05/2023

909-730-2161
bc@sptcal.com

Location: San Diego, CA

Drill: Rig 77


Energy Transfer Ratio = 80.4% @ 43.9 blows per minute

Hammer Energy Measurements performed per ASTM D4633 using an approved and calibrated SPT Analyzer 8G from Pile Dynamics, Inc. meeting the criteria of ASTM D4633-05 and per the process defined in ASTM D4633-05, The process and equipment requirements followed per ASTM D4633-05 meet the criteria of ASTM D4633-16.

LOGGED BY WD	BEGIN DATE 4-19-24	COMPLETION DATE 4-19-24	BOREHOLE LOCATION Northing: ft Easting: ft	HOLE ID BH-1
DRILLING CONTRACTOR TriCounty Drilling				SURFACE ELEVATION (MLLW)
DRILLING METHOD Hollow-Stem Auger	DRILL RIG Dietrich D-120			BOREHOLE DIAMETER 8"
SAMPLER TYPE(S) AND SIZE(S) (ID) Mod Cal (2.4"), Shelby (2.87"), SPT (1.4")	SPT HAMMER TYPE Automatic Hammer 140 lb 30 inch drop			HAMMER EFFICIENCY, ERI 80.4%
GROUNDWATER DEPTH: DURING DRILLING Not Encountered				TOTAL DEPTH OF BORING 26.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		CLAYEY SAND (SC); medium dense; yellowish brown; moist; about 9% fine GRAVEL, max. 1/2 in. dia.; about 45% fine SAND; about 46% low plasticity fines; weak cementation.	X	D-1	8 8 11	19	100		13.8	110.7				DS, PI, PA
1	1														
2	2														
3	3		About 9% fine GRAVEL; about 48% fine SAND; about 43% low plasticity fines; weak cementation.		T-2			100		11.7	122.3				DS, PA
4	4														
5	5		About 7% fine GRAVEL, max. 3/8 in. dia.; about 49% fine SAND; about 42% low plasticity fines; weak cementation.	X	D-3	8 11 13	24	100		15.3	109.7				PI, UU, PA
6	6														
7	7														
8	8		SILTY, CLAYEY SAND (SC-SM); yellowish brown; moist; about 3% fine GRAVEL, max. 3/8 in. dia.; about 65% fine SAND; about 32% low plasticity fines; weak cementation.		T-4			100		11.6	106.9				DS, PI, PA
9	9														
10	10		CLAYEY SAND (SC); medium dense; yellowish brown; moist; about 1% fine GRAVEL, max. 3/8 in. dia.; about 62% fine SAND; about 31% low plasticity fines; weak cementation.	X	D-5	7 11 18	29	100		13.6	114.6				PI, UU, PA
11	11														
12	12														
13	13		About 2% fine GRAVEL, max. 0.187 in. dia.; about 70% fine SAND; about 28% low plasticity fines; weak cementation.	X	D-6	10 16 20	36	100		10.8	106.3				PA
14	14														
15	15		SILTY, CLAYEY SAND (SC-SM); medium dense; yellowish brown; moist; about 2% fine GRAVEL, max. 3/8 in. dia.; about 62% fine SAND; about 36% low plasticity fines; weak cementation.	X	D-7	5 6 10	16	100		14.2	108.9				DS, PI, PA
16	16														
17	17														
18	18			X	S-8	3 7 9	16	28							
19	19														
20	20		CLAYEY SAND (SC); dense; yellowish brown; moist; about 75% medium to fine SAND; about 25% low plasticity fines; weak cementation.	X	D-9	7 20 36	56	100		12.9	112.3				PA
21	21														
22	22														
23	23		Poorly-graded SAND very dense; yellowish brown; moist; mostly medium to fine SAND; trace nonplastic fines; weak cementation; TERRACE DEPOSITS (Qt).	X	S-10	12 25 34	59	44							
24	24														
25	25														

(continued)

 Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	PROJECT NAME UCSD Steel Pile Research.gpj		HOLE ID BH-1
	PREPARED BY CP	DATE 4-29-24	SHEET 1 of 2

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
25			Poorly-graded SAND (<i>continued</i>).		S-11	13	63	44							
26						28									
27			Bottom of borehole at 26.5 ft bgs. Notes:			35									
28															
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31															
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34															
35															
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Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

PROJECT NAME
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HOLE ID
BH-1

PREPARED BY
CP

DATE
4-29-24

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LOGGED BY WD	BEGIN DATE 4-19-24	COMPLETION DATE 4-19-24	BOREHOLE LOCATION Northing: ft Easting: ft	HOLE ID BH-2
DRILLING CONTRACTOR TriCounty Drilling				SURFACE ELEVATION (MLLW)
DRILLING METHOD Hollow-Stem Auger	DRILL RIG Dietrich D-120			BOREHOLE DIAMETER 8"
SAMPLER TYPE(S) AND SIZE(S) (ID) Mod Cal (2.4"), Shelby (2.87"), SPT (1.4")	SPT HAMMER TYPE Automatic Hammer 140 lb 30 inch drop			HAMMER EFFICIENCY, ERI 80.4%
GROUNDWATER DEPTH: DURING DRILLING Not Encountered				TOTAL DEPTH OF BORING 26.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0			CLAYEY SAND (SC); medium dense; yellowish brown; moist; about 6% fine GRAVEL, max. 1/2 in. dia.; about 47% fine SAND; about 47% low plasticity fines; weak cementation.	X	D-1	9 10 11	21	100		13.4	111.5				PI, UU, PA
1															
2															
3			About 7% fine GRAVEL, max. 3/4 in. dia.; about 53% fine SAND; about 40% low plasticity fines; weak cementation.		SH-2			100		11.8	118.0				UU, PA
4															
5			About 4% fine GRAVEL, max. 1/2 in. dia.; about 50% fine SAND; about 46% low plasticity fines; weak cementation.	X	D-3	7 12 18	30	100		14.6	113.6				DS, PI, PA
6															
7															
8			SILTY, CLAYEY SAND (SC-SM); medium dense; yellowish brown; moist; about 3% fine GRAVEL, max. 1/2 in. dia.; about 64% fine SAND; about 33% low plasticity fines; weak cementation.		SH-4			100		11.4	105.7				DS, PI, PA
9															
10			About 65% fine SAND; about 35% low plasticity fines; weak cementation.	X	D-5	6 9 8	17	100		13.5	110.5				DS, PI, PA
11															
12															
13			CLAYEY SAND (SC); medium dense; yellowish brown; moist; about 3% fine GRAVEL, max. 1/2 in. dia.; about 66% fine SAND; about 31% low plasticity fines; weak cementation.	X	D-6	14 19 23	42	100		11.3	111.9				PA
14															
15			About 1% fine GRAVEL, max. 3/8 in. dia.; about 58% fine SAND; about 41% low plasticity fines; weak cementation.	X	D-7	10 15 24	39	100		14.3	114.4				DS, PI, PA
16															
17															
18				X	S-8	5 5 8	13	44							
19															
20			About 74% fine SAND; about 26% low plasticity fines; weak cementation.	X	D-9	11 20 38	58	100		12.7	115.2				PA
21			Poorly-graded SAND dense; yellowish brown; moist; mostly medium to fine SAND; trace nonplastic fines; weak cementation; TERRACE DEPOSITS (Qt).												
22															
23			Very dense; mostly fine SAND.	X	S-10	20 43 50/5"		67							
24															
25															

(continued)



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HOLE ID
BH-2

PREPARED BY
CP

DATE
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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
25			Poorly-graded SAND (<i>continued</i>).		S-11	30	73	100							
26						28									
27			Bottom of borehole at 26.5 ft bgs. Notes:			45									
28															
29															
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