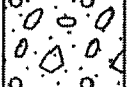
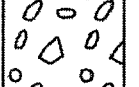
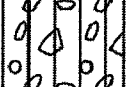
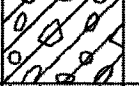
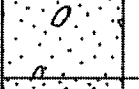







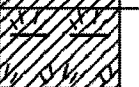

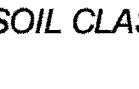





UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)					
MAJOR DIVISIONS		USCS		TYPICAL DESCRIPTIONS	
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SANDS	MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
		CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
FINE-GRAINED SOILS	SANDS	50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE		SM	SILTY SANDS, SAND-SILT MIXTURES
		MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SANDS	50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS


NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS


LEGEND


 (2-INCH) O.D. STANDARD PENETRATION TEST


 (3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE


 SHELBY TUBE SAMPLE


 GRAB SAMPLE


 CORE SAMPLE


 WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING


 WATER LEVEL OBSERVED IN BORING AFTER DRILLING


 WATER LEVEL OBSERVED IN BORING OVERNIGHT

 LL LIQUID LIMIT (NP=NON-PLASTIC)

 PI PLASTICITY INDEX (NP=NON-PLASTIC)

 TV TORVANE SHEAR (tsf)

 PEN POCKET PENETROMETER (tsf)

 UC UNCONFINED COMPRESSION (ksf)


 TXUU UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate A-0.1

GEOLABS, INC. CLASSIFICATION*			
GRANULAR SOIL (- #200 <50%)		COHESIVE SOIL (- #200 ≥50%)	
<ul style="list-style-type: none">• PRIMARY constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e., GRAVEL, SAND)• SECONDARY constituents are composed of a percentage less than the primary constituent. If the soil mass consists of 12 percent or more fines content, a cohesive constituent is used (SILTY or CLAYEY); otherwise, a granular constituent is used (GRAVELLY or SANDY) provided that the secondary constituent consists of 20 percent or more of the soil mass. Secondary constituents are capitalized and bold (i.e., SANDY GRAVEL, CLAYEY SAND) and precede the primary constituent.• accessory descriptions compose of the following: <u>with some: ≥12%</u> <u>with a little: 5 - 12%</u> <u>with traces of: <5%</u> accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY GRAVEL with a little sand)		<ul style="list-style-type: none">• PRIMARY constituents are based on plasticity. Primary constituents are capitalized and bold (i.e., CLAY, SILT)• SECONDARY constituents are composed of a percentage less than the primary constituent, but more than 20 percent of the soil mass. Secondary constituents are capitalized and bold (i.e., SANDY CLAY, SILTY CLAY, CLAYEY SILT) and precede the primary constituent.• accessory descriptions compose of the following: <u>with some: ≥12%</u> <u>with a little: 5 - 12%</u> <u>with traces of: <5%</u> accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY CLAY with some sand)	
EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 15% Fines. Described as: SILTY GRAVEL with some sand			

RELATIVE DENSITY / CONSISTENCY						
Granular Soils			Cohesive Soils			
N-Value (Blows/Foot)		Relative Density	N-Value (Blows/Foot)		PP Readings (tsf)	Consistency
SPT	MCS		SPT	MCS		
0 - 4	0 - 7	Very Loose	0 - 2	0 - 4		Very Soft
4 - 10	7 - 18	Loose	2 - 4	4 - 7	< 0.5	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	0.5 - 1.0	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	1.0 - 2.0	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	2.0 - 4.0	Very Stiff
			> 30	> 55	> 4.0	Hard

MOISTURE CONTENT DEFINITIONS

Dry: Absence of moisture, dry to the touch

Moist: Damp but no visible water

Wet: Visible free water, usually soil is below water table

GRAIN SIZE DEFINITION

Description	Sieve Number and / or Size
Boulders	> 12 inches (305-mm)
Cobbles	3 to 12 inches (75-mm to 305-mm)
Gravel	3-inch to #4 (75-mm to 4.75-mm)
Coarse Gravel	3-inch to 3/4-inch (75-mm to 19-mm)
Fine Gravel	3/4-inch to #4 (19-mm to 4.75-mm)
Sand	#4 to #200 (4.75-mm to 0.075-mm)
Coarse Sand	#4 to #10 (4.75-mm to 2-mm)
Medium Sand	#10 to #40 (2-mm to 0.425-mm)
Fine Sand	#40 to #200 (0.425-mm to 0.075-mm)

ABBREVIATIONS

WOH: Weight of Hammer

WOR: Weight of Drill Rods

SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

Plate
A-0.2

*Soil descriptions are based on ASTM D2488-09a, Visual-Manual Procedure, with the above modifications by Geolabs, Inc. to the Unified Soil Classification System (USCS).

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-05-18	2018	24	25

DATE

ORIGINAL PLAN

NO.


SURVEY PLOTTED BY

DESIGNED BY

NOTED BY

CHECKED BY

MA\DOT Highway 2013700400 Cdnru Miscellaneous BMPs\04 Graphics\CAD Sheets\Bld Package 2\B-01 Boring Logs-1.dwg
LOGLEGEND FOR SOIL 7136-00.GPJ GEOLABS.GDT 6/24/15



4/30/20
EXP DATE

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

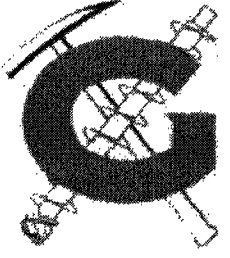
BORING LOGS – 1


MISCELLANEOUS PERMANENT
BEST MANAGEMENT PRACTICES, PHASE 2B

Project No. HWY-0-05-18

Scale: None Date: April 2018

SHEET No. B-01 OF 2 SHEETS

	GEOLABS, INC. Geotechnical Engineering	OAHU MISCELLANEOUS BMPs SITES 5 (PID 111091), 4 (PID 200526), 6 (PID 505421), & 7 (PID 106997) KANE OHE, OAHU, HAWAII		Log of Boring 201								
Laboratory		Field		Approximate Ground Surface Elevation (feet MSL): 231 *		Description						
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)					RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample
Sieve #200 = 92.2%	33	83			21	2.0					MH	Reddish brown CLAYEY SILT with some sand and gravel, stiff, moist (fill)
	56				8						CL	Gray with brown mottling SILTY CLAY , medium stiff, moist (alluvium)
	24	96			18	2.0	5				CH	Dark grayish brown SILTY CLAY , stiff, moist (older alluvium)
	52				9		10				CH	Reddish brown SILTY CLAY , stiff, moist (residual soil)
	53	58			18	3.0	15				MH	Brown with red mottling CLAYEY SILT with a little sand and traces of gravel, stiff, moist (saprolite)
67				9		20						Boring terminated at 21.5 feet
Date Started: April 2, 2015		Water Level: ∇ Not Encountered		Plate A - 3								
Date Completed: April 2, 2015												
Logged By: J. Turban		Drill Rig: CME-45C TRUCK (Energy Transfer Ratio = 76.6%)										
Total Depth: 21.5 feet		Drilling Method: 4" Solid-Stem Auger										
Work Order: 7136-00		Driving Energy: 140 lb. wt., 30 in. drop										

	GEOLABS, INC. Geotechnical Engineering	OAHU MISCELLANEOUS BMPs SITES 5 (PID 111091), 4 (PID 200526), 6 (PID 505421), & 7 (PID 106997) KANE OHE, OAHU, HAWAII		Log of Boring 202								
Laboratory		Field		Approximate Ground Surface Elevation (feet MSL): 218 *		Description						
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)					RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample
LL=92 PI=45	47	62			23	1.5					MH	Reddish brown CLAYEY SILT with a little decomposed gravel, stiff, moist (residual soil)
	49				20							
Direct Shear	49	57			12	4.0	5					
					7		10					
UC	64				7	0.5	15				SP	Gray GRAVELLY SAND with a little silt, loose, dry to moist (alluvium)
											CH	Reddish brown SILTY CLAY with a little gravel, soft, moist (residual soil)
	64				3		20					grades to wet
												Boring terminated at 21.5 feet
Date Started: April 2, 2015		Water Level: ∇ Not Encountered		Plate A - 4								
Date Completed: April 2, 2015												
Logged By: J. Turban		Drill Rig: CME-45C TRUCK (Energy Transfer Ratio = 76.6%)										
Total Depth: 21.5 feet		Drilling Method: 4" Solid-Stem Auger										
Work Order: 7136-00		Driving Energy: 140 lb. wt., 30 in. drop										

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-05-18	2018	25	25

NOTE:
1. See Sheets C-02, C-03 and C-04 for approximate locations of borings.



4/30/20
EXP DATE
[Signature]
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BORING LOGS - 2
MISCELLANEOUS PERMANENT
BEST MANAGEMENT PRACTICES, PHASE 2B
Project No. HWY-0-05-18
Scale: None Date: April 2018
SHEET No. B-02 OF 2 SHEETS