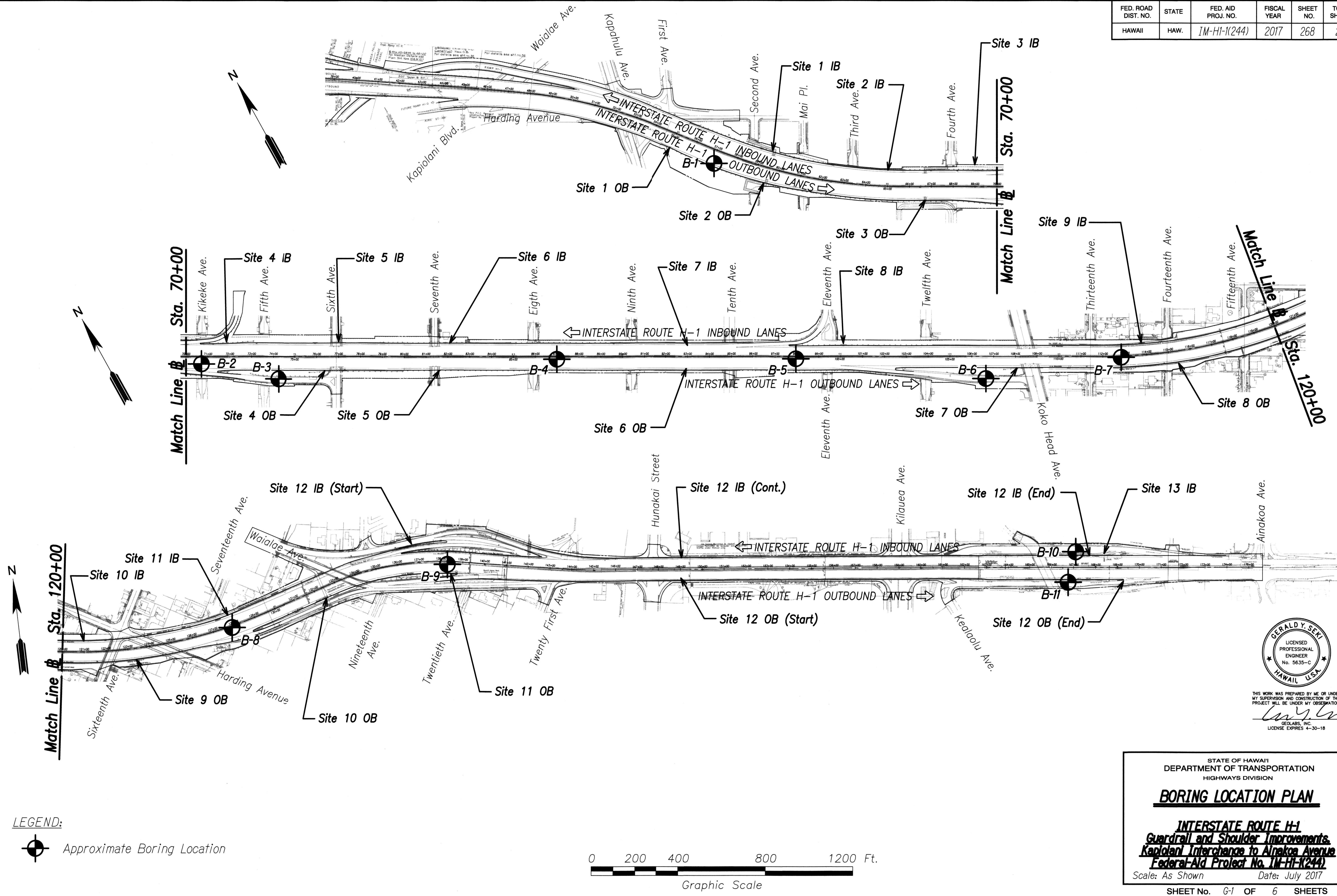


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H1-K(244)	2017	268	273



DESIGNED BY	DATE
CHECKED BY	
NOTED BY	
QUANTITIES BY	
ORIGINAL PLAN	
NO.	

LEGEND:

Approximate Boring Location









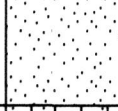

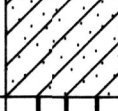
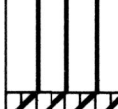
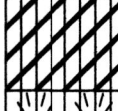

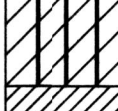


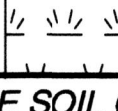
GERALD Y. SEKI  
LICENSED PROFESSIONAL ENGINEER  
No. 5635-C  
HAWAII, U.S.A.

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


STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**BORING LOCATION PLAN**  
**INTERSTATE ROUTE H-1**  
**Guardrail and Shoulder Improvements**  
**Kapiolani Interchange to Ainakoa Avenue**  
**Federal-Aid Project No. IM-H1-K(244)**  
Scale: As Shown      Date: July 2017  
SHEET No. 6-1 OF 6 SHEETS



 <div>GEOLABS, INC. Geotechnical Engineering</div>		Soil Log Legend					
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		
		MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		
	SANDS	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		
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES		
			MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES	
		FINE-GRAINED SOILS	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		
SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE			MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
				CH	INORGANIC CLAYS OF HIGH PLASTICITY		
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
			HIGHLY ORGANIC SOILS			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	LL	LIQUID LIMIT (NP=NON-PLASTIC)
	(3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX (NP=NON-PLASTIC)
	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
	GRAB SAMPLE	PEN	POCKET PENETROMETER (tsf)
	CORE SAMPLE	UC	UNCONFINED COMPRESSION (ksf)
	WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING	TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)
	WATER LEVEL OBSERVED IN BORING AFTER DRILLING		
	WATER LEVEL OBSERVED IN BORING OVERNIGHT		

Plate

A-0.1

GEOLABS, INC.

Geotechnical Engineering

## Soil Classification Log Key

(with deviations from ASTM D2488)

### GEOLABS, INC. CLASSIFICATION\*

#### GRANULAR SOIL (- #200 <50%)

- 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:
  - with some: >12%
  - with a little: 5 - 12%
  - with traces of: <5%accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY GRAVEL with a little sand)

#### COHESIVE SOIL (- #200 ≥ 50%)

- 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:
  - with some: >12%
  - with a little: 5 - 12%
  - with traces of: <5%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

### ABBREVIATIONS

WOH: Weight of Hammer

WOR: Weight of Drill Rods

SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

### 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)

Plate

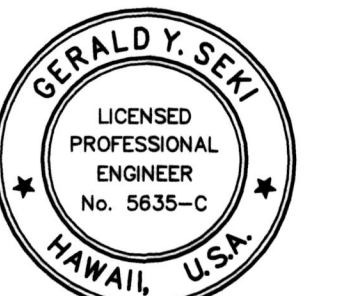
A-0.2

\*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).

SURVEY PLANNED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

LOG LEGEND FOR SOIL 6099-00.GPJ GEOLABS.GDT 7/12/16

SOIL CLASS LOG KEY 6099-00.GPJ GEOLABS.GDT 7/12/16



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GEOLOGICAL ENGINEER  
GEOLOGICAL ENGINEER  
LICENSE EXPIRES 4-30-18

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION


**BORING LOG LEGENDS**

**INTERSTATE ROUTE H-1**  
**Guardrail and Shoulder Improvements,**  
**Kapiolani Interchange to Alakoa Avenue**  
**Federal-Aid Project No. IM-HI-1(244)**

Scale: As Shown      Date: July 2017

SHEET No. G-2 OF 6 SHEETS




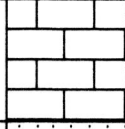
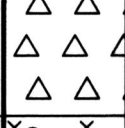
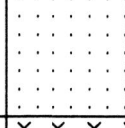
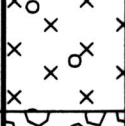
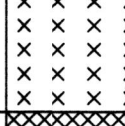

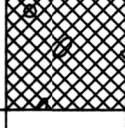
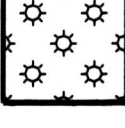
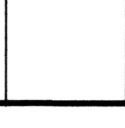




GEOLABS, INC.  
Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

	BASALT		FINGER CORAL
	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER		SILTSTONE
	COBBLES		TUFF
	CORAL		VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Moderately Fractured:	6 to 12 inches apart
Closely Fractured:	3 to 6 inches apart
Severely Fractured:	Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered:	Rock shows no sign of discoloration or loss of strength.
Slightly Weathered:	Slight discoloration inwards from open fractures.
Moderately Weathered:	Discoloration throughout and noticeably weakened though not able to break by hand.
Highly Weathered:	Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.
Extremely Weathered:	Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

HARDNESS

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard:	Specimen breaks with difficulty after several "pinging" hammer blows. Example: Dense, fine grain volcanic rock
Hard:	Specimen breaks with some difficulty after several hammer blows. Example: Vesicular, vugular, coarse-grained rock
Medium Hard:	Specimen can be broked by one hammer blow. Cannot be scraped by knife. SPT may penetrate by ~25 blows per inch with bounce. Example: Porous rock such as clinker, cinder, and coral reef
Soft:	Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot. Example: Weathered rock, chalk-like coral reef
Very Soft:	Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure. Example: Saprolite

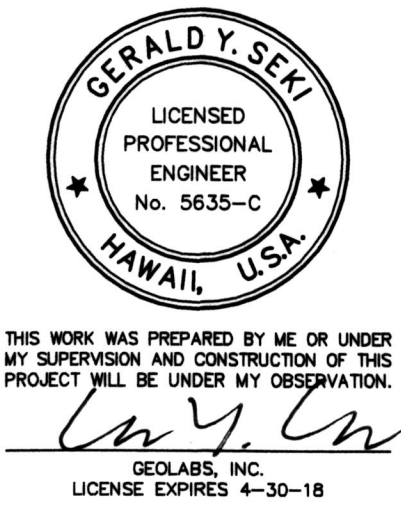
Plate  
A-0.3

GEOTECHNICAL NOTES:

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Interstate Route H-1 Guardrail and Shoulder Improvements, Kapiolani Interchange to Ainakoa Avenue, Honolulu, Oahu, Hawaii" dated July 22, 2016 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.
- For boring locations, see Sheet G-1.
- The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
- The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.
- The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.

ORIGINAL PLAN	SURVEY PLANNED BY	DATE
NOTES BOOK	DRAWN BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

LOG LEGEND FOR ROCK 6099-00.GPJ GEOLABS GDT 7/12/16



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOG LEGEND & NOTES**


**INTERSTATE ROUTE H-1**  
**Guardrail and Shoulder Improvements,**  
**Kapiolani Interchange to Ainakoa Avenue**  
**Federal Aid Project No. IM-H1-K(244)**


Scale: As Shown      Date: July 2017


SHEET No. G-3 OF 6 SHEETS




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(244)	2017	271	273

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 1		
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 58 *			
Sieve #200 = 20.9% Direct Shear	11	109				35/3"						Description			
	8					28						9-inch CONCRETE			
	9	121				29/6" +30/3"		5			GW GC	Light gray SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course)			
												Brownish gray GRAVEL (BASALTIC) with sand and clay and some cobbles (basaltic), medium dense, damp (fill)			
						20/3"		10				Gray with brown mottling COBBLES AND BOULDERS (BASALTIC) with clayey sand, very dense, damp (fill)			
												Boring terminated at 10.25 feet			
												* Elevations estimated from Google Earth © 2013.			
												Latitude: 21.28670° N Longitude: 157.81214° W			
Date Started: February 8, 2010														Water Level: ∇ Not Encountered	
Date Completed: February 8, 2010															
Logged By: Y. Chiba														Drill Rig: CME-55	
Total Depth: 10.25 feet														Drilling Method: 4" Auger & HQ Coring	
Work Order: 6099-00														Driving Energy: 140 lb. wt., 30 in. drop	

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 3		
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 108 *			
LL=NP PI=NP Sieve #200 = 41.4%	20	95				23						Description			
	22					9						11-inch CONCRETE			
	22	76				13		5			GW SC	Grayish brown SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course)			
												Reddish brown with black mottling medium CLAYEY SAND with gravel (basaltic), medium dense, damp (fill)			
						15/1"		10				Dark gray with red mottling COBBLES (BASALTIC) with sand and some silt, medium dense, damp (fill)			
												Boring terminated at 10.1 feet			
												Latitude: 21.28393° N Longitude: 157.80797° W			
Date Started: February 8, 2010														Water Level: ∇ Not Encountered	
Date Completed: February 8, 2010															
Logged By: Y. Chiba														Drill Rig: CME-55	
Total Depth: 10.1 feet														Drilling Method: 4" Auger & HQ Coring	
Work Order: 6099-00														Driving Energy: 140 lb. wt., 30 in. drop	

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 2		
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 87 *			
	17	111				80						Description			
	33	90				36	3.0					9-inch CONCRETE			
	8					18/3"		5			GW SM	Gray SANDY GRAVEL (BASALTIC) with little silt, dense, damp (base course)			
												Reddish brown with dark gray mottling medium to coarse SILTY SAND with some gravel (basaltic) and traces of clay, dense, damp (fill)			
						15/1"		10			CL-ML GP	Reddish brown with gray mottling CLAYEY SILT with fine sand, very stiff, damp (residual soil)			
												Dark gray with orange mottling GRAVEL (BASALTIC) with silt, dense, dry to damp (weathered rock)			
												Gray with orange mottling vesicular BASALT, closely fractured, highly weathered, very hard			
												Boring terminated at 10.1 feet			
												Latitude: 21.28455° N Longitude: 157.80877° W			
Date Started: February 9, 2010														Water Level: ∇ Not Encountered	
Date Completed: February 9, 2010															
Logged By: Y. Chiba														Drill Rig: Mobile B-80	
Total Depth: 10.1 feet														Drilling Method: 4" Auger & HQ Coring	
Work Order: 6099-00														Driving Energy: 140 lb. wt., 30 in. drop	

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 4		
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 144 *			
LL=70 PI=44  UC= 11050 psi UC= 13620 psi	12	127				63	3.5					Description			
	38					60/3"	3.5					9-inch CONCRETE			
								5			GW CH	Gray SANDY GRAVEL (BASALTIC) with some silt, dense, dry to damp (base course)			
												Reddish brown CLAY with gravel (basaltic), very stiff, damp (fill)			
												Gray vesicular BASALT, moderately fractured, slightly weathered, very hard			
												Boring terminated at 10 feet			
												Latitude: 21.28247° N Longitude: 157.80458° W			
Date Started: February 9, 2010														Water Level: ∇ Not Encountered	
Date Completed: February 9, 2010															
Logged By: Y. Chiba														Drill Rig: Mobile B-80	
Total Depth: 10 feet														Drilling Method: 4" Auger & HQ Coring	
Work Order: 6099-00														Driving Energy: 140 lb. wt., 30 in. drop	

SURVEY PLATTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
NO.	





THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.  
*Gerald Y. Sen*  
GEOLABS, INC.  
LICENSE EXPIRES 4-30-18


STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>BORING LOGS-1</b>	
<b>INTERSTATE ROUTE H-1 Guardrail and Shoulder Improvements Kapiolani Interchange to Ainakoa Avenue Federal Aid Project No. IM-HI-1(244)</b>	
Scale: As Shown	Date: July 2017
SHEET No. G-4 OF 6 SHEETS	




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1M-HI-1(244)	2017	272	273

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 5
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 181 *		
											Description		
		25	99			35/6" +15/1"	3.0		GW		11-inch CONCRETE		
		9				40			CL		Brownish gray SANDY GRAVEL (BASALTIC) with some silt, dense, damp (base course)		
		9				41		5			Reddish brown SANDY CLAY with silt, very stiff, damp (fill)		
											grades with gravel and some cobbles (basaltic)		
		26	94			20/6" +15/3"	2.5	10	CH		Dark reddish brown with gray mottling SILTY CLAY with sand and some gravel (coralline), very stiff, damp (fill)		
											Boring terminated at 10.75 feet		
								15					
								20			Latitude: 21.28102° N Longitude: 157.80172° W		
Date Started: February 9, 2010													Water Level: ∇ Not Encountered
Date Completed: February 9, 2010													
Logged By: Y. Chiba													Drill Rig: Mobile B-80
Total Depth: 10.75 feet													Drilling Method: 4" Auger & HQ Coring
Work Order: 6099-00													Driving Energy: 140 lb. wt., 30 in. drop

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 7
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 181 *		
											Description		
	UC= 3180 psi			89	83				GW		9-inch CONCRETE		
											Light grayish brown SANDY GRAVEL (BASALTIC) with some silt, dense, damp (base course)		
				95	50			5			Reddish gray vesicular BASALT, closely to severely fractured, slightly weathered, very hard grades to moderately fractured at 3 feet		
											grades to closely fractured		
								10			Boring terminated at 10 feet		
								15					
								20			Latitude: 21.27911° N Longitude: 157.79793° W		
Date Started: February 10, 2010													Water Level: ∇ Not Encountered
Date Completed: February 10, 2010													
Logged By: Y. Chiba													Drill Rig: Mobile B-80
Total Depth: 10 feet													Drilling Method: 4" Auger & HQ Coring
Work Order: 6099-00													Driving Energy: 140 lb. wt., 30 in. drop

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 6
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 203 *		
											Description		
		23	83			25/1"			GW		12-inch CONCRETE		
		6				15/6" +10/0"			CL		Grayish brown SANDY GRAVEL (BASALTIC) with some silt, dense, damp (base course)		
		8				Ref. 20/3"		5	GP		Reddish brown SANDY CLAY with gravel (basaltic), medium stiff, damp (fill)		
											Dark brownish gray GRAVEL (BASALTIC) with some sand, dense, damp to dry (weathered rock)		
											Dark gray with orange mottling scoriaceous BASALT, closely fractured, highly weathered, medium hard to hard		
		3				15/1"		10			Boring terminated at 10.1 feet		
								15					
								20			Latitude: 21.27969° N Longitude: 157.79964° W		
Date Started: February 11, 2010													Water Level: ∇ Not Encountered
Date Completed: February 11, 2010													
Logged By: Y. Chiba													Drill Rig: Mobile B-80
Total Depth: 10.1 feet													Drilling Method: 4" Auger & HQ Coring
Work Order: 6099-00													Driving Energy: 140 lb. wt., 30 in. drop

	<b>GEOLABS, INC.</b> Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 8
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 115 *		
											Description		
		21	101			26			GW		8-inch CONCRETE		
		8				24			SC		4-inch CONCRETE		
						10/1"		5	SP		Grayish brown SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course)		
											Orangish brown CLAYEY SAND with gravel (basaltic), medium dense, damp (fill)		
											Dark gray SAND with some gravel (basaltic), medium dense, damp (weathered rock)		
						12/1"		10			Reddish gray scoriaceous BASALT, closely to severely fractured, highly weathered, medium hard		
											grades to very hard		
											Boring terminated at 10.1 feet		
								15					
								20			Latitude: 21.27863° N Longitude: 157.79352° W		
Date Started: February 10, 2010													Water Level: ∇ Not Encountered
Date Completed: February 10, 2010													
Logged By: Y. Chiba													Drill Rig: Mobile B-80
Total Depth: 10.1 feet													Drilling Method: 4" Auger & HQ Coring
Work Order: 6099-00													Driving Energy: 140 lb. wt., 30 in. drop

SURVEY PLATTED BY	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
QUANTITIES BY	
NO.	



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.  
GEOLABS, INC.  
LICENSE EXPIRES 4-30-18

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION


**BORING LOGS-2**


**INTERSTATE ROUTE H-1  
Guardrail and Shoulder Improvements  
Kapiolani Interchange to Ainakoa Avenue  
Federal Aid Project No. 1M-HI-1(244)**


Scale: As Shown Date: July 2017



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1M-H1-1(244)	2017	273	273

		GEOLABS, INC. Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 9	
Other Tests		Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 84 *				
											Description				
											9-inch CONCRETE				
											3-inch CONCRETE				
											Grayish brown SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course)				
											Dark reddish brown SANDY CLAY with gravel (basaltic) and little gravel (coralline), very stiff, damp (fill)				
											Brownish gray SILTY COBBLES (BASALTIC) with gravel and some boulders, dense, damp (weathered rock)				
											Reddish gray vesicular BASALT, closely fractured, highly weathered, very hard				
											Boring terminated at 10.1 feet				
											Latitude: 21.27908° N Longitude: 157.79063° W				
Date Started: February 10, 2010											Water Level: ∇ Not Encountered				
Date Completed: February 10, 2010															
Logged By: Y. Chiba											Drill Rig: Mobile B-80				
Total Depth: 10.1 feet											Drilling Method: 4" Auger & HQ Coring				
Work Order: 6099-00											Driving Energy: 140 lb. wt., 30 in. drop				

		GEOLABS, INC. Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 11	
Other Tests		Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 30 *				
											Description				
											11-inch ASPHALTIC CONCRETE				
											Light tan SANDY GRAVEL (CORALLINE) with some clay, dense, damp (fill)				
											grades to light gray sandy gravel (basaltic) at 1.5 feet				
											Reddish brown with multi-color mottling CLAYEY SAND with gravel and some sand (coralline), dense, damp (fill)				
											Brown SANDY COBBLES (BASALTIC) with clay, dense, moist (alluvium)				
											Blackish brown SANDY CLAY, soft, moist (alluvium)				
											Brown with dark gray mottling CLAYEY GRAVEL (BASALTIC) with some sand, medium dense, wet (alluvium)				
											Boring terminated at 16.5 feet				
											Latitude: 21.27795° N Longitude: 157.78233° W				
Date Started: February 11, 2010											Water Level: ∇ 13.0 ft. 02/11/2010 1140 HRS				
Date Completed: February 11, 2010															
Logged By: Y. Chiba											Drill Rig: Mobile B-80				
Total Depth: 16.5 feet											Drilling Method: 4" Auger & HQ Coring				
Work Order: 6099-00											Driving Energy: 140 lb. wt., 30 in. drop				

		GEOLABS, INC. Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 10	
Other Tests		Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 35 *				
											Description				
											4-inch ASPHALTIC CONCRETE				
											Tan with white mottling GRAVELLY SAND (CORALLINE) with silt and little clay, very dense, damp (fill)				
											Light gray SANDY GRAVEL (BASALTIC) with some silt, very dense, damp (fill)				
											Brown SANDY CLAY with some sand (coralline) and gravel (basaltic), very stiff, damp (fill)				
											Dark brown SANDY CLAY with some silt and gravel (basaltic), soft, moist (alluvium)				
											Brownish gray vesicular BASALT, closely fractured, highly weathered, hard				
											Boring terminated at 15.1 feet				
											Latitude: 21.27831° N Longitude: 157.78218° W				
Date Started: February 11, 2010											Water Level: ∇ Not Encountered				
Date Completed: February 11, 2010															
Logged By: Y. Chiba											Drill Rig: Mobile B-80				
Total Depth: 15.1 feet											Drilling Method: 4" Auger & HQ Coring				
Work Order: 6099-00											Driving Energy: 140 lb. wt., 30 in. drop				

		GEOLABS, INC. Geotechnical Engineering		INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII										Log of Boring 10	
Other Tests		Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 35 *				
											Description				
											4-inch ASPHALTIC CONCRETE				
											Tan with white mottling GRAVELLY SAND (CORALLINE) with silt and little clay, very dense, damp (fill)				
											Light gray SANDY GRAVEL (BASALTIC) with some silt, very dense, damp (fill)				
											Brown SANDY CLAY with some sand (coralline) and gravel (basaltic), very stiff, damp (fill)				
											Dark brown SANDY CLAY with some silt and gravel (basaltic), soft, moist (alluvium)				
											Brownish gray vesicular BASALT, closely fractured, highly weathered, hard				
											Boring terminated at 15.1 feet				
											Latitude: 21.27831° N Longitude: 157.78218° W				
Date Started: February 11, 2010											Water Level: ∇ Not Encountered				
Date Completed: February 11, 2010															
Logged By: Y. Chiba											Drill Rig: Mobile B-80				
Total Depth: 15.1 feet											Drilling Method: 4" Auger & HQ Coring				
Work Order: 6099-00											Driving Energy: 140 lb. wt., 30 in. drop				

DATE	
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	NOTE BOOK
No.	No.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.  
Gerald Y. Seki  
GEOLABS, INC.  
LICENSE EXPIRES 4-30-18

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOGS-3**

INTERSTATE ROUTE H-1  
Guardrail and Shoulder Improvements  
Kapiolani Interchange to Ainaloa Avenue  
Federal Aid Project No. 1M-H1-1(244)

Scale: As Shown      Date: July 2017

SHEET No. 6-6 OF 6 SHEETS