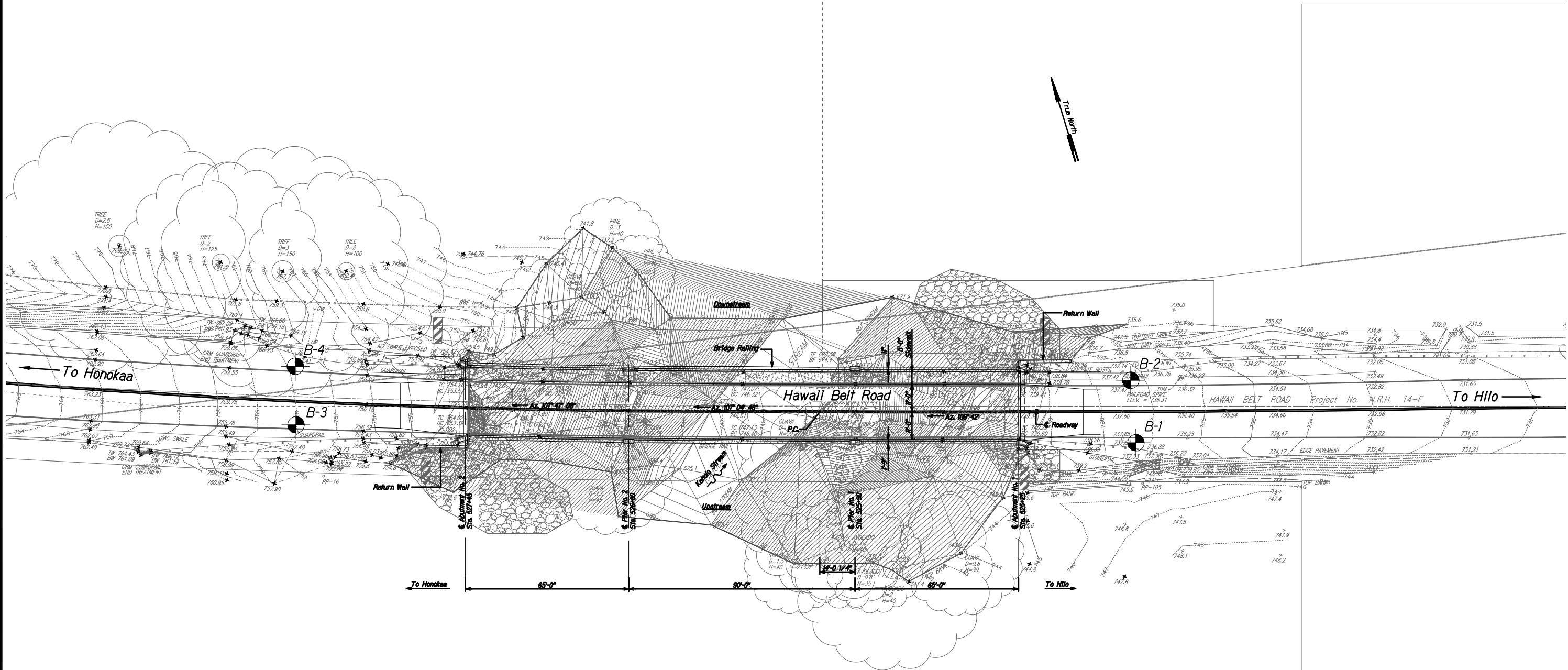


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(072)	2024	39	85



REVISION	DATE	BY	CHKD
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

LEGEND:  
Approximate Boring Location



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*Gerald Y. Seki*


STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOCATION PLAN**

**HAWAII BELT ROAD**  
**Seismic Retrofit of Kaholo Stream Bridge**  
**Fed. Aid Proj. No. BR-019-2(072)**

Scale: As Noted Date: Jul. 2024
















SHEET No. B-1 OF 9 SHEETS



GEOLABS, INC.  
Geotechnical Engineering


Soil Log Legend


UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)


MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS  MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	GRAVELS  MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS  LESS THAN 5% FINES	 GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES  MORE THAN 12% FINES	 GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			 GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		 GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
	SANDS  50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	CLEAN SANDS  LESS THAN 5% FINES	 SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES  MORE THAN 12% FINES	 SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			 SM	SILTY SANDS, SAND-SILT MIXTURES
		 SC	CLAYEY SANDS, SAND-CLAY MIXTURES	
FINE-GRAINED SOILS  50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	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
	 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


 (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)

UC

UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH

TXUU

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)



GEOLABS, INC.  
Geotechnical Engineering

Soil Classification Log Key  
(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION\*

GRANULAR SOIL (- #200 <50%)			COHESIVE SOIL (- #200 ≥50%)		
<ul style="list-style-type: none"><li>PRIMARY constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e., GRAVEL, SAND)</li><li>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.</li><li>accessory descriptions compose of the following: with some: &gt;12% with a little: 5 - 12% with traces of: &lt;5% accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY GRAVEL with a little sand)</li></ul>			<ul style="list-style-type: none"><li>PRIMARY constituents are based on plasticity. Primary constituents are capitalized and bold (i.e., CLAY, SILT)</li><li>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.</li><li>accessory descriptions compose of the following: with some: &gt;12% with a little: 5 - 12% with traces of: &lt;5% accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY CLAY with some sand)</li></ul>		
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

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

\*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).

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NOTED BY	
REVISION	

DRAWING NAME: A:\DRAWING\DRAWING\WORKING\8063-10\_KAHOLO\_BRIDGE\8063-10SHEETBORINGLOGS.DWG PLOT TIME: 07-15-24, 4:06 PM

LOG LEGEND FOR SOIL 8063-00.GPJ GEOLABS.GDT 10/11/21

SOIL CLASS LOG KEY 8063-00.GPJ GEOLABS.GDT 10/11/21



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

BORING LOG LEGENDS

HAWAII BELT ROAD  
Seismic Retrofit of Kaholo Stream Bridge  
Fed. Aid Proj. No. BR-019-2(072)

Scale: As Noted Date: Jul. 2024












SHEET No. B-2 OF 9 SHEETS



GEOLABS, INC.  
Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

	BASALT		CONGLOMERATE
	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

GEOTECHNICAL NOTES:

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Seismic Retrofit of Kaholo Bridge, Hawaii Belt Road, Project No. BR-019-2(072), District of Hamakua, Island of Hawaii" dated December 13, 2023 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.
2. For boring locations, see Sheet B-1.
3. 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.
4. 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.
5. 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.



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HIGHWAYS DIVISION

ROCK LOG LEGEND & NOTES



HAWAII BELT ROAD  
Seismic Retrofit of Kaholo Stream Bridge  
Fed. Aid Proj. No. BR-019-2(072)

Scale: As Noted      Date: Jul. 2024

SHEET No. B-3 OF 9 SHEETS

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NOTED BY	
DATE	

DRAWING NAME: A:\DRAWING\DRAWING\WORKING\8063-10\_KAHOLO\_BRIDGE\_8063-10SHEETBORINGLOGS.DWG PLOT TIME: 07-15-24, 4:06 PM

		GEOLABS, INC. Geotechnical Engineering						SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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 ): 737 *		
											Description		
LL=43 PI=10	52				14						8-inch ASPHALTIC CONCRETE		
											GM	Gray with some brown SILTY GRAVEL (BASALTIC), medium dense, moist (fill)	
												ML	Orangish brown with gray mottling CLAYEY SILT with some sand (basaltic) and a little decomposed gravel, stiff to very stiff, moist (saprolite)
TXUU Su=1.7 ksf	54	68			41	1.0	5			grades with cobble sized basalt corestones locally			
Direct Shear	65	62			17	0.8	10			grades to medium stiff and very moist locally			
Sieve #200 = 31.2%	32	77	29		51		15			GM	Gray and brown SILTY GRAVEL (BASALTIC) with some sand, medium dense, moist (weathered basalt)		
	44				23		20			ML	Brown with gray mottling CLAYEY SILT with some sand (basaltic) and traces of gravel, very stiff, moist (saprolite)		
	39		47	0	15/6" +25/3"		25				Brownish gray to gray vesicular BASALT, severely fractured, moderately to highly weathered, soft to medium hard (pahoe-hoe basalt)		
							30				ML		
35											Water Level:  Not Encountered		
Date Started: May 13, 2021											Drill Rig: MOBILE B-53.1		
Date Completed: May 14, 2021											Drilling Method: 4" Solid-Stem Auger & HQ Coring		
Logged By: S. Latronic											Driving Energy: 140 lb. wt., 30 in. drop		
Total Depth: 80.5 feet													
Work Order: 8063-00													

GEOLABS, INC. Geotechnical Engineering							SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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	(Continued from previous plate)		
										Description		
UC= 660 psi	35		14	10	25/2"		40		ML	Brown with gray mottling CLAYEY SILT with some sand (basaltic) and traces of gravel, hard, moist (saprolite)		
										Brownish gray to gray vesicular BASALT, closely fractured, moderately to highly weathered, medium hard (pahoe-hoe basalt)		
										grades to hard locally		
										grades with small voids		
UC= 4300 psi			55	13			45			Brownish gray to gray vugular BASALT, closely to severely fractured, moderately weathered, medium hard to hard (a'a basalt)		
										Brownish gray subangular SANDY GRAVEL (BASALTIC) with a little silt and cobbles, medium dense, moist (clinker)		
										Gray vugular BASALT, closely to severely fractured, slightly weathered, hard (a'a basalt)		
										Brownish gray to gray vesicular BASALT, moderately to closely fractured, slightly to moderately weathered, medium hard to hard (pahoe-hoe basalt)		
UC= 4300 psi			57	0			50			grades with highly weathered soft zones locally		
UC= 4300 psi			92	10			60					
UC= 4300 psi			100	50			65					
UC= 4300 psi			100	60			70					
Date Started: May 13, 2021										Water Level: $\nabla$ Not Encountered		
Date Completed: May 14, 2021												
Logged By: S. Latronic										Drill Rig: MOBILE B-53.1		
Total Depth: 80.5 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring		
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop		



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DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOGS - 1**

**HAWAII BELT ROAD**  
**Seismic Retrofit of Kaholo Stream Bridge**  
**Fed. Aid Proj. No. BR-019-2(072)**


Scale: As Noted Date: Jul. 2024

















SHEET No. B-4 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(072)	2024	43	85

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NO.	

DRAWING NAME: A:\DRAWING\DRAWING\WORKING\8063-10\_KAHOLO\_BRIDGE\_8063-10SHEETBORINGLOGS.DWG PLOT TIME: 07-15-24, 4:07 PM

		GEOLABS, INC.		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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	(Continued from previous plate)				
											Description				
			83	25							grades to very hard				
			93	52			75								
							80				Boring terminated at 80.5 feet				
											* Elevations estimated from Topographic Survey Map provided by KSF, Inc. on September 30, 2021.				
							85								
							90								
							95								
							100								
							105								
Date Started: May 13, 2021							Water Level: $\nabla$ Not Encountered								
Date Completed: May 14, 2021															
Logged By: S. Latronic							Drill Rig: MOBILE B-53.1								
Total Depth: 80.5 feet							Drilling Method: 4" Solid-Stem Auger & HQ Coring								
Work Order: 8063-00							Driving Energy: 140 lb. wt., 30 in. drop								

		GEOLABS, INC. Geotechnical Engineering					SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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)		USCS	Approximate Ground Surface Elevation (feet ): 737 *		
										Description		
TXUU Su=1.3 ksf	18	100			24				GP	9-inch ASPHALTIC CONCRETE		
									GP	Brownish gray GRAVEL (BASALTIC) with some sand, medium dense, moist (fill)		
	43				8					Dark gray GRAVELLY SAND with some silt, medium dense to loose, moist (fill)		
									MH	Brown CLAYEY SILT with some sand, medium stiff, wet (residual soil)		
	55	66			11		5					
	66				6		10			grades with white mottling		
	71	60			13		15					
			0									
Direct Shear							20					
	18				31					grades with some gravel, hard		
			0									
							25					
	21				45							
			43	0			30			Gray with orangish mottling vesicular BASALT, severely fractured, highly to moderately weathered, medium hard to hard (basalt formation)		
			0	0	30/1"							
							35					
Date Started: May 4, 2021										Water Level: ∇ Not Encountered		
Date Completed: May 6, 2021												
Logged By: D. Gremminger										Drill Rig: MOBILE B-53.1		
Total Depth: 102.5 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring		
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop		



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**BORING LOGS - 2**
















**HAWAII BELT ROAD**  
**Seismic Retrofit of Kaholo Stream Bridge**  
**Fed. Aid Proj. No. BR-019-2(072)**


Scale: As Noted      Date: Jul. 2024

SHEET No. **B-5** OF **9** SHEETS

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NO. _____	

DRAWING NAME: A:\DRAWING\DRAWING\WORKING\8063-10\_KAHOLO\_BRIDGE\_8063-10SHEETBORINGLOGS.DWG PLOT TIME: 07-15-24, 4:07 PM

 <b>GEOLABS, INC.</b> Geotechnical Engineering		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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	(Continued from previous plate)
										Description
Sieve #200 = 52.5%	28				31					breaks down to a sandy gravel (basaltic), hard
			14	0			40		ML	Brownish gray GRAVELLY SILT with some sand, hard, wet (saprolite)
	43				32					
			0	0			45			
	26				77					
			26	0			50			Gray vesicular BASALT, severely fractured, highly to moderately weathered, medium hard to hard (basalt formation)
										
			22	0	45/2"		55			
										
			7	0	25/1"		60			
										
			88	64	50/4"		65			Gray BASALT, severely to moderately fractured, moderately weathered, hard (basalt formation)
										
			80	42			70			
Date Started: May 4, 2021										Water Level: ∇ Not Encountered
Date Completed: May 6, 2021										
Logged By: D. Gremminger										Drill Rig: MOBILE B-53.1
Total Depth: 102.5 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop

 <b>GEOLABS, INC.</b> Geotechnical Engineering		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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	(Continued from previous plate)
										Description
UC= 1230 psi			100	62			75			
			100	85			80			grades to closely to slightly fractured
			62	22			85			grades to severely to closely fractured
			52	23						
UC= 9080 psi			70	33			90		GM	Reddish brown SANDY GRAVEL (BASALTIC), dense, wet (clinker)
			62	22			95			Gray BASALT, severely to moderately fractured, highly to moderately weathered, medium hard to hard (basalt formation)
							100			
							105			Boring terminated at 102.5 feet
Date Started: May 4, 2021										Water Level: ∇ Not Encountered
Date Completed: May 6, 2021										
Logged By: D. Gremminger										Drill Rig: MOBILE B-53.1
Total Depth: 102.5 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop



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HIGHWAYS DIVISION










**BORING LOGS - 3**



**HAWAII BELT ROAD**  
**Seismic Retrofit of Kaholo Stream Bridge**  
**Fed. Aid Proj. No. BR-019-2(072)**

Scale: As Noted      Date: Jul. 2024

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
IN CHARGE	
NO.	

DRAWING NAME: A:\DRAWING\DRAWING\WORKING\8063-10\_KAHOLO\_BRIDGE\_8063-10SHEETBORINGLOGS.DWG PLOT TIME: 07-15-24, 4:07 PM

		GEOLABS, INC. Geotechnical Engineering				SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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 ): 758 *	
										Description	
LL=77 PI=27 TXUU Su=2.1 ksf Sieve #200 = 9.0% TXUU Su=2.2 ksf  Direct Shear Sieve #200 = 93.9%  LL=60 PI=12	46				57				GM MH MH	8-inch ASPHALTIC CONCRETE	
										Gray and brown SILTY GRAVEL (BASALTIC), medium dense, moist (fill)	
										Dark brown CLAYEY SILT with a little gravel (basaltic), hard, moist (fill)	
	37	74			41	2.0	5			Orangish brown with gray mottling CLAYEY SILT with some sand (basaltic) and a little decomposed gravel, very stiff, moist (saprolite)	
	29	80			35	3.0	10			grades with gravel	
	67	56			13	0.8	15			grades to medium stiff and very moist locally	
	68	57	43		31	2.5	20			grades with a little sand, very stiff	
43					20				grades to reddish brown locally		
					7				grades to medium stiff		
Date Started: May 12, 2021										Water Level:  Not Encountered	
Date Completed: May 13, 2021											
Logged By: S. Latronic										Drill Rig: MOBILE B-53.1	
Total Depth: 91 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring	
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop	

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Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate)			
											Description			
UC= 600 psi	64		14		23					MH	grades to very stiff			
	40				52		40				grades to brownish gray, hard			
	72		42	0	16		45				Gray vugular BASALT, closely to severely fractured, slightly to moderately weathered, medium hard to hard (a'a basalt)			
										ML	Brownish gray CLAYEY SILT with some sand (basaltic), very stiff, moist (saprolite)			
			72	28			50				Gray vesicular BASALT, moderately fractured, slightly to moderately weathered, medium hard to hard (pahoehoe basalt)			
			92	12							Brownish gray vesicular BASALT, closely to severely fractured, highly weathered, soft (pahoehoe basalt)			
			93	37			55				Gray vugular BASALT, closely fractured, slightly to moderately weathered, medium hard to hard (a'a basalt)			
									ML	Brownish gray SANDY SILT with some decomposed gravel, stiff, moist (saprolite)				
	UC= 3040 psi			88	35			60				Brownish gray vesicular BASALT, moderately fractured, slightly to moderately weathered, medium hard to hard (pahoehoe basalt)		
				57	23			65				grades with severely fractured, highly weathered soft zones locally		
								70						
Date Started: May 12, 2021										Water Level:  Not Encountered				
Date Completed: May 13, 2021														
Logged By: S. Latronic										Drill Rig: MOBILE B-53.1				
Total Depth: 91 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring				
Work Order: 8063-00										Driving Energy: 140 lb. wt., 30 in. drop				



LICENSE EXPIRES 4/30/26

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

*Gerald Y. Seki*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION



**BORING LOGS - 4**




**HAWAII BELT ROAD**  
**Seismic Retrofit of Kaholo Stream Bridge**  
**Fed. Aid Proj. No. BR-019-2(072)**

Scale: As Noted Date: Jul. 2024

SHEET No. B-7 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(072)	2024	46	85

 <b>GEOLABS, INC.</b> Geotechnical Engineering		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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	(Continued from previous plate)
										Description
			72	28						
							75			Gray vugular BASALT, moderately fractured, slightly weathered, hard to very hard (a'a basalt)
			75	42					GM	Grayish brown SILTY GRAVEL (BASALTIC), medium dense, moist (clinker)
							80			Gray vugular BASALT, moderately fractured, slightly weathered, very hard (a'a basalt)
			72	33					GM	Grayish brown SILTY GRAVEL (BASALTIC), medium dense, moist (clinker)
							85			Gray vugular BASALT, moderately fractured, slightly weathered, very hard (a'a basalt)
			93	67						grades to vesicular locally
							90			
										Boring terminated at 91 feet
							95			
							100			
							105			
Date Started: May 12, 2021									Water Level:  Not Encountered	
Date Completed: May 13, 2021										
Logged By: S. Latronic									Drill Rig: MOBILE B-53.1	
Total Depth: 91 feet									Drilling Method: 4" Solid-Stem Auger & HQ Coring	
Work Order: 8063-00									Driving Energy: 140 lb. wt., 30 in. drop	

 <b>GEOLABS, INC.</b> Geotechnical Engineering		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF 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)		USCS	Approximate Ground Surface Elevation (feet ): 758 *
										Description
									GM	4-inch ASPHALTIC CONCRETE
									MH	Gray and brown SILTY GRAVEL (BASALTIC), medium dense, moist (fill)
	25				15					Dark brown CLAYEY SILT with a little gravel (basaltic), stiff to very stiff, moist (fill)
LL=176 PI=91	76	48			26	1.8	5		MH	Brown with orange mottling CLAYEY SILT with some sand (basaltic) and traces of decomposed gravel, stiff, moist (saprolite)
TXUU Su=1.3 ksf	69	56			11	0.8	10			grades to medium stiff and very moist locally
LL=32 PI=NP	40				46		15		ML	Brown with orange mottling CLAYEY SILT with some sand and decomposed cobble corestones locally, hard, very moist
Direct Shear	46	83			50/5"		20			grades with gravel
			8							
Sieve #200 = 41.4%	39				58		25		GM	Brown with orange mottling SILTY GRAVEL with some sand, very dense to dense, very moist (basalt formation)
			25							
	36				31		30			
			0	0			35			
Date Started: May 10, 2021								Water Level:  Not Encountered		
Date Completed: May 11, 2021										
Logged By: S. Latronic								Drill Rig: MOBILE B-53.1		
Total Depth: 76 feet								Drilling Method: 4" Solid-Stem Auger & HQ Coring		
Work Order: 8063-00								Driving Energy: 140 lb. wt., 30 in. drop		



LICENSE EXPIRES 4/30/26

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ME OR UNDER MY SUPERVISION

*Gerald Y. Seki*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION









**BORING LOGS – 5**

**HAWAII BELT ROAD**  
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Scale: As Noted Date: Jul. 2024

SHEET No. B-8 OF 9 SHEETS



		GEOLABS, INC.		SEISMIC RETROFIT OF KAHOLO BRIDGE HAWAII BELT ROAD, PROJECT NO. BR-019-2(072) DISTRICT OF HAMAKUA, ISLAND OF HAWAII										Log of Boring 4	
Geotechnical Engineering															
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate)				
											Description				
UC= 420 psi	15		57	7	50/2"		35			GM	grades to highly weathered basalt				
											Brownish gray vesicular BASALT, severely fractured, moderately to highly weathered, soft to medium hard (pahoehoe basalt)				
											Gray dense BASALT, moderately fractured, slightly to moderately weathered, hard to very hard (a'a basalt)				
										GM	Brownish gray SILTY GRAVEL (BASALTIC), medium dense, moist (clinker)				
											Grayish brown vesicular BASALT, severely fractured, moderately to highly weathered, soft to medium hard (pahoehoe basalt)				
	29		76	33	50/2"		40				Brownish gray vugular BASALT, closely fractured, slightly to moderately weathered, medium hard to hard (a'a basalt)				
											Grayish brown vesicular BASALT, moderately fractured, moderately to highly weathered, medium hard (pahoehoe basalt)				
											Gray vugular BASALT, moderately fractured, slightly weathered, hard (a'a basalt)				
UC= 2230 psi			95	20			45			ML	Reddish brown with gray mottling SANDY SILT with a little gravel (basaltic), stiff, moist (saprolite)				
											Gray vugular BASALT, moderately fractured, slightly weathered, hard (a'a basalt)				
											Brownish gray vesicular BASALT, moderately fractured, slightly to moderately weathered, medium hard to hard (pahoehoe basalt)				
											grades to dense				
			57	35			60			VOID					
							65								
							70								
Date Started: May 10, 2021											Water Level:  Not Encountered				
Date Completed: May 11, 2021															
Logged By: S. Latronic											Drill Rig: MOBILE B-53.1				
Total Depth: 76 feet											Drilling Method: 4" Solid-Stem Auger & HQ Coring				
Work Order: 8063-00											Driving Energy: 140 lb. wt., 30 in. drop				