GEOLABS, INC.

Geotechnical Engineering

KAMEHAMEHA HIGHWAY DRAINAGE
AND SAFETY IMPROVEMENTS
VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring 1

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	13	95			40					SM
	14				9					SM
Sieve - #200 = 1.5%	6	89			11		5			SM / SP
	5	93			8		10			
							15			
							20			
							25			
							30			
							35			

Approximate Ground Surface Elevation (feet): 16 *

Description

8-inch **ASPHALTIC CONCRETE**

Brown with some gray **SILTY SAND** with a little gravel (basaltic), medium dense, moist (fill)

Light tan with traces of brown **SILTY SAND (CORALLINE)** with some gravel, medium dense, moist (fill)

Brownish tan fine **SILTY SAND**, medium dense, moist (alluvium)

Tan poorly graded **SAND (CORALLINE)** with traces of silt and gravel, loose, moist (beach deposit)

Boring terminated at 11.5 feet

* Elevations estimated from Roadway Plan and Profile dated May 2022 transmitted by WSP USA.

Date Started:	June 13, 2022	Water Level: ▼	Not Encountered		Plate
Date Completed:	June 13, 2022				
Logged By:	S. Latronic	Drill Rig:	CME-55D	(Energy Transfer Ratio = 77.2%)	A - 1
Total Depth:	11.5 feet	Drilling Method:	6" Hollow-Stem Auger		
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop		

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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Log of Boring **2**

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation (feet): 14 *
											7-inch **ASPHALTIC CONCRETE**
	12	91			25					GW SM	Light tan **SANDY GRAVEL (CORALLINE)** with a little silt, dense, moist (fill)
	7				16					SP	Brownish tan fine to medium **SILTY SAND**, medium dense, moist (alluvium)
	5	96			30		5				Tan poorly graded **SAND (CORALLINE)**, medium dense, moist (beach deposit)
	6	99			26		10				Boring terminated at 11.5 feet
							15				
							20				
							25				
							30				
							35				

Date Started:	June 13, 2022	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 13, 2022			
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 2
Total Depth:	11.5 feet	Drilling Method:	6" Hollow-Stem Auger	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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WAIALUA, OAHU, HAWAII

Log of Boring **3**

Approximate Ground Surface Elevation (feet): 13 *

Laboratory: Other Tests	Laboratory: Moisture Content (%)	Laboratory: Dry Density (pcf)	Field: Core Recovery (%)	Field: RQD (%)	Field: Penetration Resistance (blows/foot)	Field: Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			SM	Brown fine SILTY SAND, medium dense, dry to moist (alluvium)
	2				8					SP-SM	Light tan poorly graded fine SAND (CORALLINE) with a little silt, loose, dry to moist (beach deposit)
Direct Shear	23	114			9		5				grades coarser locally
			0								
	27				12		10				grades to medium dense, wet
			28								
	28	89			40		15				grades with fine gravel
			100								Gray subrounded BOULDERS (BASALTIC), very dense (alluvium)
							20			CH	Brown SILTY CLAY with some sand (basaltic) and a little gravel, medium stiff (alluvium)
LL=53 PI=29	43				7						
			61				25				grades with cobbles (basaltic) locally
	47	71			50/4"						
			99	16							Gray with traces of brown vugular BASALT, moderately to closely fractured, slightly weathered, hard to very hard (a'a basalt)
UC= 12820 psi			100	47			30				
							35				

Date Started:	June 7, 2022	Water Level: ▽ 12.4 ft. 06/08/2022 1250 HRS ▼ 12.3 ft. 06/08/2022 1805 HRS	Plate
Date Completed:	June 8, 2022		
Logged By:	S. Latronic	Drill Rig: CME-55D (Energy Transfer Ratio = 77.2%)	A - 3.1
Total Depth:	71.5 feet	Drilling Method: 4" Solid-Stem Auger & PQ Coring	
Work Order:	7651-00(A)	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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AND SAFETY IMPROVEMENTS
VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring **3**

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description
			57	20							
							40			GW	Gray with some brown subangular **SANDY GRAVEL (BASALTIC)** with some cobbles, dense (clinker)
			38								
							45			GM	Brown with some gray **SILTY GRAVEL (BASALTIC)** with some sand, very dense (clinker)
Sieve - #200 = 13.9%	24		57		52						
							50				
UC= 8500 psi			63	50							grades with cobbles (basaltic) locally
							55				Gray vugular **BASALT**, moderately fractured, slightly weathered, hard to very hard (a'a basalt)
			100	28						SM	Reddish brown with some gray **SILTY SAND (BASALTIC)** with some gravel, slightly cemented, dense (clinker)
							60				Gray dense **BASALT**, moderately to closely fractured, unweathered to slightly weathered, very hard (a'a basalt)
			100	15							
							65				
			100	72							
							70				

Date Started:	June 7, 2022	Water Level: ▽	12.4 ft. 06/08/2022 1250 HRS	Plate
Date Completed:	June 8, 2022	▼	12.3 ft. 06/08/2022 1805 HRS	
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 3.2
Total Depth:	71.5 feet	Drilling Method:	4" Solid-Stem Auger & PQ Coring	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

GEOLABS, INC. Geotechnical Engineering	KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS VICINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII	Log of Boring 3

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description
											Boring terminated at 71.5 feet

Date Started:	June 7, 2022	Water Level: ▽	12.4 ft.	06/08/2022 1250 HRS	Plate
Date Completed:	June 8, 2022	▼	12.3 ft.	06/08/2022 1805 HRS	
Logged By:	S. Latronic	Drill Rig:	CME-55D	(Energy Transfer Ratio = 77.2%)	A - 3.3
Total Depth:	71.5 feet	Drilling Method:	4" Solid-Stem Auger & PQ Coring		
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop		

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KAMEHAMEHA HIGHWAY DRAINAGE
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VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring **4**

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	7		57		25/2"					SM
Direct Shear TXUU S_u=2.4 ksf Sieve - #200 = 6.8%	20	105	0		29		5			SP-SM
	21		44		12		10			
	36		28		34		15			CH
LL=60 PI=28 TXUU S_u=2.4 ksf UC= 10460 psi	60	66	98	62	20	2.0	20			MH
			65	0			25			SM
			57	0			30			GW-GM

Approximate Ground Surface Elevation (feet): 12 *

Description

Brownish tan with some gray **SILTY SAND (CORALLINE)** with a little cobbles (basaltic), medium dense, moist (fill)

Gray **BOULDERS (BASALTIC)**, very dense, dry (fill)

Tan poorly graded **SAND (CORALLINE)** with a little silt and traces of gravel, medium dense, moist to wet (beach deposit)

grades with brown sandy silt pockets locally

Gray with traces of brown subrounded **GRAVELLY COBBLES (BASALTIC)**, dense (alluvium)

Reddish brown with some gray **SILTY CLAY** with some gravel (basaltic), hard (alluvium)

Brown with grayish brown mottling **CLAYEY SILT** with a little gravel (basaltic), very stiff (alluvium)

Brown with reddish brown mottling **CLAYEY SILT** with some sand and a little gravel (basaltic), stiff (alluvium)

Gray vugular **BASALT**, slightly fractured, slightly weathered, hard (a'a basalt)

Brown and gray **SILTY SAND (BASALTIC)** with some gravel, medium dense (clinker)

Brownish gray vugular **BASALT**, severely fractured, moderately weathered, medium hard (a'a basalt)

Brown and gray **SANDY GRAVEL (BASALTIC)** with a little cobbles and traces of silt, medium dense (clinker)

Date Started:	June 9, 2022	Water Level: ▽ 12.4 ft. 06/09/2022 1030 HRS	Plate
Date Completed:	June 9, 2022	▽ 9.9 ft. 06/09/2022 1535 HRS	
Logged By:	S. Latronic	Drill Rig: CME-55D (Energy Transfer Ratio = 77.2%)	A - 4.1
Total Depth:	66 feet	Drilling Method: 4" Solid-Stem Auger & PQ Coring	
Work Order:	7651-00(A)	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring 4

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	31				20					GW-GM
			22							
							40			SM
	21	114			48/6" +50/4"					
			9							
							45			
UC= 24070 psi	21		100	71	50/5"					
							50			
UC= 13280 psi			100	73						
							55			
			100	60						
							60			
UC= 25730 psi			100	75						
							65			
							70			

(Continued from previous plate)

Description

Brown with some gray **SILTY SAND (BASALTIC)** with some gravel and a little cobbles, very dense (clinker)

Reddish brown with some gray cemented **BASALT**, moderately fractured, moderately weathered, hard (welded clinker)

Gray dense **BASALT**, moderately fractured, slightly weathered, very hard (a'a basalt)

Boring terminated at 66 feet

Date Started:	June 9, 2022	Water Level: ▽ 12.4 ft. 06/09/2022 1030 HRS ▽ 9.9 ft. 06/09/2022 1535 HRS	Plate
Date Completed:	June 9, 2022		
Logged By:	S. Latronic	Drill Rig: CME-55D (Energy Transfer Ratio = 77.2%)	A - 4.2
Total Depth:	66 feet	Drilling Method: 4" Solid-Stem Auger & PQ Coring	
Work Order:	7651-00(A)	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring **5**

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation (feet): 14 *
										SM SP	Brownish tan **SILTY SAND**, medium dense, moist (alluvium)
	1	84			17						Light tan with some white poorly graded fine to medium **SAND (CORALLINE)**, loose to medium dense, dry to moist (beach deposit)
	3				11						
	6	82			12		5				
	33	78			4		10			CH	Brown to reddish brown **SILTY CLAY**, soft to medium stiff, moist (alluvium)
											Brownish gray **GRAVELLY COBBLES (BASALTIC)** with some clayey silt, medium dense, wet (alluvium)
							15				Boring terminated at 12 feet
							20				
							25				
							30				
							35				

Date Started:	June 15, 2022	Water Level: ▼ 11.8 ft. 06/15/2022 0905 HRS		Plate
Date Completed:	June 15, 2022			
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 5
Total Depth:	12 feet	Drilling Method:	6" Hollow-Stem Auger	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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VICINITY OF MP 3.06 TO MP 3.54
WAIALUA, OAHU, HAWAII

Log of Boring 6

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet): 14 *
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					**Description**
										SM	Brown **SILTY SAND** with traces of clay, medium dense, moist (alluvium)
LL=59 PI=29	24	76			32	4.0				CH	Brown **SILTY CLAY** with a little cobbles (basaltic), very stiff to hard, moist (alluvium)
	22				45						
	18				23/6" +25/1"		5				grades with boulders (basaltic)
											Boring terminated at 6.1 feet
							10				
							15				
							20				
							25				
							30				
							35				

Date Started:	June 15, 2022	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 15, 2022			
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 6
Total Depth:	6.1 feet	Drilling Method:	6" Hollow-Stem Auger	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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WAIALUA, OAHU, HAWAII

Log of Boring 7

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation (feet): 16 *
											8-inch ASPHALTIC CONCRETE
	13				16					GW SM	Brownish gray SANDY GRAVEL (BASALTIC) with some cobbles, very dense, moist (fill)
										CH	Brown fine to medium SILTY SAND with some cobbles (basaltic), medium dense, moist (fill)
	6				25/1"		5				Reddish brown with some gray SILTY CLAY with a little gravel (basaltic), very stiff, moist (alluvium)
											Gray BOULDER (BASALTIC), very dense, dry (alluvium)
											Boring terminated at 5.1 feet
							10				
							15				
							20				
							25				
							30				
							35				

Date Started:	June 14, 2022	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 14, 2022			
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 7
Total Depth:	5.1 feet	Drilling Method:	4" Solid-Stem Auger	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22

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WAIALUA, OAHU, HAWAII

Log of Boring **8**

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet): 19 * **Description**
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					
											7-inch **ASPHALTIC CONCRETE**
	15	88	80		25/3"					GM	Gray with some brown **SILTY GRAVEL (BASALTIC)** with some cobbles and a little sand, very dense, moist (fill)
											Gray **BOULDERS (BASALTIC)**, very dense, dry (alluvium)
	38				17		5			CH	Reddish brown **SILTY CLAY**, very stiff, moist (alluvium)
			63							SM	Brown with some gray **SILTY SAND (BASALTIC)** with some rounded gravel, medium dense, moist (alluvium)
	43				21		10			ML	Brown with gray mottling **CLAYEY SILT** with traces of decomposed gravel, very stiff, moist (alluvium)
											Boring terminated at 13 feet
							15				
							20				
							25				
							30				
							35				

Date Started:	June 14, 2022	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 14, 2022			
Logged By:	S. Latronic	Drill Rig:	CME-55D (Energy Transfer Ratio = 77.2%)	A - 8
Total Depth:	13 feet	Drilling Method:	4" Solid-Stem Auger & PQ Coring	
Work Order:	7651-00(A)	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7651-00(A).GPJ GEOLABS.GDT 10/13/22