

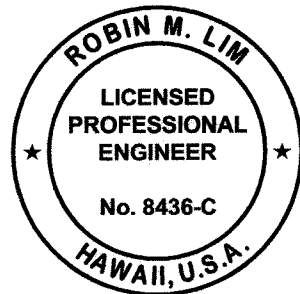


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	95	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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): 145 *					
										Description					
UC=15354 psi	7								GM	4-inch ASPHALTIC CONCRETE					
	14		100	25					CH	Brown with white mottling SILTY GRAVEL with sand, medium dense (base material)					
							5			Grayish brown SILTY CLAY with basaltic gravel, very dense, very damp to moist (fill)					
										Gray slightly vesicular BASALT, moderately to closely fractured, slightly weathered, hard to very hard (basalt formation)					
			157	100	83										
				100	0										
							10								
UC=7016 psi					50/.4'					Gray vugular BASALT, slightly fractured, slightly weathered, hard (basalt formation)					
			155	96	96					grades to closely fractured					
				50	6										
				67	23					Grayish red with orange mottling strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Dark gray slightly vesicular BASALT, closely fractured, slightly weathered, hard (basalt formation)					
UC=4536 psi										Grayish red with orange mottling vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Dark gray vugular BASALT, closely fractured, moderately weathered, hard (basalt formation)					
										Dark gray with yellow mottling strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Gray vesicular BASALT, moderately to closely fractured, moderately weathered, hard (basalt formation)					
										Grayish red strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Boring terminated at 48.5 feet					
Date Started:		December 3, 2001				Water Level: ∇		Not Encountered							
Date Completed:		December 4, 2001				Drill Rig:		DIEDRICH D-25							
Logged By:		K. Gronseth				Drilling Method:		4" Solid-Stem Auger & HQ Coring							
Total Depth:		48.5 feet				Driving Energy:		140 lb. wt., 30 in. drop							
Work Order:		4605-10													

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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): 133 *					
										Description					
UC=20854 psi									GM	12-inch ASPHALTIC CONCRETE					
										Grayish brown SILTY BASALTIC GRAVEL with sand, very dense, damp (base material)					
										Grayish brown with yellow and purple mottling BASALT, highly weathered, soft (clinker)					
										Gray vugular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)					
UC=3006										Grayish brown strongly vesicular BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation)					
Date Started:		December 5, 2001				Water Level: ∇		Not Encountered							
Date Completed:		December 6, 2001				Drill Rig:		CME-75							
Logged By:		E. Shinsato				Drilling Method:		4" Auger & HQ Coring							
Total Depth:		81.5 feet				Driving Energy:		140 lb. wt., 30 in. drop							
Work Order:		4605-10													



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[Signature]
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION





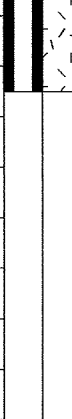
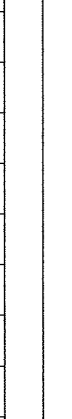
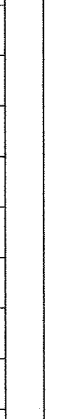

BORING LOGS


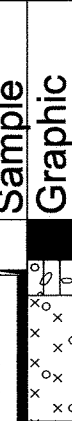







Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

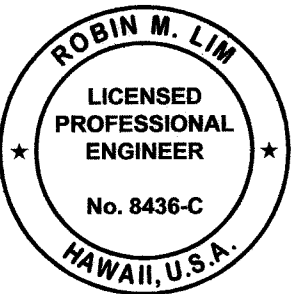
Scale: As Noted Date: April 2007

SHEET No. B-3 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	96	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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	(Continued from previous plate)					
										Description					
psi							60			grades to gray, slightly weathered, medium hard to hard					
UC=1923 psi		106					65			Dark gray vugular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)					
							70			Dark gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)					
							75			Grayish red strongly vesicular BASALT, moderately fractured, moderately weathered, medium hard (clinker)					
							80			Dark gray strongly vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)					
							85			grades to closely fractured, moderately weathered					
							90			Boring terminated at 81.5 feet					
Boring Log Plot 4605-10.GPJ GEOLABS.DOT 4/3/05															
Date Started: December 5, 2001															
Date Completed: December 6, 2001															
Water Level: ∇ Not Encountered															
Logged By: E. Shinsato															
Drill Rig: CME-75															
Total Depth: 81.5 feet															
Drilling Method: 4" Auger & HQ Coring															
Work Order: 4605-10															
Driving Energy: 140 lb. wt., 30 in. drop															

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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): 122 *					
										Description					
UC=4417 psi							5		GM	10-inch ASPHALTIC CONCRETE					
										Dark brown SILTY GRAVEL with sand, dense, damp (base material)					
										Gray and brown scoriaceous BASALT AND SANDY SILT, soft to medium hard (clinker)					
										Brownish gray strongly vesicular BASALT, closely fractured, moderately to highly weathered, hard (basalt formation)					
UC=7622 psi		126					10			Gray strongly vesicular BASALT, slightly fractured, slightly weathered, hard (basalt formation)					
							15			Brownish orange with gray mottling scoriaceous BASALT, slightly fractured, moderately to highly weathered, medium hard (basalt formation)					
		149					20			Gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)					
							25			Reddish brown with gray mottling strongly vesicular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)					
							30			grades to scoriaceous					
							35			Gray with dark reddish brown mottling strongly vesicular BASALT, moderately fractured, slightly to moderately weathered, hard (basalt formation)					
							40			grades to closely fractured, moderately weathered					
							45			Gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)					
							50			Gray strongly vesicular BASALT, slightly fractured, slightly weathered, hard (basalt formation)					
							55			Gray vugular BASALT, slightly fractured, slightly weathered, hard (basalt formation)					
Boring Log Plot 4605-10.GPJ GEOLABS.DOT 4/3/05															
Date Started: November 28, 2001															
Date Completed: November 29, 2001															
Water Level: ∇ Not Encountered															
Logged By: Y. Chiba															
Drill Rig: CME-55G															
Total Depth: 81 feet															
Drilling Method: 4" Auger & HQ Coring															
Work Order: 4605-10															
Driving Energy: 140 lb. wt., 30 in. drop															



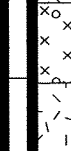
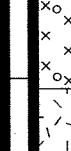
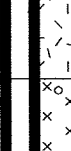

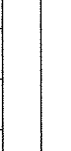
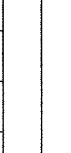
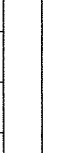
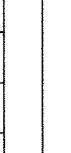
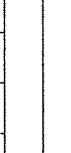
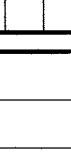




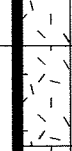

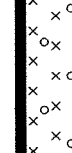

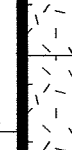


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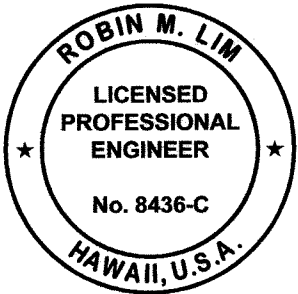

SIGNATURE 4-30-08
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. B-4 OF 14 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	97	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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	(Continued from previous plate)					
										Description					
UC=2034 psi		127					60			Gray vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)					
							65			Reddish brown scoriaceous BASALT, severely fractured, moderately weathered, medium hard (clinker)					
							70			Reddish brown scoriaceous BASALT, closely fractured, moderately weathered, medium hard (clinker)					
							75			Gray vugular BASALT, moderately fractured, moderately weathered, medium hard to hard (basalt formation)					
							80			Grayish brown BASALT, severely fractured, moderately weathered, medium hard (clinker)					
							85			Grayish brown vugular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)					
							90			Boring terminated at 81 feet					
							95								
							100								
							105								
							110								
Date Started: November 28, 2001		Water Level: ▽ Not Encountered													
Date Completed: November 29, 2001															
Logged By: Y. Chiba		Drill Rig: CME-55G													
Total Depth: 81 feet		Drilling Method: 4" Auger & HQ Coring													
Work Order: 4605-10		Driving Energy: 140 lb. wt., 30 in. drop													

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, 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): 112 *					
										Description					
UC=1556 psi	13		70	43	40/.3' Ref. 20/.0' Ref.		5		GM	11.5-inch ASPHALTIC CONCRETE					
										Grayish brown SILTY BASALTIC GRAVEL with sand, very dense, damp (base material)					
										Grayish brown strongly vesicular BASALT, closely to severely fractured, moderately weathered, medium hard (basalt formation)					
UC=2003 psi	19	104	85	68			10			Gray vesicular BASALT, slightly fractured, moderately weathered, hard (basalt formation)					
										Grayish brown vesicular BASALT, closely to severely fractured, moderately weathered, medium hard (basalt formation)					
		113	73	45			15			Gray strongly vesicular BASALT, moderately fractured, moderately weathered, medium hard to hard (basalt formation)					
		55	0		40/.3' Ref.		20			Brown vesicular BASALT, severely fractured, highly weathered, soft (clinker)					
		100	88				25			Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard to hard (basalt formation)					
										Gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)					
		100	97				30			Grayish brown vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)					
		85	42				35			Reddish gray strongly vesicular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)					
										Gray vugular BASALT, closely fractured, moderately weathered, hard (basalt formation)					
		30	8				40			grades to severely fractured					
										Grayish brown vesicular BASALT, severely fractured, moderately to highly weathered, soft (clinker)					
Date Started: November 28, 2001		Water Level: ▽ Not Encountered													
Date Completed: November 29, 2001															
Logged By: E. Shinsato		Drill Rig: MOBILE B-80													
Total Depth: 80.5 feet		Drilling Method: 4" Auger & HQ Coring													
Work Order: 4605-10		Driving Energy: 140 lb. wt., 30 in. drop													




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EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. B-5 OF 14 SHEETS	

ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____	
	DRAWN BY _____	
NOTE BOOK	TRACED BY _____	
	DESIGNED BY _____	
	QUANTITIES BY _____	
	CHECKED BY _____	
No. _____		




ROBIN M. LIM
 LICENSED
 PROFESSIONAL
 ENGINEER
 No. 8436-C
 HAWAII, U.S.A.

 4-30-08
SIGNATURE EXPIRATION DATE OF THE LICENSE

SHEET No. **B-6** OF **14** SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____	
	DRAWN BY _____ "	
NOTE BOOK	TRACED BY _____ "	
	DESIGNED BY _____ "	
	QUANTITIES BY _____ "	
	CHECKED BY _____ "	
No. _____		



ROBIN M. LIM
 LICENSED
 PROFESSIONAL
 ENGINEER
 No. 8436-C
 HAWAII, U.S.A.

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SIGNATURE Michael Wong EXPIRATION DATE OF THE LICENSE 4-30-08


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION


BORING LOGS

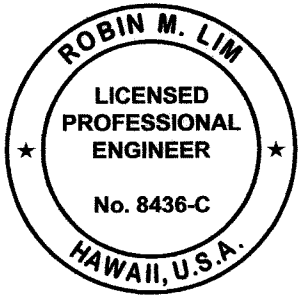
Kalanianaʻole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted Date: April 2007

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	100	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 103	
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					
			73	17			60			Gray with yellow and black mottling BASALT, closely fractured, moderately weathered, medium hard to hard (basalt formation)					
							60			Boring terminated at 60 feet					
							65								
							70								
							75								
							80								
							85								
							90								
							95								
							100								
							105								
							110								
Date Started:			November 26, 2001			Water Level: ∇			Not Encountered						
Date Completed:			November 26, 2001			Drill Rig:			CME-55G						
Logged By:			Y. Chiba			Drilling Method:			4" Auger, 4" Casing & HQ Coring						
Total Depth:			60 feet			Driving Energy:			140 lb. wt., 30 in. drop						
Work Order:			4605-10												

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 104	
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): 154 *					
										Description					
UC=584 psi	6				19				GM	6.5-inch ASPHALTIC CONCRETE					
	35	79			67.8' Ref.	>4.5	5		CH	Grayish brown SILTY BASALTIC GRAVEL with sand, medium dense, dry (base material)					
			47	0						Brown with orange and black mottling SILTY CLAY with traces of moderately weathered basaltic gravel and sand, very stiff, moist (fill)					
			22	18						Gray vesicular BASALT, closely to severely fractured, moderately to highly weathered, soft to medium hard (basalt formation)					
			67	30	10/.0' Ref.					Gray vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)					
		96								Grayish brown strongly vesicular BASALT, severely to closely fractured, moderately to highly weathered, soft to medium hard (basalt formation)					
			100	78						grades to moderately fractured, moderately weathered, medium hard					
			75	43						Grayish brown vugular BASALT, closely to severely fractured, moderately weathered, medium hard (basalt formation)					
			65	40											
			35	0						Brown and gray BASALT, severely fractured, moderately weathered, soft (clinker)					
		66	17	25/.1' Ref.						Grayish brown vesicular BASALT, severely to closely fractured, moderately weathered, soft to medium hard (basalt formation)					
		67	25												
		95	87							Gray vugular BASALT, closely fractured, slightly weathered, hard to very hard (basalt formation)					
		67	50							grades to moderately fractured					
Date Started:			November 26, 2001			Water Level: ∇			Not Encountered						
Date Completed:			November 26, 2001			Drill Rig:			MOBILE B-80						
Logged By:			E. Shinsato			Drilling Method:			4" Auger & HQ Coring						
Total Depth:			60.7 feet			Driving Energy:			140 lb. wt., 30 in. drop						
Work Order:			4605-10												



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted Date: April 2007















FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	101	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				Log of Boring 104		
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
	26		10	0			60			Brown and gray BASALT, severely fractured, moderately weathered, soft (clinker)
							60.7			Boring terminated at 60.7 feet
							65			
							70			
							75			
							80			
							85			
							90			
							95			
							100			
							105			
							110			
Date Started: November 26, 2001			Water Level: ∇ Not Encountered							
Date Completed: November 26, 2001										
Logged By: E. Shinsato			Drill Rig: MOBILE B-80							
Total Depth: 60.7 feet			Drilling Method: 4" Auger & HQ Coring							
Work Order: 4605-10			Driving Energy: 140 lb. wt., 30 in. drop							

ORIGINAL
PLAN

SURVEY PLOTTED BY _____ DATE _____
DRAWN BY _____
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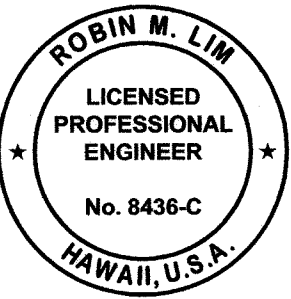
BORING LOG DOT 4605-10.DWG, GEOLABS.DWG 2/26/05

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				Log of Boring 105		
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): 95 *
										Description
	13	91			54				SM	6-inch ASPHALTIC CONCRETE
	4				50/.4'				ML	Brown SILTY SAND with gravel (base material)
	9				9		5		SP-SM	Gray and brown SANDY SILT with basaltic gravel, dense, damp (fill)
										Gray and brown SAND with silt, basaltic gravel, and cobbles, loose to medium dense (colluvium)
	9				8/.5' +50/.4'		10		GW/GM	Gray and brown BASALTIC COBBLES, BOULDERS, AND GRAVEL with silt and sand, medium dense to dense (colluvium)
	9		57		62		15			
			40				20			
	12		59		50/.5'		25			
			33				30			
			7		20/.0' Ref.		35			
			37		20/.0' Ref.		40			
	11		20		50/.4' Ref.		45			
	10		42		50/.3' Ref.		50			
							55			
Date Started: December 7, 2001			Water Level: ∇ 77.5 ft. 12/11/01 1200 HRS							
Date Completed: December 11, 2001										
Logged By: Gronseth & Shinsato			Drill Rig: CME-75							
Total Depth: 81.5 feet			Drilling Method: 4" Solid-Stem Auger & HQ Coring							
Work Order: 4605-10			Driving Energy: 140 lb. wt., 30 in. drop							

ORIGINAL
PLAN

SURVEY PLOTTED BY _____ DATE _____
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BORING LOG DOT 4605-10.DWG, GEOLABS.DWG 2/26/05



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION


BORING LOGS

Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted Date: April 2007

SHEET No. B-9 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	102	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 105	
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					
	12		42		40				GW/ GM						
	14		17		41		60								
			40		20/.0' Ref.		65								
			73	30	20/.0' Ref.		70								
			97	92			75								
							80								
							85								
							90								
							95								
							100								
							105			Grayish brown vugular BASALT with cemented coralline sediment and basaltic gravel, moderately fractured, moderately to slightly weathered, hard (cemented beach rock) Grayish brown vugular BASALT, moderately fractured, moderately weathered, hard (basalt formation) Boring terminated at 81.5 feet					
							110								
Date Started:		December 7, 2001				Water Level: ∇		77.5 ft. 12/11/01 1200 HRS							
Date Completed:		December 11, 2001				Drill Rig:		CME-75							
Logged By:		Gronseth & Shinsato				Drilling Method:		4" Solid-Stem Auger & HQ Coring							
Total Depth:		81.5 feet				Driving Energy:		140 lb. wt., 30 in. drop							
Work Order:		4605-10													

SURVEY PLOTTED BY

DATE

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NOTE BOOK

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No.

BORING LOGS DOT 4605-10.GPJ GEOLABS DOT 120005

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 106	
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): 90 *					
										Description					
	24	81			41				GM CL	6-inch ASPHALTIC CONCRETE					
	11				58/.7' Ref. 96		5		GW- GM	Grayish brown SILTY BASALTIC GRAVEL with sand, medium dense, damp (base material)					
	10	87								Brown SILTY CLAY with coralline gravel, stiff to very stiff, moist (fill)					
										Brown BASALTIC GRAVEL with silt and sand, dense, dry to damp (colluvium)					
	8		60		50		10								
										Gray and brown BASALTIC COBBLES AND BOULDERS with sand and gravel and some clay, medium dense to dense (colluvium)					
							15								
							20								
					50/.2' Ref.		25								
							30								
	26				88		35								
							40								
					100/.9' Ref.		45								
					50/.5' Ref.		50								
							55			Gray and brown BASALTIC BOULDERS with cobbles, sand and gravel, dense (colluvium)					
Date Started:		December 11, 2001				Water Level: ∇		Not Encountered							
Date Completed:		December 14, 2001				Drill Rig:		MOBILE B-80							
Logged By:		E. Shinsato				Drilling Method:		4" Auger & HQ Coring							
Total Depth:		76.5 feet				Driving Energy:		140 lb. wt., 30 in. drop							
Work Order:		4605-10													

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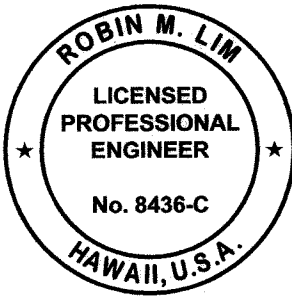
NOTE BOOK

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EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. B-10 OF 14 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	103	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				Log of Boring 106		
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
			41		40/.3' Ref.					
			38		25/.0' Ref.		60			
			35		20/.0' Ref.		65			
			100	100	50/.3' Ref.		70			Gray vesicular BASALT with cemented basaltic gravel and coralline sediment, slightly fractured, moderately weathered, medium hard (beach rock)
			100	100			75			Gray vugular BASALT, moderately fractured, slightly to moderately weathered, hard (basalt formation)
										Boring terminated at 76.5 feet
							80			
							85			
							90			
							95			
							100			
							105			
							110			
Date Started: December 11, 2001				Water Level: ∇ Not Encountered						
Date Completed: December 14, 2001										
Logged By: E. Shinsato				Drill Rig: MOBILE B-80						
Total Depth: 76.5 feet				Drilling Method: 4" Auger & HQ Coring						
Work Order: 4605-10				Driving Energy: 140 lb. wt., 30 in. drop						

SURVEY PLOTTED BY _____ DATE _____

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ORIGINAL
PLAN

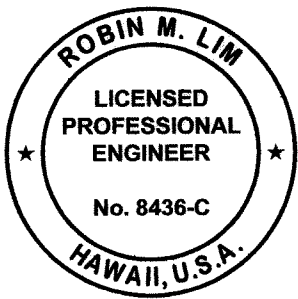
NOTE BOOK

No. _____

BORING LOG DOT 4605-10.GPJ GEOLABS.GIT 3/20/05

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				Log of Boring 107		
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): 94 * Description
	10		33		39	>4.5			GM	4.5-inch ASPHALTIC CONCRETE
			40			>4.5	5		CH	Dark brown SILTY GRAVEL with sand, dense, damp (base material)
									GM	Grayish brown SILTY CLAY with sand and some gravel, hard, dry to damp (fill)
										Gray BASALTIC COBBLES AND GRAVEL with clayey silt and sand, dense (colluvium)
										Dark brown and gray CLAYEY COBBLES AND BOULDERS with some sand and gravel, medium dense, damp (colluvium)
LL=74 PI=49	18		49		43/.8' Ref.	>4.5 >4.5	10			
			62			3.5	15			
	29		73		35/.4' Ref.		20			
			68			2.0	25			
			68		10/.0' Ref.		30			Gray with tan and brown mottling moderately to highly weathered BASALTIC COBBLES AND BOULDERS in a silty sand matrix, dense (colluvium)
			45				35			
	4		74		10/.0' Ref.		40			
			33				45			
	6		47		47/.5' +10/.1' Ref.		50			Gray and brown SANDY SILT AND BASALTIC COBBLES AND BOULDERS, dense (colluvium)
							55			
Date Started: November 30, 2001				Water Level: ∇ 90 ft. 12/03/01 1200 HRS						
Date Completed: December 3, 2001										
Logged By: Chiba & Shinsato				Drill Rig: MOBILE B-80						
Total Depth: 100.5 feet				Drilling Method: 4" Auger & HQ Coring						
Work Order: 4605-10				Driving Energy: 140 lb. wt., 30 in. drop						

BORING LOG DOT 4605-10.GPJ GEOLABS.GIT 3/20/05




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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. B-11 OF 14 SHEETS	

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTE BOOK	DRAWN BY _____	" _____
	TRACED BY _____	" _____
	DESIGNED BY _____	" _____
	QUANTITIES BY _____	" _____
No. _____	CHECKED BY _____	" _____

A circular professional engineer seal for Robin M. Lim. The outer ring contains the name "ROBIN M. LIM" at the top and "HAWAII, U.S.A." at the bottom. The inner circle contains the text "LICENSED PROFESSIONAL ENGINEER" and "No. 8436-C". Two small stars are positioned on the left and right sides of the inner circle.

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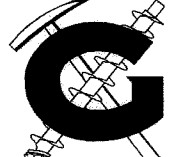
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION


BORING LOGS

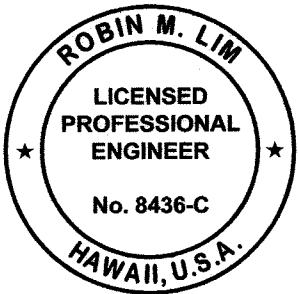
Kalanianaʻole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted Date: April 2007

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	105	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 108	
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					
			58												
			60				60								
			67				65								
			50	30			70			Grayish brown vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)					
			100	55			75			Tannish white cemented CORAL with some basaltic gravel and shells, severely to closely fractured, moderately weathered, medium hard to hard (coral formation)					
			87	47			80			Grayish brown vesicular BASALT, slightly to moderately fractured, moderately weathered, medium hard (basalt formation)					
			100	57			85								
			92	38			90			grades to severely fractured					
			93	63			95			grades to highly weathered, soft					
										grades to medium hard					
							100			Gray vesicular BASALT, moderately fractured, slightly to moderately weathered, hard (basalt formation)					
										Boring terminated at 100.5 feet					
Date Started: December 4, 2001												Water Level: ∇ 72.5 ft. 12/5/01 1500 HRS			
Date Completed: December 5, 2001															
Logged By: E. Shinsato												Drill Rig: MOBILE B-80			
Total Depth: 100.5 feet												Drilling Method: 4" Auger & HQ Coring			
Work Order: 4605-10												Driving Energy: 140 lb. wt., 30 in. drop			

		GEOLABS, INC. Geotechnical Engineering		KALANIANA'OLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII										Log of Boring 109	
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					
	13	106			67				GM	7-inch ASPHALTIC CONCRETE					
	4				16				GC	Grayish brown SILTY BASALTIC GRAVEL with sand, very dense, dry (base material)					
	3	86			8		5		SP	Brown CLAYEY BASALTIC GRAVEL with some sand, medium dense, moist (fill)					
										Tan fine to medium grained CORALLINE SAND, loose to medium dense, dry (dune sand deposit)					
	4				25		10								
	26	85			78/.8' Ref.	>4.5	15		CH	Brown with multi-colored mottling SILTY CLAY with some weathered basaltic gravel and traces of coralline sand, very stiff, moist (colluvium)					
LL=67 PI=40	75				23	>4.5	20			grades with some basaltic cobbles					
										grades to hard					
	32	88			81/.8' Ref.	>4.5	25								
	10		71		50/.3' Ref.		30			Gray and brown CLAYEY BASALTIC COBBLES with some boulders, sand and gravel, dense (colluvium)					
			75				35			Gray and brown CLAYEY BASALTIC COBBLES with some boulders, sand and gravel, dense (colluvium)					
			38				40								
			29		50/.4' Ref.		45								
	19		67		90/.8' Ref.		50								
							55								
Date Started: December 6, 2001												Water Level: ∇ Not Encountered			
Date Completed: December 7, 2001															
Logged By: E. Shinsato												Drill Rig: MOBILE B-80			
Total Depth: 95.5 feet												Drilling Method: 4" Auger & HQ Coring			
Work Order: 4605-10												Driving Energy: 140 lb. wt., 30 in. drop			



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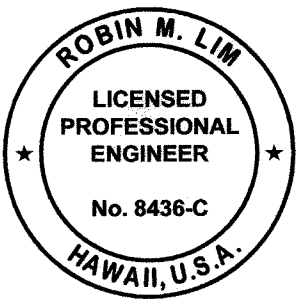
*Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)*

Scale: As Noted Date: April 2007

SHEET No. B-13 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	106	106

		GEOLABS, INC. Geotechnical Engineering		KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				Log of Boring 109		
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
	19		33							
			72		20/0'			60		
			45	25				65		
			30	14	50/3'			70		Gray and white BASALTIC BOULDERS with some coral, hard (colluvium) grades to severely fractured
			72	58	40/0'			75		
			40	0				80		Tannish white cemented CORAL, severely fractured, moderately weathered, medium hard (coral formation)
			0	0	20/0'			85		Gray vesicular BASALT, severely fractured, moderately weathered, medium hard (basalt formation) Gray and brown BASALT, severely fractured, highly weathered, soft (clinker)
			0	0	20/0'			90		
						95		Boring terminated at 95.5 feet		
						100				
						105				
						110				
Date Started:		December 6, 2001		Water Level:		Not Encountered				
Date Completed:		December 7, 2001		Drill Rig:		MOBILE B-80				
Logged By:		E. Shinsato		Drilling Method:		4" Auger & HQ Coring				
Total Depth:		95.5 feet		Driving Energy:		140 lb. wt., 30 in. drop				
Work Order:		4605-10								



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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. B-14 OF 14 SHEETS	