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

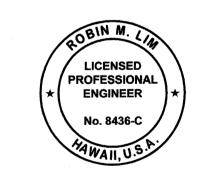
					Engine			ł	KALA	MAKAPUU, OAHU, HAWAII 1
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	ore Secovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 145 * Description
JC=15354	7		100	25	50/.4'		5-		GM CH	4-inch ASPHALTIC CONCRETE Brown with white mottling SILTY GRAVEL with sand, medium dense (base material) 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
psi		107	100				10 ⁻			hard (basalt formation)
JC=7016 psi		155	96	96			15			Gray vugular BASALT, slightly fractured, slightly weathered, hard (basalt formation)
			50	6			20	-		grades to closely fractured Grayish red with orange mottling strongly vesicular
			67	23			25	- × × × × × × × × × × × × × × × × × × ×		BASALT, severely fractured, moderately weathered, medium hard (clinker) Dark gray slightly vesicular BASALT, closely
			100	19			30			fractured, slightly weathered, hard (basalt formation)
			55	0				- \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
			60	0			35	- × × × × × × × × × × × × × × × × × × ×	d	Grayish red with orange mottling vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker) Dark gray vugular BASALT, closely fractured,
			60	8			40	-	d d	moderately weathered, hard (basalt formation) Dark gray with yellow mottling strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)
JC=4536 psi		122		35			45	× × × × × × × × × × × × × × × × × × ×	d	Gray vesicular BASALT, moderately to closely fractured, moderately weathered, hard (basalt formation)
I							50	- X X X X X O X Y	d	Grayish red strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker) Boring terminated at 48.5 feet
							55			* Elevations estimated from Topographic Drawings provided by Park Engineering on October 11, 2001.
Date Sta					3, 2001 4, 2001				400	Water Level: ☑ Not Encountered
Logged I Total De Work Or	Эу: pth:		K. Gr 48.5 4605	onse feet						Drill Rig: DIEDRICH D-25 Drilling Method: 4" Solid-Stem Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop

KALANIANAOLE HWY. IMPROVEMENTS

GEOLABS, INC.

Log of Boring

	C				BS, IN Engine		,		KALA	ANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 2			
Other Tests Moisture	Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	SS	Approximate Ground Surface Elevation (feet MSL): 133 *			
Oth Moi	ပ္ပံ	Me.	Core	RQ	Per Res (blo	Poc (tsf)	Dep	Sar	nscs	Description			
										12-inch ASPHALTIC CONCRETE	1		
					67			- 0	GM	Grayish brown SILTY BASALTIC GRAVE sand, very dense, damp (base material)	:L With		
					62			×××	c c	Grayish brown with yellow and purple mo	ttling		
							5	×××	۲	BASALT, highly weathered, soft (clinker)			
					20/.0'					Gray vugular BASALT, moderately fractu			
			100	78	Ref.				-	slightly weathered, very hard (basalt form	nation) -		
		-											
10.00054	Anna de	4-74					10				_		
JC=20854		171						1		Grayish brown strongly vesicular BASAL	T closely		
psi			100	62				- 1		to moderately fractured, moderately wear	thered.		
								1		medium hard (basalt formation)			
							15	-			-		
			400	400							-		
			100	100							-		
								- 1		Gray vugular BASALT, slightly fractured,	eliahtly		
							20			weathered, hard to very hard (basalt forn			
			100	83							, -		
			100	00				- '	\	Gray vesicular BASALT, moderately to sl	iahtly		
										fractured, slightly weathered, medium ha	rd to hard		
							25	- ' '		(basalt formation)	-		
			100	80							-		
								-	-		_		
							20						
							30				-		
			100	85				-					
										Grayish brown strongly vesicular BASAL fractured, moderately weathered, mediur	I, closely		
							35			(basalt formation)	IIIIaiu		
										(basait isimatism)	-		
			77	50				-			-		
							40	-		Grayish brown vesicular BASALT, moder	ately		
			400	00						fractured, slightly to moderately weather			
			100	00						medium hard (basalt formation)	, -		
								- 1					
	The state of the s						45	-					
			100	33									
		:	100							grades to severely fractured	-		
											_		
							50						
			100	72			-	- '		Grayish brown strongly vesicular BASAL	T , -		
	and the second s						Territoria de la casa	-		moderately fractured, moderately weather			
UC=3006		119					55	- ()		medium hard (basalt formation)	_		
Date Starte					5, 2001					Water Level: Not Encountered			
110+0 ()	piete	ea:			6, 2001		_			Daill Dies CME 75			
Date Comp Logged By	/:		E. Sh	insate	0					Drill Rig: CME-75			



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION



state of hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS

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

Date: April 2007 Scale: As Noted 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

					BS, IN Engine		,	ļ	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 2
Other Tests	Moisture Content (%)		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description
psi			97	97			60			grades to gray, slightly weathered, medium hard to hard
			100	40			65			Dark gray vugular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)
			100	83			70	- '\'- '\'- '\'- '\'- '\'- '\'- '\'- '\		Dark gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation) Grayish red strongly vesicular BASALT,
JC=1923 psi		106	97	62			75	- x x x x x x x x x x x x x x x x x x x	d	moderately fractured, moderately weathered, medium hard (clinker) Dark gray strongly vesicular BASALT, moderately fractured, slightly weathered, hard (basalt
			100	80			80			formation) grades to closely fractured, moderately weathered
							85	-		Boring terminated at 81.5 feet
	-						90	-		
							95	_		
							100	-		
							105			
Date Sta	arted.		Dece	mher	5, 2001		110			Water Level: Not Engagetered
Date Sta Date Co Logged Total De Work Or	mple By: epth:			mber insat feet	6, 2001					Drill Rig: CME-75 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine			ŀ	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Noisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 122 * Description	
U	20		70	33	10/.0' Ref.	ш	- - -		GM	10-inch ASPHALTIC CONCRETE Dark brown SILTY GRAVEL with sand, de damp (base material)	•
110-4447		106	98	28			5-	× -/\ -/\ -/\ -/\		Gray and brown scoriaceous BASALT AN SANDY SILT, soft to medium hard (clinke Brownish gray strongly vesicular BASALT fractured, moderately to highly weathered (basalt formation)	r) , closely
UC=4417 psi		126	100	60			10- -			Gray strongly vesicular BASALT, slightly f	ractured
			75	60			15			slightly weathered, hard (basalt formation Brownish orange with gray mottling scorial BASALT, slightly fractured, moderately to	ceous
UC=7622		149		60			20-			weathered, medium hard (basalt formation Gray vugular BASALT, slightly fractured, sweathered, hard to very hard (basalt formation)	n) slightly
psi			98	57			-			Reddish brown with gray mottling strongly	,
			98	20			25-			vesicular BASALT, closely fractured, mod weathered, medium hard (basalt formatio grades to scoriaceous	lerately
			88	47			30			Gray with dark reddish brown mottling stro	
			07	57			35-			vesicular BASALT, moderately fractured, to moderately weathered, hard (basalt for	
			97	57			-			grades to closely fractured, moderately we	eathered
			100	100			40-			Gray vugular BASALT, slightly fractured, sweathered, hard to very hard (basalt form	
			100	70			45			Gray strongly vesicular BASALT, slightly f slightly weathered, hard (basalt formation	
			100	95			50-			Gray vugular BASALT, slightly fractured, sweathered, hard (basalt formation)	slightly
Date Sta			Nove	mber	28, 200		55-			Water Level: ☑ Not Encountered	4
Logged Total De			Y. Ch 81 fe							Drill Rig: CME-55G Drilling Method: 4" Auger & HQ Coring	







state of hawaii department of transportation highways division

BORING LOGS

Kalanianaole 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.	
HAWAII	HAW.	NH-072-1(51)	2007	97	106

					3S, IN Engine				KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Moisture Content (%)		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	(Continued from previous plate) Description	
O			97	97						•	
			97	20			60			Gray vesicular BASALT, moderately frac slightly weathered, hard (basalt formation	
			67	53			65	- × × × × × × × × × × × × × × × × × × ×		Reddish brown scoriaceous BASALT, set fractured, moderately weathered, mediu (clinker) Gray vugular BASALT, moderately fractured	m hard
			95	95			70	× × × × × × × × × × × × × × × × × × ×	· · · · · · · · · · · · · · · · · · ·	slightly weathered, hard (basalt formation Reddish brown scoriaceous BASALT, classification fractured, moderately weathered, medius (clinker)	on) osely im hard
			63	37			75 ⁻	×0;		Gray vugular BASALT, moderately fraction moderately weathered, medium hard to (basalt formation) Grayish brown BASALT, severely fractule moderately weathered, medium hard (cl.)	hard red,
JC=2034 psi		127			10/.0'		80	× 0 × 0 × 0 × 0 × 0 × 0 × 0 × 0 × 0 × 0	×	Grayish brown vugular BASALT, modera fractured, moderately weathered, mediu (basalt formation)	ately
					Ref.		85	-		Boring terminated at 81 feet	
							90	_			
							95				
							100				
							105				
Date Sta	rted:		Nove	mber	28, 200	1	110			Water Level: Not Encountered	
Date Co	mple		Nove	mber	29, 200						
Logged I Total De		· .	Y. Ch 81 fe							Drill Rig: CME-55G Drilling Method: 4" Auger & HQ Coring	
	der:		4605							Driving Energy: 140 lb. wt., 30 in. drop	

					3S, IN Engine		,	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 4	ng
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): 112 * Description	
	13		70 90	43 47	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, clos to severely fractured, moderately weathered, medium hard (basalt formation)	
			100	68			10		Gray vesicular BASALT, slightly fractured, moderately weathered, hard (basalt formation) Grayish brown vesicular BASALT, closely to	
			85	68			15		severely fractured, moderately weathered, medium hard (basalt formation)	
UC=1556 psi		104	73	45			20		Gray strongly vesicular BASALT, moderately fractured, moderately weathered, medium hard hard (basalt formation)	d to
UC=2003 psi		113	55	0			25	-	Brown vesicular BASALT, severely fractured, highly weathered, soft (clinker)	
	19		100	88	40/.3' Ref.		30	-		
			100		INCI.		35		Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard to hard (basa formation) Gray vugular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)	У
			100	100			40		Grayish brown vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)	t
			85	42			45		Reddish gray strongly vesicular BASALT, close fractured, moderately weathered, medium hard (basalt formation) Gray vugular BASALT, closely fractured,	t ———
			30	8			50	-	moderately weathered, hard (basalt formation) grades to severely fractured Grayish brown vesicular BASALT, severely	
						and the second s	55	- x x x x x x x x x x x x x x x x x x x	fractured, moderately to highly weathered, soft (clinker)	
Date Sta					28, 200° 29, 200°				Water Level: Not Encountered	
Date Co Logged	By:	eu.	E. Sh	ninsat		1			Drill Rig: MOBILE B-80	
Total De Work Or	•		80.5 4605						Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	





state of hawaii Department of transportation highways division

BORING LOGS

Kalanianaole 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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	98	106

	- (BS, IN				KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII			
Other Tests	Moisture Content (%)		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	(Continued from previous plate) Description	
			33	7	50/.4' Ref.				×°× × ×°× × ×°× × ×°×			-
	·		93	62	20/.0' Ref.		60	-	×		Gray vugular BASALT, closely fractured, moderately weathered, medium hard to (basalt formation)	nard
			63	43			65		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Grayish brown vesicular BASALT, model fractured, moderately weathered, mediu (basalt formation)	m hard
JC=2383		102	47	7			70		× × × × × × × × × × × × × × × × × × ×		Grayish brown BASALT, severely fracture moderately to highly weathered, soft to rehard (clinker)	ed, nedium
psi							7.5	-	× × × × × × × × × × × × × × × ×			
			82	57	50/.3' Ref.		75		× // - / - / - /		Gray vugular BASALT, closely to modera fractured, slightly weathered, hard to ver (basalt formation)	ately y hard
							80		·-//		Boring terminated at 80.5 feet	
							85					
							90					
							95	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
							100					
							105					
Date Sta	ortod.		Novo	mha	28, 200	1	110	1			Water Level: Not Englished	
Date Co	mple		Nove	mber	29, 200						Not Encountered	
Logged Total De			E. Sh 80.5								Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring	
Work Or			4605	-10							Driving Energy: 140 lb. wt., 30 in. drop	

					BS, IN				KAL	ANIANAOLE HWY. IMPROVEMENTS Log of Boring
	-				Engine	eering				MAKAPUU, OAHU, HAWAII 101
Other Tests	Aoisture Sontent (%)	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): 158 * Description
	4333	ō≥ 72 70	O S S	0	20 50/.5' Ref. 77/.9' Ref.		10		SM SM	4-inch ASPHALTIC CONCRETE Brown with gray mottling SILTY CLAY with some weathered basaltic gravel, very stiff, moist (alluvium/fill) Gray and brown with orange mottling SILTY SANI with some weathered basaltic gravel, dense, very
UC=115	36	85	100	15	7		15	-		
psi		00	60	6			20	-		Dark brown vesicular BASALT, closely to severely fractured, moderately to highly weathered, soft to medium hard (basalt formation)
			100	9			25	5-1-1	- 11 -	
							30)	<i>></i>	Boring terminated at 30 feet
							35	5-		
							40)-		
							45	5-		
							50)		
Date Sta					6, 2001		5	5		Water Level: Not Encountered
Date Cor Logged E Total De	3y:	ed:	Dece K. Gr 30 fe	onse	6, 2001 th					Drill Rig: CME-75 Drilling Method: 4" Solid-Stem Auger & HQ Coring





state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

Kalanianaole Highway Improvements <u>Retaining Wall at Makapuu, Oahu</u> <u>Federal-Aid Project No. NH-072-1(51)</u>

Scale: As Noted

Date: April 2007

SHEET No. **B-6** 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	99	106

					BS, IN Engine				KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	Approximate Ground Surface Elevation (feet MSL): 158 * Description	
LL=84 PI=54	44 37 19	70	73 100	42 60	24 25 82/.8' Ref.		5		CL SM/ GM CH	3-inch ASPHALTIC CONCRETE Brown with white mottling SILTY CLAY w (base material) Gray with orange and brown mottling SIL with highly weathered basaltic gravel, medense, damp, very moist (fill) Brown SILTY CLAY, very stiff, moist (sap Grayish brown with white mottling strongl vesicular BASALT, moderately fractured, moderately to highly weathered, medium (basalt formation)	TY SAND edium rolite)
JC=1477 psi		106	100	31			15	0000		Gray slightly vesicular BASALT, closely for slightly weathered, hard (basalt formation	
			100	64			20			Gray vesicular BASALT, closely to mode fractured, slightly weathered, hard to very (basalt formation)	rately y hard
			100				25			Gray vesicular BASALT, moderately fract slightly weathered, hard (basalt formation	· · · · · · · · · · · · · · · · · · ·
			100	38			30			Gray non-vesicular BASALT, closely fracting slightly weathered, very hard (basalt form Boring terminated at 31.5 feet	
							35				
							40				
							45				
							50				
							55				-
Date Sta Date Cor Logged I	mplet			mber	30, 2001 30, 2001 th		<u> </u>			Water Level: Not Encountered Drill Rig: CME-75	
Total De			31.5 4605	feet						Drilling Method: 4" Solid-Stem Auger & HQ Co	ring

					BS, IN			ł	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Boring
	1				Engine					MARAPOO, OAHO, HAVVAH	103
Other Tests	/loisture Sontent (%)	ory Unit Veight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 156 * Description	
U	39	74	OŒ	UL.	35	3.5		- °p -	GM CH	6-inch ASPHALTIC CONCRETE Dark brown SILTY GRAVEL, dense, dry t	o damp
LL=75 PI=48	36				17	4.0	5		СН	(base material) Dark brown wit orange mottling SILTY CL some highly weathered basaltic gravel, h	
	39	56	100	0	22/.8' Ref.					damp (fill) Brown with multi-colored mottling SILTY (with basaltic sand and some gravel, very	CLAY
			100	25			10			damp to dry (saprolite) Gray-brown CLAYEY DECOMPOSED BA	ASALT,
JC=203		100		20						loose to medium dense, damp (decompo basalt rock) Gray vugular BASALT, closely fractured,	
psi		100	95	33			15			weathered, medium hard (basalt formation) Grayish brown strongly vesicular BASAL moderately fractured, moderately weather medium hard (basalt formation)	on) T,
			95	0			20	- (grades to vugular Grayish brown with yellow mottling vugula BASALT, closely fractured, highly weathe medium hard (basalt formation)	
			98	62			25			Gray with yellow and brown mottling vugues BASALT, moderately to slightly fractured	,
			100	70			30	-		moderately weathered, medium hard (ba formation) Gray with reddish brown mottling scoriace BASALT, moderately fractured, moderate weathered, medium hard (basalt formation)	eous ely
			100	37			35	5		grades to vesicular	ŕ
							40			grades to closely fractured, highly weather	
			72	48			40			slightly weathered, hard (basalt formation	
-			62	40			45	- x x x x x x x x x x x x x x x x x x x	d	Brownish gray with tan mottling scoriaced BASALT, closely fractured, moderately weathered, medium hard (clinker) Gray vugular BASALT, slightly fractured, weathered, were hard (basalt formation)	
			100	95			50			weathered, very hard (basalt formation)	
Date Sta					26, 2001		55	5		Water Level: Not Encountered	
Date Cor Logged I		ea:	Nove Y. Ch		26, 2001					Drill Rig: CME-55G	
Total De			60 fe	et						Drilling Method: 4" Auger, 4" Casing & HQ Cor	ring





state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

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

Scale: As Noted

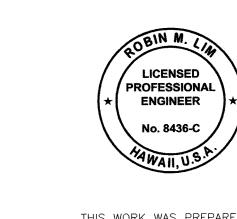
Date: April 2007 SHEET No. B-7 OF 14 SHEETS

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

			echr	nical	3S, IN Engine	ering	}		KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 103	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	(%) DØN 17	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample (-``\'-`\'-\'\'-\'\'-\'\'-\'\'-\'\'-\'\'	nscs	(Continued from previous plate) Description Gray with yellow and black mottling BASALT, closely fractured, moderately weathered, medium hard to hard (basalt formation) Boring terminated at 60 feet	1
							65				-
							70				
							75				- - -
							80				- - - -
		-					85				- - -
							90	7			- - -
				·			95	——————————————————————————————————————			-
							100	-			-
							110	-			-
Date Sta Date Cor Logged E	mplet			mber	26, 2001 26, 2001					Water Level: Not Encountered Drill Rig: CME-55G	
Total De	pth:		60 fe	et				-		Drilling Method: 4" Auger, 4" Casing & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	

ATE

					BS, IN Engine				KALA	NIANAOLE 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	nscs	Approximate Ground Surface Elevation (feet MSL): 154 * Description
	6 35	79	47 22	0 18	19 67/.8' Ref.	>4.5	5		GM	CLAY with traces of moderately weathered basaltic gravel and sand, very stiff, moist (fill) Gray vesicular BASALT, closely to severely
JC=584		96	67	30	10/.0' Ref.		10			fractured, moderately to highly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation) Grayish brown strongly vesicular BASALT, severely to closely fractured, moderately to highly weathered, soft to medium hard (basalt formation)
psi			100	78			15			grades to moderately fractured, moderately weathered, medium hard
		Ş	75	43			20			Grayish brown vugular BASALT, closely to severely fractured, moderately weathered, medium hard (basalt formation)
			65	40			25			
			35	0			30	-		Brown and gray BASALT, severely fractured, moderately weathered, soft (clinker)
			66	17	25/.1' Ref.		35	- × × × × × × × × × × × × × × × × × × ×		Grayish brown vesicular BASALT, severely to closely fractured, moderately weathered, soft to medium hard (basalt formation)
			67	25			40			
			95	87			45			Gray vugular BASALT, closely fractured, slightly weathered, hard to very hard (basalt formation) grades to moderately fractured
			67	50			50			
Date Star					26, 200		55	×××		Water Level: Not Encountered
Date Con Logged E Total Dep	3y:		Nove E. Sh 60.7	insat	26, 200° o	1				Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

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

Scale: As Noted

Date: April 2007 SHEET No. B-8 OF 14 SHEETS

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

		Geo	techi	nical	3S, IN Engine			ł	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description	
	26		10	0	40/.2'		60	× × × × × × × × × × × × × × × × × × ×		Brown and gray BASALT, severely fraction moderately weathered, soft (clinker)	ured,
)	20				Ref.		65			Boring terminated at 60.7 feet	
							70				
							75				
							80				
							85				
							90				
							95				
							100-				
							105				
Date Sta					26, 2001		110-			Water Level: ☑ Not Encountered	
Date Col Logged I Total De Work Or	By: pth:		E. Sh 60.7 4605	insat feet	26, 2001 o					Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	

			EOI echr		•		C. ering		T T T T T T T T T T T T T T T T T T T	KALA	NIANAOLE 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	nscs	Approximate Ground Surface Elevation (feet MSL): 95 * Description
	13 4 9	91			54 50/. 9	ļ .4'		5		SM ML SP- SM	6-inch ASPHALTIC CONCRETE Brown SILTY SAND with gravel (base material) 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/.9 +50/			10		GM	Gray and brown BASALTIC COBBLES, BOULDERS, AND GRAVEL with silt and sand, medium dense to dense (colluvium)
	9		57		62	2		15			
			40					20		de maria de la companya de la compan	
	12		59		50/	.5'		25			
		-	33					30		Marine de la companya	
			7		20/. Re			35		, V	
			37		20/ Re	.0'		40		M. The state of th	
	11		20		50/. Re	1		45		, , , , , , , , , , , , , , , , , , ,	
	10		42		50/. Re	1		50			
Date Star	nplet	ed:	Decei Decei Grons	mber	11, 2	001		55	0.0		Water Level:
Logged B Total Dep			81.5 f		וווט ג	isal	<i>.</i>				Drilling Method: 4" Solid-Stem Auger & HQ Coring





state of hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS

Kalanianaole 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		TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	102	106

					BS, IN Engine				KALA	NIANAOLE 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	nscs	(Continued from previous plate) Description
	12		42 17		40	·	60-		GW/ GM	
			73	30	20/.0' Ref. 20/.0' Ref.		70			
			97	92	IXGI.	·	75 ⁻			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
							85			formation) Boring terminated at 81.5 feet
							90	-		
							95	-		
							105			
Date Sta	mplet	ed:	Dece	mber	7, 2001 11, 2001		110			Water Level:
Logged I Total De Work Or	pth:		81.5 4605	feet	& Shinsa					Drill Rig: CME-75 Drilling Method: 4" Solid-Stem Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop

	1	Geo	techr	LABS	•			!	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 106
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 90 * Description
	24 11 10	81		5 F	41 58/.7' Ref. 96		5		GM CL GW- GM	
	8		60		50		10			Gray and brown BASALTIC COBBLES AND
			37				15			BOULDERS with sand and gravel and some clay medium dense to dense (colluvium)
			52	1 1	50/.2' Ref.		20			
			55				25	-		
	26		57		88		30			
			25				35	- 2		
			33	1	00/.9' Ref.		40			
			48	1	50/.5' Ref.		45			
			48				50			Gray and brown BASALTIC BOULDERS with cobbles, sand and gravel, dense (colluvium)
Date Sta				ember 14			55			Water Level: Not Encountered
Logged Total De	By:			ninsato						Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring





STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

Kalanianaole 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

	and the second s						
				.IB2: STATE\DOT\KALAM	nianaole\re	ETAINING WA	ALL\CADD\
		FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		HAWAII	HAW.	NH-072-1(51)	2007	103	106
g of oring 07							
me							
th D lium							
-							





state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

Kalanianaole Highway Improvements Retaining Wall at Makapuu, Oahu

Scale: As Noted SHEET No. B-11 OF 14 SHEETS

Federal-Aid Project No. NH-072-1(51) Date: April 2007

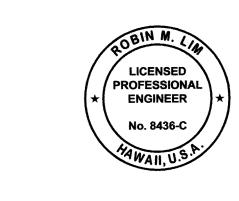
	(BS, IN Engine			K	ALA	KALANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII				
Other Tests Moisture	Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description				
			38		40/.3' Ref. 25/.0' Ref.		60							
			35		20/.0' Ref.		65							
			100	100	50/.3' Ref.		70	/		Gray vesicular BASALT with cemented ba gravel and coralline sediment, slightly fract moderately weathered, medium hard (bead Gray vugular BASALT, moderately fracture slightly to moderately weathered, hard (baselightly to moderately weathered)	ctured, sch rock) ed,			
			100	100			75	-		formation) Boring terminated at 76.5 feet				
							85							
							90							
							95							
							100	-						
							105							
Date Starte Date Comp Logged By Total Dept	plete /:	ed:	Dece	mber insate	11, 200° 14, 200°		110			Water Level: Not Encountered Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring				

				BS, IN LEngine			KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf) Core	Recovery (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic USCS	Approximate Ground Surface Elevation (feet MSL): 94 * Description	
	10	3	33	39	>4.5 >4.5	5	GM CH GM	4.5-inch ASPHALTIC CONCRETE Dark brown SILTY GRAVEL with sand, de damp (base material) Grayish brown SILTY CLAY with sand an gravel, hard, dry to damp (fill) Gray BASALTIC COBBLES AND GRAVE clayey silt and sand, dense (colluvium)	d some
LL=74 PI=49	18	4	19	43/.8' Ref.	>4.5 >4.5	10		Dark brown and gray CLAYEY COBBLES BOULDERS with some sand and gravel, dense, damp (colluvium)	
		6	62		3.5	15			
	29	7	73	35/.4' Ref.		20			
		6	88		2.0	25			
		6	88	10/.0' Ref.		30		Gray with tan and brown mottling modera highly weathered BASALTIC COBBLES BOULDERS in a silty sand matrix, dense	AND
		4	15			35		(colluvium)	
	4	7	74	10/.0' Ref.		40			
		3	33			45	- JOO - JOO JOO -	Gray and brown SANDY SILT AND BASA COBBLES AND BOULDERS, dense (col	
	6	4	17	47/.5' +10/.1 Ref.	1	50 55			
Date Sta Date Co Logged Total De	mplete By:	ed: De	ecembe	r 30, 200 r 3, 2001 Shinsato	1			Water Level: 90 ft. 12/03/01 1200 HRS Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	!	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	104	106

					BS, IN Engine			ł	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 107	ng
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)		RQD (%)	Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)-	☐ Sample ○ Graphic	nscs	(Continued from previous plate) Description	
	6		40		10/.0' Ref. 20/.3'		60 ⁻				
	O		35		Ref. 50/.3'		65				
			54		Ref.		70			Crov vugular BASALT moderately fractured wit	h
			75	49	50/.3' Ref.		75			Gray vugular BASALT, moderately fractured wit some severely fractured seams, moderately weathered, medium hard (basalt formation)	.11
			82	4355			80		* * * * * * * * * * * * * * * * * * * *	Tannish white cemented CORAL with traces of basaltic gravel and shells, moderately weathers medium hard (coral formation)	
			5	0			85	-		Grayish brown vesicular BASALT with traces of coralline sand cemented in basalt, closely fractured, moderately weathered, medium hard (basalt formation) Gray and brown BASALTIC ROCK, severely fractured, highly weathered, soft (clinker)	
	11		0	0	30/.2' Ref.	Z	90	-	d d		
	16		100	100	40/.1' Ref.		95	- x x x x x x x x x x x x x x x x x x x		Grayish brown vesicular BASALT, moderately to closely fractured, moderately weathered, mediu hard (basalt formation)	
							100			Boring terminated at 100.5 feet	
							105				
Date Sta Date Co	mple		Dece	mber	30, 200 3, 2001 hinsato	1	110			Water Level: 90 ft. 12/03/01 1200 HRS	
Γotal De Nork Or	pth:		100.5	feet						Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	

					3S, IN Engine			ļ	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Boring 108
Si N	\bot									1 0 10	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen (tsf)	Depth (feet)	Sample Graphic	SOSO	Approximate Ground Surface Elevation (feet MSL): 90 * Description	
	15	102			50/.2' Ref.	Δ.5		×°00	GM CH	4-inch ASPHALTIC CONCRETE Brown SILTY BASALTIC GRAVEL with so cobbles and sand, very dense, dry (base	material
LL=58 PI=34	14	97			67 40/.3' Ref.	/.3' >4.5				Brown SILTY CLAY with some moderately weathered basaltic gravel and sand, hard (fill) Brown and gray CLAYEY BASALTIC COE	, damp
			71				10			with some boulders, gravel and sand, der (colluvium)	
			78					- SC - SC			
			50				15	- 20			
	30		75		40/.3' Ref.		20				
			57				25				
			53				30	- 3			
			17				35	- - - - - -	SC	Dark brown and gray CLAYEY SAND with cobbles and gravel, medium dense to der (colluvium)	n basaltionse
			37		30/.0' Ref.		40	- <i> </i>			DDI 50
	11		40		75/.8' Ref.		45		X	Gray and brown CLAYEY BASALTIC CO AND BOULDERS with sand and gravel, (colluvium)	
			4962		20/.0' Ref.		50		X X		
							55		X		
Date Sta					4, 2001 5, 2001				. ,	Water Level: 72.5 ft. 12/5/01 1500 HRS	
Logged	By:		E. Sh	ninsat	0					Drill Rig: MOBILE B-80	
Total De	pth:		100.5	5 feet -10				4.41		Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	





state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

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

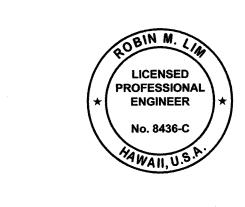
Scale: As Noted

Date: April 2007 SHEET No. B-12 OF 14 SHEETS

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

					3S, IN			K	ALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description	
			5860				60 ⁻				
			67				65				
			50	30			70	- * *		Grayish brown vesicular BASALT, model fractured, moderately weathered, mediu	
			100	55			75	* * * * * * * * * * * * * * * * * * *		(basalt formation) Tannish white cemented CORAL with so basaltic gravel and shells, severely to clefractured, moderately weathered, mediu hard (coral formation)	osely
			87	47			80	*		Grayish brown vesicular BASALT, slightl moderately fractured, moderately weath 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 Gray vesicular BASALT, moderately fractility to moderately weathered, hard (I	
				·			100			formation) Boring terminated at 100.5 feet	
							105				
Date Sta	mple		Dece	mber	4, 2001		110			Water Level: 72.5 ft. 12/5/01 1500 HRS Drill Pig: MORU E R 90	
	Logged By: E. Shinsato Total Depth: 100.5 feet Work Order: 4605-10									Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	

					3S, IN			ŀ	KALA	NIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII 109
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 84 *
ð	<u>≅</u> 3 13 4	106		RG	67 16	Po (ts	De	Sa	GM GC SP	Description 7-inch ASPHALTIC CONCRETE Grayish brown SILTY BASALTIC GRAVEL with sand, very dense, dry (base material)
	3	86			8		5	X	O.	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		СН	Brown with multi-colored mottling SILTY CLAY with some weathered basaltic gravel and traces coralline sand, very stiff, moist (colluvium)
LL=67 PI=40	75				23	>4.5	20			grades with some basaltic cobbles
	32	88			81/.8' Ref.	>4.5	25			grades to hard
	10		71		50/.3' Ref.		30			Gray and brown CLAYEY BASALTIC COBBLES with some boulders, sand and gravel, dense (colluvium)
			75				35	- 100 - 100 - 100 - 100	X	Gray and brown CLAYEY BASALTIC COBBLES with some boulders, sand and gravel, dense (colluvium)
			38				40	- 132 - 132 - 132 - 132		
			29		50/.4' Ref.		45		X	
	19		67		90/.8' Ref.		50			
Date Sta Date Cor					6, 2001 7, 2001		55		III.	Water Level: ■ Not Encountered
Logged E Total De	Зу:		E. Sh 95.5	insat						Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop





state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS

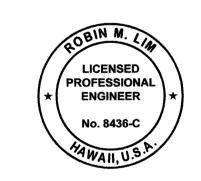
Kalanianaole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)

Scale: As Noted

Date: April 2007 SHEET No. B-13 OF 14 SHEETS

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

					3S, IN			ł	KALA	ANIANAOLE HWY. IMPROVEMENTS MAKAPUU, OAHU, HAWAII	Log of Boring 109
Other Tests	Moisture Content (%)		Core	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	nscs	(Continued from previous plate) Description	
			7245	25	20/.0' Ref.		60 65				
	19		30	14	50/.3' Ref.		70			Gray and white BASALTIC BOULDERS with coral, hard (colluvium) grades to severely fractured	h som
			72	58	40/.0' Ref.		75				
			40	0			80	- * * * * * * * * * * * * * * * * * * *		Tannish white cemented CORAL, severely fractured, moderately weathered, medium h (coral formation)	nard
			0	0	20/.0' Ref.		85	**************************************		Gray vesicular BASALT, severely fractured, moderately weathered, medium hard (basa formation) Gray and brown BASALT, severely fractured highly weathered, soft (clinker)	lt
			0	0	20/.0' Ref.		90	- ×°× - ×°× - ×°× - ×°× - ×°× - ×°× - ×°×			
							95	- × × × × × × × × × × × × × × × × × × ×		Boring terminated at 95.5 feet	
							100	-			
							105				
Date Sta			-		6, 2001		110			Water Level: ☑ Not Encountered	
Date Cor Logged I Total De Work Ore	Зу: pth:	ied.		ninsat feet	7, 2001 o			100-1-1		Drill Rig: MOBILE B-80 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	





STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

Kalanianaole 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