

No. CHEC

Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

	MAJOR DIVISION	S	US	CS	TYPICAL DESCRIPTIONS
	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
COARSE- GRAINED	GRAVELS	LESS THAN 5% FINES	000	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
SOILS	MORE THAN 50% OF COARSE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	FRACTION RETAINED ON NO. 4 SIEVE	MORE THAN 12% FINES	9 £ 6)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS	CLEAN SANDS	0	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL	SANDS	LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
RETAINED ON NO. 200 SIEVE	50% OR MORE OF COARSE FRACTION PASSING	SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
	THROUGH NO. 4 SIEVE	MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
	SILTS			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE- GRAINED SOILS	AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
·				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
500/ OD MODE OF				МН	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
50% OR MORE OF MATERIAL PASSING THROUGH NO. 200	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		СН	INORGANIC CLAYS OF HIGH PLASTICITY
SIEVE				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
· · · · · · · · · · · · · · · · · · ·	HIGHLY ORGANIC SOI	LS	<u> </u>	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

		A CONTRACT C
	ED TO INIDICATE BODDEDI INIE COIL	CIACCIEICATIONIC
NOTE. DUAL STRIBULS ARE US	ED TO INDICATE BORDERLINE SOIL	CLASSIFICA HUNS

LEGEND

2-INCH O.D. STANDARD PENETRATION TEST

3-INCH O.D. MODIFIED CALIFORNIA SAMPLE



SHELBY TUBE SAMPLE



GRAB SAMPLE CORE SAMPLE LIQUID LIMIT

PLASTICITY INDEX

TORVANE SHEAR (tsf)

POCKET PENETROMETER (tsf)

WATER LEVEL OBSERVED IN BORING

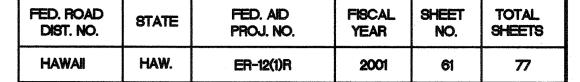
r Tests	ture ent (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	et Pen.	Depth (feet)-	ole hic	W	Approximate Ground Surface Elevation (feet): 182 *
Other	Moisture Content (Iry L	col	ğ	Pene Resis	Pocket F (tsf))ept	Sample Graphic	nscs	Description
	2 0		87	68	TRS	T T	-	のリンパーンパーンパーンパ		Gray vesicular BASALT, closely to moderately fractured, slightly weathered, very hard (basalt formation)
		. ,	100	90			5-	大公公公公		Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, medium hard (basalt formation)
			92	51			10-			Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation) grades to moderately fractured
			97	67			15-	は次次次		grades to moderately fractured grades to severely fractured Gray vesicular BASALT, closely to moderately fractured, slightly weathered, medium hard (basalt formation)
			20				20-	か	SM	Orangish brown SILTY SAND, medium dense, very moist (pahala ash)
	69		0		10		25-			
**	83		0		18		30-			grades with traces of weathered basalt gravel, medium dense, wet
	51				20		35-			grades with seams of gray silty sand
	40		8		05/4		40-			Gray vesicular BASALT, closely fractured, slightly
	12		66	42	25/.1' Ref.		45-	小公公公		weathered, medium hard (basalt formation)
	,				7		50-			* Elevations estimated from Structural Drawings
			The second secon				-			received on December 5, 2000 by KSF, Inc.
							55- - -			
Date Sta	rted:		Decer	nher	5, 2000		60			Water Level: ▽
Date Cor	nplete	ed: l	Decer	nber	5, 2000			******************		None None
Logged E			G. Ba							Drill Rig: CONCORE
Total De Work Ord			47 fee 4612-				-			Drilling Method: NX Coring Driving Energy: 140 lb. wt., 30 in. drop

EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE

DISTRICT OF KAU, ISLAND OF HAWAII

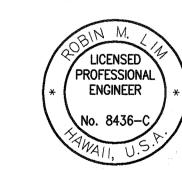
GEOLABS, INC.

Geotechnical Engineering



Log of Boring

GEOLABS, INC. 2006 KALIHI STREET HONOLULU, HAWAII 96819



STATE OF HAWAI'I DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY

Scale: As Shown

Date: January 2001

SHEET No. G2 OF 6



61

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	62	. 77

enanth fra Alder Vernach ab de Marie an air an dean aid -					BS, IN			-		EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE	Log of Boring
<u>s</u>					Engine			TT	DIST	RICT OF KAU, ISLAND OF HAWAII	2
Other Tests	isture	Dry Unit Weight (pcf)	e covery (RQD (%)	Penetration Resistance (blows/foot)	ket Pe	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet): 177 *	
<u></u>	<u>\$</u> 0̄	V V V	<u>%</u>	S Ra	Per Dic	Poc (tsf	Del	Sar	Sn	Description	
			98	63						Gray vesicular BASALT, closely fractured, weathered, medium hard (basalt formation	n)
			94	91			5	かない		Brownish gray scoriaceous BASALT, close fractured, slightly to moderately weathered medium hard (basalt formation)	ely] d,]
										Gray vesicular BASALT, closely to moderation fractured, slightly weathered, medium har formation)	
			23	7			10-	<u> </u>		Reddish gray vesicular BASALT, closely find slightly weathered, medium hard (basalt	ractured,
				`	,-				SM	\formation) \VOID	
							15-			Orangish brown SILTY SAND slightly cem	ented,
	73		0		11		-			medium dense, moist (pahala ash)	
			**				20-				
	72		0	·	20					grades with traces of basalt gravel	
							25-				-
,	54				25					grades to brown	
		·	0								1
		,					30-				-
, , , , , , , , , , , , , , , , , , ,	16		4.0.0		78					Gray vesicular BASALT, moderately to slig	ghtly
			100	29			35-	さんない		weathered, soft (basalt formation) grades to closely to severely fractured, me hard	edium †
٠,							· . •	1		Boring terminated at 38 feet	·]
							40-				4
							-				-
							-				}
							45-				1
											1
							50-				1
							-				-
							· •				-
			-				55-				1
							-				1
							,				-
Date Sta	rted.		Dece	mher	4, 2000		60-			Water Level: ♀	
Date Co	mplete	ed:	Dece	mber	4, 2000					None	
Logged Total De			G. Ba 38 fee					·		Drill Rig: CONCORE Drilling Method: NX Coring	
Work Or			4612-	00					-	Driving Energy: 140 lb. wt., 30 in. drop	

					BS, IN Engine				(EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE
<u>ω</u> ⊤									DIS I	RICT OF KAU, ISLAND OF HAWAII 3
ner Tests	Moisture Content (%	Dry Unit Weight (pc	Core Recovery (%)	2 RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet): 190 *
Other	ဦပို	کی≷	S S	RC	Re (bfc	Po (tst	De	Sal	S	Description
			87	73				スジンスン		Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation)
			100	18			5- - -	水水水水		Reddish gray scoriaceous BASALT, severely to closely fractured, slightly weathered, medium hard (basalt formation)
			83	53			10-			
			97	60			15-	2000年2000年		Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to severely fractured grades to closely to moderately fractured
			31	15			20-	- XXXX - XXXX		grades to closely fractured
							25-		SM	Brown SILTY SAND, dense, moist, slightly cemented (pahala ash)
					25		30-		SM	Yellowish brown and gray SILTY SAND, medium dense, very moist (pahala ash)
					12		35-	1		grades to orangish brown with coarse sand
					33		-	\		grades to medium dense to dense
			41	26	32/.5' +42/.2'		40-			grades to grayish brown
					Ref.		45-	公公		Gray scoriaceous BASALT, closely fractured, moderately weathered, medium hard (basalt formation)
							50-			Boring terminated at 46 feet
, .				`						
							55-			
					W ₁ (1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		60-			
Date Start Date Com					7, 2000 8, 2000					Water Level: None
Logged By	4		G. Ba		o, 2000					None Drill Rig: CONCORE
Total Dept		6	46 fee	st .						Drilling Method: NX Coring

GEOLABS, INC. 2006 KALIHI STREET HONOLULU, HAWAII 96819



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

SIGNATURE

DATE

STATE OF HAWAI'I DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY

REPLACEMENT OF

KEAIWA STREAM BRIDGE

Federal Aid Project No. ER-12(1)R

Scale: As Shown

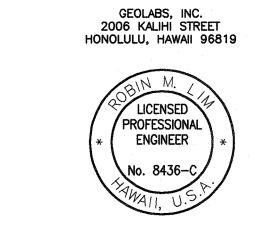
Date: January 2001

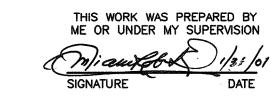
SHEET No. G3 OF 6 SHEETS

	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
-	HAWAII	HAW.	ER-12(1)R	2001	63	77

					BS, IN					EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE RICT OF KAU, ISLAND OF HAWAII Log of Boring 4
Other Tests	Aoisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	nscs	Approximate Ground Surface Elevation (feet): 191 * Description
			71	56			5-			Gray vugular BASALT, severely fractured, slightly weathered, very hard (basalt formation) Gray vugular BASALT, closely to moderately fractured, slightly weathered, very hard (basalt formation) CLINKER Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation)
			90	58	,		10-			formation) Gray vugular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly
			95	45			15-			weathered, medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation)
			53	30			20-		SM	Gray vesicular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) grades to moderately fractured
				·	12		25- 30-		SM	Grayish brown SILTY SAND, medium dense to dense, moist slightly cemented (pahala ash) Orangish brown SILTY SAND with traces of weathered basalt gravel, medium dense, very moist (pahala ash)
					24		35-			grades with seams of dark gray silty sand
					16		40-	\		grades with seams of coarse sand
			30	30	13		45-			Gray scoriaceous BASALT, closely fractured,
							50-			slightly weathered, medium hard (basalt formation) Boring terminated at 47 feet
							55- -			
Data St	ortod.		Doco	mha-	6 2000		60-			Water Level: 7
Date Sta Date Co Logged	mplet	ed:		mber	6, 2000 6, 2000					Water Level: None Drill Rig: CONCORE
Total De Work Or			47 fee 4612-	······································				-		Drilling Method: NX Coring Driving Energy: 140 lb. wt., 30 in. drop

		LABS, IN		l .	OF KEAIWA STREAM BRIDGE	g of ring
(eotechr	nical Engine	ering	DIST	RICT OF KAU, ISLAND OF HAWAII)
Other Tests Moisture Content (%)	Dry Unit Weight (pcf) Core Recovery (%)	RQD (%) Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Sample Graphic USCS	Approximate Ground Surface Elevation (feet): 194.5 *	
Sol Sign	Ory Neig Sore	Racing Residual (blow	Pocl (tsf)	Sample Graphi USCS	Description	
	100	61		· · · · · · · · · · · · · · · · · · ·	Gray vugular BASALT, closely fractured, slight weathered, very hard (basalt formation)	lly
	100	55		5-1-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-	Reddish gray scoriaceous BASALT, closely fractured, moderately weathered, medium hard (basalt formation)	d
,	100	52	1	0-1 公	grades to severely fractured	
		02	1	5	Brownish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (bandard)	asal
	100	57			Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (ba formation)	asal
	43	40	2	0-1 次	Gray vesicular BASALT, closely fractured, slight weathered, medium hard (basalt formation)	htly
	13		2	5- SM/ MH		
78		20	3	SM/ MH	Orangish brown SILTY SAND AND SANDY SI medium dense to stiff, moist (pahala ash)	LT,
				-	Boring terminated at 31.5 feet	
			3	5-		
			4	0-		
			4:	5-		
			_			
			50	0-		
			5:	5-		
			66			lar lafter on some state and state a
Date Started:		mber 30, 2000			Water Level:	
Date Complete Logged By:	d: Decei G. Ba	mber 1, 2000		:	None Drill Rig: CONCORE	
Total Depth:	31.5 f		**************************************	-	Drilling Method: NX Coring	
Work Order:	4612-				Driving Energy: 140 lb. wt., 30 in. drop	





STATE OF HAWAI'I DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY

REPLACEMENT OF

KEAIWA STREAM BRIDGE

Federal Aid Project No. ER-12(1)R Scale: As Shown Date: January 2001

SHEET No. G4 OF 6 SHEETS

63

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(1)R	2001	64	77

Approximate Ground Surface Elevation (feet): 193.5 * Description 100 70 100		1			BS, IN				D10-	EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE
Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation) Reddish gray scoriaceous BASALT, severely fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to closely to moderately fractured 35 Jack Started Starte	र्							T	צוט	
Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation) Reddish gray scoriaceous BASALT, severely fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to closely to moderately fractured 35 Jack Started Starte	ner Tesi	ntent (9	sight (pc	(%) Qì	netratio sistance ows/foo	cket Pe	pth (fee	mple	SS	
weathered, very hard (basalt formation) Reddish gray scoriaceous BASALT, severely fractured, slightly weathered, soft to medium hard (lossalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (lossalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (lossalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, soft to medium hard (lossalt formation) Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, soft to medium hard (lossalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) Gray vesicular BASALT, closely fractured	Ď Š		N O N	RO	Pe BR BR	Po (tst	De	Sal	ns	•
fractured, slightly weathered, soft to medium hard (basalt formation) Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) Basic Standed: November 27, 2000 Date Standed: November 27, 2000 Date Completed: Date Completed: Date Standed: Date Completed: Date Standed: November 27, 2000 Date Standed: November 27, 2000 Date Completed: Date Standed: Da							•			
Reddish gray scoriaceous BASALT, moderately fractured, slightly weathered, soft to medium hard (basalt formation) 85 40 72 48 20 35							5-			↑ fractured, slightly weathered, soft to medium hard ↑
100 70 15 15 15 15 15 15 15 1	,		100	70				+ 1/2-/-2+		Reddish gray scoriaceous BASALT, moderately
Reddish gray scoriaceous BASALT, closely fractured, slightly weathered, soft to medium hard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to closely to moderately fractured. 15			400	70			10-	ハンハーハ		Gray vesicular BASALT, moderately fractured,
Tractured, signtly weathered, sort to medium nard (basalt formation) grades to severely to closely fractured at 12.5 feet Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt formation) grades to closely to moderately fractured slightly weathered, medium hard (basalt formation) grades to closely to moderately fractured or moderately fractured grades to closely to moderately fractured slightly weathered, medium hard (basalt formation) grades with dark brown seams and traces of weathered basalt grades with dark brown seams and traces of weathered basalt formation) Grayish brown strongly vesicular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Grayish brown strongly vesicular BASALT, severely fractured, slightly weathered, soft to medium hard (basalt formation) Boring terminated at 55 feet Date Started: November 27, 2000 Date Completed: December 11, 2000 Date C			100	70			15-			formation) Reddish gray scoriaceous BASALT, closely
SIM Orangish brown SILTY SAND, medium dense, very moist (pahala ash) 23			85	40			•	インシーン		(basalt formation)
Date Started: November 27, 2000 Date Completed: Date Started: November 27, 2000 Both Completed: Date C			72	48			20			slightly weathered, medium hard (basalt formation)
23 40 grades with dark brown seams and traces of weathered basalt 23 45 Gray vesicular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Grayish brown strongly vesicular BASALT, severely fractured, slightly weathered, sightly weathered, sightly weathered, soft to medium hard (basalt formation) Boring terminated at 55 feet Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties of the medium hard (basalt formation) Date Started: November 27, 2000 Material Properties			0				25		SM	Orangish brown SILTY SAND, medium dense,
23 45 grades with dark brown seams and traces of weathered basalt 52 29 Gray vesicular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Grayish brown strongly vesicular BASALT, severely fractured, slightly weathered, soft to medium hard (basalt formation) Boring terminated at 55 feet Date Started: November 27, 2000 Water Level: \$\frac{1}{2}\$ None Logged By: \$\frac{1}{2}\$ G. Barut Drill Rig: MOBILE B-53 Total Depth: \$\frac{1}{2}\$ MOBILE B-53 Drilling Method: HQ Coring & Rotary Wash							, · -			
grades with dark brown seams and traces of weathered basalt Solution Sol					15		30-	1		
grades with dark brown seams and traces of weathered basalt 52 29 45 50					20		35-	- \		-
Date Started: November 27, 2000 Date Completed: December 11, 2000 Logged By: G. Barut Drill Rig: MOBILE B-53 Total Depth: 55 feet Gray vesicular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) Grayish brown strongly vesicular BASALT, severely fractured, slightly weathered, soft to medium hard (basalt formation)					23		40-			1
Date Started: November 27, 2000 Date Completed: December 11, 2000 Logged By: G. Barut Au Au Au Au Au Au Au Au Au			50		23		45-	\		
Date Started: November 27, 2000 Date Completed: December 11, 2000 Logged By: G. Barut Total Depth: 55 feet GrayIsh brown strongly vesicular BASAL1, severely fractured, slightly weathered, soft to medium hard (basalt formation) Water Level: None None Drill Rig: MOBILE B-53 Drilling Method: HQ Coring & Rotary Wash				29			50-	**************************************		weathered, medium hard (basalt formation)
Date Started: November 27, 2000 Date Completed: December 11, 2000 Logged By: G. Barut Total Depth: 55 feet November 27, 2000 Water Level: None None Drill Rig: MOBILE B-53 Drilling Method: HQ Coring & Rotary Wash			40				-	· /公·公·公·公·	\$	severely fractured, slightly weathered, soft to
Date Started:November 27, 2000Water Level: ₹Date Completed:December 11, 2000NoneLogged By:G. BarutDrill Rig:MOBILE B-53Total Depth:55 feetDrilling Method:HQ Coring & Rotary Wash							55-			Boring terminated at 55 feet
Date Completed:December 11, 2000NoneLogged By:G. BarutDrill Rig:MOBILE B-53Total Depth:55 feetDrilling Method:HQ Coring & Rotary Wash	Data Starts		N		27, 2000		60-			Water Levely =
Logged By:G. BarutDrill Rig:MOBILE B-53Total Depth:55 feetDrilling Method:HQ Coring & Rotary Wash										-1
	Logged By	7 -	G. B	arut		~				Drill Rig: MOBILE B-53
Work Order: 4612-00 Driving Energy: 140 lb, wt., 30 in, drop	Total Depth Work Orde					······				Drilling Method: HQ Coring & Rotary Wash Driving Energy: 140 lb. wt., 30 in. drop

DATE

	G	EOI	_AE	BS, IN	IC.				EMERGENCY REPLACEMENT DE KEANNA STREAM PRIDGE Log of Borin
	Geo	techr	nical	Engine	ering				OF KEAIWA STREAM BRIDGE RICT OF KAU, ISLAND OF HAWAII 7
Other Tests	Moisture Content (%) Dry Unit Weight (ncf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet): 199 * Description
0	≥0 0≤	69	<u>8</u> 56	<u> </u>	<u> </u>	Ω	S	O ,	Gray vugular BASALT, closely to moderately fractured, slightly weathered, very hard (basalt formation)
		100	70			5	**************************************		easier coring at 2 to 2.5 feet Reddish gray BASALT FRAGMENTS (clinker) Gray vesicular BASALT, moderately fractured, slightly weathered, medium hard (basalt
		98	53			10-	· () () () () () () () () () (formation) Gray vesicular BASALT, severely to closely fractured, slightly weathered, hard (basalt
		100	54		·	15	からない		formation) grades to closely to moderately fractured at 8.5 t Brownish gray vesicular BASALT, severely fractured, moderately weathered, medium hard
		100	70			20-	了公文公文		(basalt formation) Gray vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)
		77	25			-	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		grades to closely to moderately fractured 14.5 fe Reddish brown scoriaceous BASALT, closely fractured, slightly weathered, soft to medium had (basalt formation)
		43	33			25-	× × × × × × × × × × × × × × × × × × ×		grades to brownish gray at 22 feet Gray BASALT FRAGMENTS, moderately weathered, medium hard (clinker) Gray vesicular BASALT, moderately fractured,
				26		30-		SM	slightly weathered, medium hard (basalt formation) Orangish brown SILTY SAND with traces of
						35-			weathered basalt gravel, medium dense, very moist to wet (pahala ash)
				21		40-			
				21	. '	-	1		grades with gray silty sand seams
		29	23	23		45-			
		95	85			50-	地方公		Gray vesicular BASALT, closely to moderately fractured, slightly to moderately weathered,
						55- -	いたない		medium hard (basalt formation) Boring terminated at 56.5 feet
					-	60-			
	mpleted:	Decer	nber	25, 2000 12, 2000					Water Level: None
ogged lotal De		G. Ba 56.5 f		***************************************					Drill Rig: MOBILE B-53 Drilling Method: HQ Coring & Rotary Wash

GEOLABS, INC. 2006 KALIHI STREET HONOLULU, HAWAII 96819



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

The property of the prop

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY

REPLACEMENT OF

KEAIWA STREAM BRIDGE

Federal Aid Project No. ER-12(1)R

Scale: As Shown

Date: January 2001

FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL		
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS		
HAWAII	HAW.	ER-12(1)R	2001	65	77		

	enocom uconnosti viner relativem conference en		GEOLABS, INC. Geotechnical Engineering							EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE DISTRICT OF KALL ISLAND OF HAWAII				
	ests	(%)					en le	eet)			RICT OF KAU, ISLAND OF HAWAII Approximate Ground Surface	8		
e Sant à le commission de l'économission de	Other Tests	Moisture Content	Dry Unit Weight (Core Recovery (%)	30D (%)	Penetration Resistance (blows/foot)	Pocket F (tsf)	Jepth (feet)	Sample Graphic	nscs	Elevation (feet): 211 *			
	Ö	ŽΟ	Dry We	<u>0</u> %	<u>R</u>	पू कू ⊕	P. C. Es	Ŏ	ιχ Δ		Description 12-inch ASPHALT CONCRETE			
		2				5/.0' Ref. 66 42		5	000000000000000000000000000000000000000	GW- GM	Gray SILTY BASALT GRAVEL with some dense, damp (fill)	sand,		
(TOTAL TREE CONTRACTOR OF THE		5	88			42			000	GM	Brownish gray SILTY BASALT GRAVEL v	vith		
				75 83	0 67	·		10			Some sand, dense, very moist Gray vugular BASALT, severely fractured weathered, very hard (basalt formation) Gray vugular BASALT, closely to moderat	ely		
				82	55			15			fractured, slightly weathered, very hard (b formation)	pasalt :		
				100	97			20-	- × × × × × × × × × × × × × × × × × × ×		Reddish gray BASALT FRAGMENTS, slig weathered, medium hard (clinker) Brownish gray scoriaceous BASALT, clos	ely		
				400	-7			25			fractured, moderately weathered, medium (basalt formation) Gray vesicular BASALT, moderately fractus slightly weathered, medium hard (basalt	Д		
				100	5 /						formation) Reddish gray vesicular BASALT, closely formation Reddish gray vesicular BASALT, closely formation	ractured,		
	·			100	77			30-	イングーナンシン		formation) Gray vesicular BASALT, moderately fracti slightly weathered, medium hard to hard (formation)	basalt		
				40	30			35-	×0× × × × × × × × × × × × × × × × × × ×		Reddish gray vesicular BASALT, closely for slightly weathered, medium hard (basalt formation) Gray vesicular BASALT, moderately fractions			
							-	40	× × × × × × × × × × × × × × × × × × ×		slightly weathered, medium hard (basalt formation) Brownish gray BASALT FRAGMENTS, medium hard (basalt formation)			
								45			weathered (clinker) Gray vesicular BASALT, closely fractured, weathered, very hard (basalt formation) Boring terminated at 40 feet			
							`	50-				1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
								55-						
					·									
L	Date Start	ed:		Nove	nber	28, 2000		60-			Water Level: ♀			
	Date Com Logged By	plete	ed: l		mber	29, 2000	·				None Drill Rig: MOBILE B-53			
	Total Dept	h:	4	40 fee	et						Drilling Method: 4" Solid-Stem Auger & HQ Cor	ing		
L	Work Orde	<u>er:</u>	4	<u> 4612-</u>	00					40.0 ***********************************	Driving Energy: 140 lb. wt., 30 in. drop			

GEOLABS, INC. Geotechnical Engineering								EMERGENCY REPLACEMENT OF KEAIWA STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII DISTRICT OF WAU, ISLAND OF HAWAII OF COMMENT Boring 9				
Other Tests	sture ntent (%)	Dry Unit Weight (pcf)	e overy (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample		Approximate Ground Surface Elevation (feet): 212.5 *		
_	© S S S	Ş Ş Ş Q	S S S	8	Peg Res	Poc (tsf)	Der	Sar	nscs	Description		
	4	112			15 44			0000	GW- GM	-: -: -: -: -: -: -: -: -: -: -: -: -:	silt,	
ć		-		-	28	-	5-	000000	GM	BOULDER Grayish brown SILTY BASALT GRAVEL, loc medium dense, moist	ose to	
			83 65	83 42			10-			Gray vugular BASALT, closely to moderately fractured, slightly to moderately weathered, hard (basalt formation)		
	-		47	25			15-	- X X X X X X X X X X X X X X X X X X X	« « « « « « « « « « « « « « « « « « «	Reddish gray BASALT FRAGMENTS, mode weathered (clinker) grades to brownish gray	rately	
			100	100			20 -	\$[\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		Gray scoriaceous BASALT, closely fractured moderately weathered, medium hard (basalt formation)	t	
			100	43			25			Gray vesicular BASALT, moderately fracture slightly weathered, medium hard to hard (baformation) Reddish gray scoriaceous BASALT, moderation fractured, slightly weathered, soft to medium	salt tely	
			100	78			30-			(basalt formation) grades to severely fractured at 27 feet Gray vesicular BASALT, closely fractured, sl weathered, medium hard (basalt formation) grades to moderately fractured at 30.5 feet	ightly	
			52	38			35-	X X X X X X X X X X X X X X X X X X X		Reddish gray scoriaceous BASALT, closely fractured, moderately weathered, soft to methard (basalt formation) Brownish to reddish gray BASALT FRAGME		
						,	40- - -			moderately weathered (clinker) Gray vesicular BASALT, moderately fracture slightly weathered, hard (basalt formation)		
		-					45-			Boring terminated at 40.5 feet		
							50-					
							55- -					
				,			-					
Date Sto	rted.		Novo	mber	27 2000	The state of the s	<u>60-</u>		1	Water Level: ♀		
Date Started: November 27, 2000 Date Completed: November 29, 2000										None None		
Logged F			G. Ba							Drill Rig: MOBILE B-53		
Total De Work Ord			<u>40.5 f</u> 4612-				<u>-</u>			Drilling Method: 4" Solid-Stem Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop		





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STATE OF HAWAI'I DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY

REPLACEMENT OF

KEAIWA STREAM BRIDGE

Federal Aid Project No. ER-12(1)R

Scale: As Shown SHEET No. G6 OF 6 SHEETS

Date: January 2001