

Geotechnical Engineering

# Soil Log Legend

## UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

	MAJOR DIVISION	S	US	CS	TYPICAL DESCRIPTIONS
	CDAVEL C	CLEAN GRAVELS	0000	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
COARSE-	GRAVELS	LESS THAN 5% FINES	000	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
GRAINED SOILS	MORE THAN 50% OF COARSE	GRAVELS WITH FINES	000	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	FRACTION RETAINED ON NO. 4 SIEVE	MORE THAN 12% FINES		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
	OU TO			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE- GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
00.20				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
				МН	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		СН	INORGANIC CLAYS OF HIGH PLASTICITY
				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HI	GHLY ORGANIC SO	DILS	<u> </u>	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

## **LEGEND**

(2-INCH) O.D. STANDARD PENETRATION TEST

(3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE

SHELBY TUBE SAMPLE

**GRAB SAMPLE** CORE SAMPLE

WATER LEVEL OBSERVED IN BORING

LIQUID LIMIT (NP=NON-PLASTIC)

PLASTICITY INDEX (NP=NON-PLASTIC)

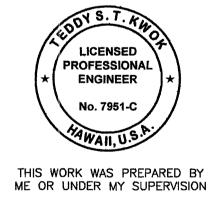
TORVANE SHEAR (tsf)

PEN POCKET PENETROMETER (tsf)

UNCONFINED COMPRESSION (psi)

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate A-0.1 FED. ROAD DIST. NO. FISCAL YEAR HAW. STP-0130(28)PH.1 2012 229 288



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOG LEGEND

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive Fed. Aid Proj. No. STP-0130(28), Phase

Scale: As Noted

REVISION

June 2012 SHEET No. G1 OF 18 SHEETS



Geotechnical Engineering

# Rock Log Legend

### **ROCK DESCRIPTIONS**

	BASALT		FINGER CORAL
99	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
× × × × ×	CLINKER	× × × × × × × × × × × × ×	SILTSTONE
× × × 00 0	COBBLES		TUFF
* * * * * *	CORAL		VOID/CAVITY

#### **ROCK DESCRIPTION SYSTEM**

#### ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive:

12 to 24 inches apart

Greater than 24 inches apart

Moderately Fractured:

Slightly Fractured:

6 to 12 inches apart

Closely Fractured:

3 to 6 inches apart

Severely Fractured:

Less than 3 inches apart

#### DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered:

Slightly Weathered:

Rock shows no sign of discoloration or loss of strength.

Slight discoloration inwards from open fractures.

Moderately Weathered:

Discoloration throughout and noticeably weakened though not able to break by hand.

Highly Weathered:

Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.

Extremely Weathered:

Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

#### **HARDNESS**

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard:

Specimen breaks with difficulty after several "pinging" hammer blows.

Example: Dense, fine grain volcanic rock

Hard:

Specimen breaks with some difficulty after several hammer blows.

Example: Vesicular, vugular, coarse-grained rock

Medium Hard:

Specimen can be broked by one hammer blow. Cannot be scraped by knife. SPT may penetrate by

~25 blows per inch with bounce.

Example: Porous rock such as clinker, cinder, and coral reef

Soft:

Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by

~100 blows per foot.

Example: Weathered rock, chalk-like coral reef

Very Soft:

Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger

pressure.

Example: Saprolite

A-0.2

Plate

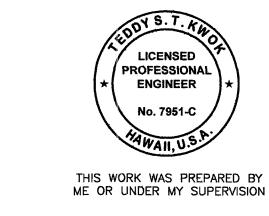
FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	STP-0130(28)PH.1	2012	230	288

### **GEOTECHNICAL NOTES**

- 1. Geotechnical engineering reports entitled "Geotechnical Engineering Exploration, Keaau-Pahoa Road Shoulder Lane Conversion, Keaau Bypass Road to Shower Drive, Keaau, District of Puna, Hawaii" dated September 14, 2007 (W.O. 5189-00 & 10 (A)), "Pavement Justification Report, Keaau-Pahoa Road Shoulder Lane Conversion, Keaau, District of Puna, Hawaii" dated September 14, 2007 (W.O. 5189-00 & 10 (B)), and "Pavement Justification Report, Keaau-Pahoa Southbound Shoulder Lane, Keaau Bypass Road to Shower Drive, Keaau, District of Puna, Hawaii" dated May 1, 2009 (W.O. 5189-20) have been prepared by Geolabs, Inc. Copies of the reports are on file at the office of the Engineer for review by the Contractor.
- 2. For boring locations, see Sheet DP1 to DP7.

DATE

- 3. The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
- 4. The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.
- 5. The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.



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SIGNATURE EXPIRATION DATE OF THE LICENS
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND \$ NOTES

KEAAU-PAHOA ROAD, SHOULDER
LANE CONVERSION PHASE 1
Keaau Bypass Road to Shower Drive
Fed. Aid Proj. No. STP-0130(28), Phase

Scale: As Noted

SHEET No. *G2* OF 18 SHEETS **230** 

June 2012



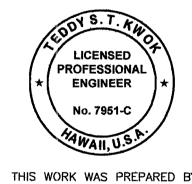
FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	STP-0130(28)PH.1	2012	231	288

		Geot	echr	nical	3S, IN Engine		·  k		EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII
Other Tests	isture ntent (%)	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): 331 *
🕏	နိုင္ပိ	Ve	Red Red	RG	Re (bld	Po (tsf	De	Sal	SO	Description
	11	104			41		-		ML	Dark brown SANDY SILT with gravel and cobbles, very stiff, damp (fill)
	10				12/.5' +25/.3'	5 5 5 5 5 15 15				grades to moist
	6				56		5-			grades to damp
					'			-		Boring terminated at 6.5 feet
A).GPJ, GEOLABS.GDT 5/18/1	44						10-			* Elevations estimated from Roadway Plans dated June 2007 prepared by Wilson Okamoto Corporation.
Date Sta	rted:		Augus	st 26,	2004		1.0			Water Level:   Not Encountered
B Date Cor					2004					
Logged E	3у:		B. Ba	cheld	er					Drill Rig: DIEDRICH D-25
Total De			6.5 fe							Drilling Method: 4" Auger
Work Ord	der:		<u>5189-</u>	<u>00 &amp;</u>	10 (A)					Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		J	KE KEA <i>l</i>	<b>AAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII
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): 340 *
Ö	<u>≥ö</u>	<u>□</u> ≥ 102	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<u>x</u>	25/.2'	P (\$	۵	S O	ML	Description  Dark gray SANDY SILT with gravel, very stiff,  damp (fill)
			80	32			5	大学などのでは、		Gray moderately vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)
							10	-		Boring terminated at 7.3 feet
Date Sta Date Cor					2004 2004					Water Level:   ■ Not Encountered
Logged F			B. Ba					t		Drill Rig: DIEDRICH D-25
Total De			7.3 fe							Drilling Method: 4" Auger & HQ Coring
Work Or	•			_	10 (A)				\	Driving Energy: 140 lb. wt., 30 in. drop

			Geot	techr		3S, IN Engine	ering	K	KE EA	EAAU	BYPASS ROAD	HOA ROAD E CONVERSION ) TO SHOWER DRIVE INA, ISLAND OF 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		oximate Ground Surface vation (feet MSL): 345 *	
	₹	S S S	Ş Ş Ş	Cor	RQ	Per Re: (blc	Po( (tsf	Del	Sal	SN		Description	
									1000		4-inch ASPHAL	TIC CONCRETE	
1								4	80 . 80 !	+	8-inch BASE Co		/A
									94	GM		RAVEL, dense, damp (fill	<u> </u>
		4	117			69		-	$ abla \mathbb{H}$	ML	1.	SILT with gravel and cobb	
								_	MI		stiff, damp (fill)	SILT With graver and cobb	nes, very
5/18/10		8				90		5-			Boring termina	ted at 6.5 feet	-
0(A).GPJ GEOLABS.GDT		······						10					-
9-00&1	Date Sta					2004					Water Level: ⋤	Not Encountered	
T 518	Date Cor					2004							
9g DC	Logged E			<u>B. Ba</u>		er					Drill Rig:	DIEDRICH D-25	
NG L	Total De			6.5 fe					_		Drilling Method:	4" Auger	
BOR	Work Ord	der:		<u>5189-</u>	<u>-00 &amp;</u>	10 (A)					Driving Energy:	140 lb. wt., 30 in. drop	

				3S, IN		ı k	K (FA	EΑ	<b>NAU</b>	BYPASS ROAD	HOA ROAD E CONVERSION O TO SHOWER DRIVE INA, ISLAND OF HAWAII	Log of Boring
Other Tests	Content (%) Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	eet)	Sample		nscs [	Appr	oximate Ground Surface vation (feet MSL): 334 *  Description	
O 2	OOS	100		<u>क</u> स्र अ	P (t	5		リー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー・ハー	<u>NL</u>	Gray moderatel	OY SILT, stiff, damp (fill) y vesicular BASALT, sligh lly weathered, hard (basal	
Date Starte	<del></del>			2004						Water Level:	Not Encountered	
Date Com Logged By	<del></del>	Augu: B. Ba	•	2004 Jer	,					Drill Rig:	DIEDRICH D-25	
Total Dept		6.4 fe	,						· · ·	Drilling Method:	4" Auger & HQ Coring	
Work Orde				10 (A)			-			Driving Energy:	140 lb. wt., 30 in. drop	



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

TEACHEST KIND 04/30/14
SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

DATE

REVISION

231

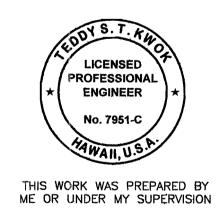
SHEET No. G3 OF 18 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(28)PH.1	2012	232	288

8			Geot	echr	nical	3S, IN Engine		K	KE (EA/	<b>EAAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  5
	Other Tests	oisture ontent (%)	Dry Unit Weight (pcf)	re covery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	<u>Sample</u> Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 319 *
<u></u>	ŏ	<u> </u>	٥٨	<u> </u>	RG	Pe Be	Po (ts	<u>D</u>	Sa	3	Description
		9	107			40/.4'		_		ML	Dark gray SANDY SILT with gravel, very stiff, damp (fill)
				100	57	+15/.0'		5-	7.3/3/3/3/3/3/		Gray moderately vesicular BASALT, moderately fractured, highly weathered, medium hard (basalt formation)
A).GPJ GEOLABS.GDT 5/18/10								10-			Boring terminated at 6.7 feet
00810	Date Sta	rted:		Augu	st 25,	2004					Water Level:   Not Encountered
_	Date Cor					2004					
×	ogged E			B. Ba	$\overline{}$	er					Drill Rig: DIEDRICH D-25
Ž	Total De			6.7 fe		40 (4)					Drilling Method: 4" Auger & HQ Coring
<u></u>	Nork Ord	<u>aer:</u>		5189	-UU &	10 (A)				······	Driving Energy: 140 lb. wt., 30 in. drop

Approximate Ground Surface Elevation (feet MSL): 310.5 *  Description  Total Depth:  August 30, 2004  Date Started: August 30, 2004  Date Completed: August 30, 2004  Logged By: B. Bachelder  Total Depth: 6.5 feet  Drilling Method: 4" Auger & HQ Coring  Work Order: 5189-00 & 10 (A)  Approximate Ground Surface Elevation (feet MSL): 310.5 *  Description  Dark brown SILTY GRAVEL, medium dense, damp (fill)  Gray slightly to moderately vesicular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)  Water Level:   Not Encountered  Drill Rig: DIEDRICH D-25  Total Depth: 6.5 feet  Driving Energy: 140 lb. wt., 30 in. drop			Geot	echr		3S, IN		k	KE (EA/	<b>EAAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring BORING
The first part of the first	ther Tests	oisture ontent (%)	ry Unit (eight (pcf)	ore scovery (%)	QD (%)	enetration esistance lows/foot)	ocket Pen. sf)	epth (feet)	ample raphic	SOS	Elevation (feet MSL): 310.5 *
Date Started:August 30, 2004Water Level: ▼Not EncounteredDate Completed:August 30, 2004Drill Rig:DIEDRICH D-25Logged By:B. BachelderDrilling Method:4" Auger & HQ Coring	A) GPJ GEOLABS GDT 5/18/10	ΣŬ				<u>ज</u> कु	P <sub>C</sub> (fs	5	5	GM	Dark brown SILTY GRAVEL, medium dense, damp (fill)  Gray slightly to moderately vesicular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
Logged By: B. Bachelder Drill Rig: DIEDRICH D-25 Total Depth: 6.5 feet Drilling Method: 4" Auger & HQ Coring	ф — — — — — — — — — — — — — — — — — — —										Water Level:   Not Encountered
Total Depth: 6.5 feet Drilling Method: 4" Auger & HQ Coring								<u> </u>			Drill Rig: DIEDRICH D-25
Work Order: 5189-00 & 10 (A) Driving Energy: 140 lb. wt., 30 in. drop	<u> </u>										
	Work Or	der:		5189	-00 &	10 (A)					

Approximate Ground Surface Elevation (feet MSL): 326 *  Description  Date Started: August 26, 2004  Date Completed: August 26, 2004		(				3S, IN		, k	KI (EA	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE OISTRICT OF PUNA, ISLAND OF HAWAII  7
Date Started: August 26, 2004 Date Completed: August 26, 2004 Total Depth: 11.6 feet  Date Started: Date Started: Date Completed: August 26, 2004 Date Date Completed: August 26, 2004 Date Date Date Completed: August 26, 2004 Date Date Completed: August 26, 2004 Date Completed: August 26, 2004 Date Completed: August 26, 2004 Date Date Date Date Date Date Date Date	ner Tests	ntent (%)	, Unit eight (pcf)	e sovery (%)	(%) Qi	netration sistance ows/foot)	cket Pen.	pth (feet)	mple	SS	
Date Started: August 26, 2004 Date Completed: August 26, 2004 Date Completed: August 26, 2004 Logged By: B. Bachelder Total Depth: 11.6 feet  Dark brown SILTY GRAVEL with cobbles and sand, medium dense, damp (fill)  Gray GRAVEL AND COBBLES (BASALTIC), loose, damp (fill)  Gray moderately vesicular BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation)  Water Level:   Not Encountered  Drill Rig: DIEDRICH D-25  Drill Rig: DIEDRICH D-25  Total Depth: 11.6 feet  Drilling Method: 4" August 28 HQ Coring	1 \$ 18		الح کے	Cor	RQ	Pel Pel Pel	Po( (tsf	De	Sal	SN	Description
Date Started: August 26, 2004   Date Completed: August 26, 2004   Logged By: B. Bachelder   Drill Rig: DIEDRICH D-25   Total Depth: 11.6 feet   Drilling Method: 4"Auger & HQ Coring									94,94,994,99	GM	
Gray moderately vesicular BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation)    Date Started: August 26, 2004   Date Completed: August 26, 2004   Logged By: B. Bachelder   Drill Rig: DIEDRICH D-25   Drilling Method: 4" Auger & HQ Coring				65						X	
moderately fractured, moderately weathered, medium hard (basalt formation)    10				94	31			5-		X X	Gray moderately vesicular RASALT closely to
Date Started: August 26, 2004 Date Completed: August 26, 2004 Logged By: B. Bachelder Drill Rig: DIEDRICH D-25 Total Depth: 11.6 feet  Date Started: August 26, 2004 Drilling Method: 4" Auger & HQ Coring								10 <sup>-</sup>			moderately fractured, moderately weathered,
Date Started:August 26, 2004Water Level: ▼Not EncounteredDate Completed:August 26, 2004Drill Rig:DIEDRICH D-25Logged By:B. BachelderDrilling Method:4" Auger & HQ Coring	GPJ GEOLABS.GDT 5/18/10										Boring terminated at 11.6 feet
Date Completed: August 26, 2004 Logged By: B. Bachelder Drill Rig: DIEDRICH D-25 Total Depth: 11.6 feet Drilling Method: 4" Auger & HQ Coring	Doto Stort			<u>Λυσυν</u>	ot 26	2004		15			Mater Level: R. Not Encountered
Logged By: B. Bachelder Drill Rig: DIEDRICH D-25 Total Depth: 11.6 feet Drilling Method: 4" Auger & HQ Coring	φ <u> </u>				<del></del>						vvaler Lever. ¥ Not Encountered
Total Depth: 11.6 feet Drilling Method: 4" Auger & HQ Coring	<u> </u>										Drill Rig: DIEDRICH D-25
	× — — — — — — — — — — — — — — — — — — —									<del> </del>	
JE VVOIN CATAGO O 100°00 OCTO 1010   1	Work Orde					10 (A)					Driving Energy: 140 lb. wt., 30 in. drop



GEOLABS, INC. STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

DATE

REVISION

232

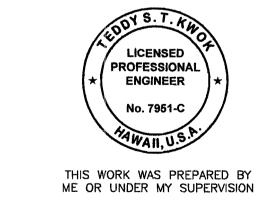
SHEET No. G4 OF 18 SHEETS

	C	Seot	echr	nical	3S, IN		ŀ	KE/ (EAA	<b>AAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII
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): 318 *  Description
			92	65			5		SM	Dark brown SILTY SAND, medium dense, damp COBBLES (BASALTIC), dense (fill) Gray moderately vesicular BASALT, slightly to moderately fractured, moderately weathered, hard (basalt formation)  Boring terminated at 6.2 feet
Date Start	plete	:d: /	Augus	st 25,	2004		10			Water Level:   Not Encountered  Drill Big: DIEDBICH D 25
Logged By Total Dep Work Orde	th:	(	B. Ba 6.2 fe 5189-	et	10 (A)				A SIL OL	Drill Rig: DIEDRICH D-25 Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop

		Geot	echr	nical	3S, IN Engine		 	KE KEA/	<b>EAAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII	ng
Other Tests	isture ntent (%)	/ Unit eight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 302 *	
₹	မွိပိ	딛꽃	Co Re	RC	Re (b)	Po (tst	De	Sa Gr	NS	Description	
		111			35/.3'			M	SP- SM	Dark brown poorly graded SAND with silt and gravel, dense, moist (fill)	
			77	17	+20/.1'		5	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Gray moderately vesicular BASALT, severely fractured, moderately weathered, soft to mediu hard (basalt formation)	m
							10	-		Boring terminated at 5.9 feet	
Date Sta	rted:		Auau	st 25.	2004	_	<u>IU</u>			Water Level:   Not Encountered	
Date Cor					2004				<u>.</u>		
Logged E			B. Ba						<del> </del>	Drill Rig: DIEDRICH D-25	
Total De			5.9 fe						, . <u>_</u>	Drilling Method: 4" Auger & HQ Coring	
Work Or					10 (A)					Driving Energy: 140 lb. wt., 30 in. drop	

					BS, IN Engine		_  _ K	KE EA/	EAAU	KEAAU - PAHOA ROAD SHOULDER LANE CONVERSION J BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  10			
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	14 ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	et)	Sample Y. Graphic		Approximate Ground Surface Elevation (feet MSL): 294 *  Description  Gray slightly vesicular BASALT, slightly fractured,			
			83	75			5-	次次次第二次次次次		moderately weathered, hard (basalt formation)  possible VOID			
	39		26		16		- - 10-	000000000000000000000000000000000000000	CM	Reddish brown well-graded GRAVEL with silt and sand, loose, moist			
	10		100	38	6/.5' +25/.3' Ref.		- - 15-	000000000000000000000000000000000000000		grades with gray cobbles (basaltic)  Gray moderately vesicular BASALT, closely			
			100	100			- - 20-	というないというないのでは、		fractured, highly weathered, medium hard (basalt formation) grades to slightly fractured, slightly weathered, hard			
			38	12			- 25- - -			Reddish gray COBBLES AND BOULDERS (BASALTIC), dense			
							30-			Boring terminated at 29.3 feet			
Date Sta			<del>_</del>		7, 2004		35-			Water Level:   Not Encountered			
Date Cor Logged E				ember icheld	7, 2004 er					Drill Rig: CME-55			
	pth:	_	29.3		——————————————————————————————————————	<del> </del>		•		Drilling Method: HQ Coring			

FED. ROAD DIST. NO. FED. AID PROJ. NO.



GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

DATE

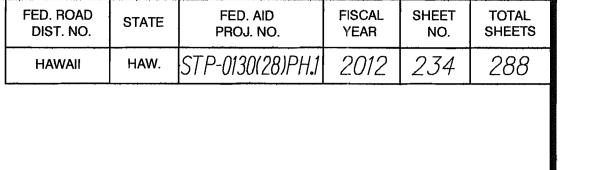
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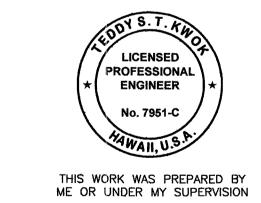
233

SHEET No. G5 OF 18 SHEETS

	(				3S, IN		KE	KEAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring 11
Other Tests	noisture content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	30D (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	eet)	Graphic USCS	Approximate Ground Surface Elevation (feet MSL): 292 *  Description
O .	20		84	22	20/.0' Ref.	T (t		O CH	Reddish brown SILTY CLAY with cobbles and boulders (basaltic), stiff, damp (fill)  Gray moderately vesicular BASALT, closely to moderately fractured, highly weathered, soft
			87	48			5	人名公公公	(basalt formation)
							10	<u> </u>	Gray slightly vesicular BASALT, slightly fractured to massive, moderately weathered, hard (basalt formation)
			37	0			10-1	<u> </u>	Gray COBBLES (BASALTIC), very dense
			97	88	20/.0' Ref.		15-		Gray slightly vesicular BASALT with olivine crystals, slightly fractured, slightly weathered, hard (basalt formation)
							20-		Boring terminated at 20.3 feet
Data Star	tod.		Δ~	ct 21	2004		<u>25</u> ⊥		Water Level:   Not Encountered
Date Star Date Con					2004				- vvaler Level. 4 - NOL ETICOURLETEU
Logged B			B. Ba		<del></del>				Drill Rig: DIEDRICH D-25
Total Dep			20.3			·			Drilling Method: 4" Auger & HQ Coring
Work Ord			5189.	-00 &	10 (A)				Driving Energy: 140 lb. wt., 30 in. drop

		eotechr	nical	BS, IN Engine		K	KEA EAAL	UA	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  12
Other Tests	Moisture Content (%) Dry Unit	Weight (pcf) ന Core ന Recovery (%)	(%) GD8 <b>45</b>	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Caphic	nscs	Approximate Ground Surface Elevation (feet MSL): 288.5 *  Description Gray moderately vesicular BASALT, slightly
	40	57	20	4/51		5-	-//-	<b>SW</b>	fractured, slightly weathered, hard (basalt formation) possible VOID
	18	88	88	4/.5' +25/.4' Ref.		10- - - -	000011-11-11-11-11-11-11-11-11-11-11-11-		Gray slightly vesicular BASALT, slightly fractured, slightly weathered, hard (basalt formation)
		90	57			15-	524222		Gray highly vesicular BASALT, moderately fractured, moderately weathered, medium hard to soft (basalt formation)
		47	25			20 <i>-</i> - -	公公公公		grades to severely fractured, highly weathered, soft
	16	100	67	3/.5' +25/.3' Ref.		25 - - -	スース・スース・スース・スース		Gray moderately to highly vesicular BASALT, moderately fractured, moderately weathered, medium hard to soft (basalt formation)  grades to hard
		80	28			- 30 - - -	次次次次次次次。 -		grades to highly vesicular
Date Sta				r 7, 2004 r 7, 2004		35 <sup>_</sup>			Water Level: ☑ Not Encountered
Logged I	By:	B. Ba	chelo						Drill Rig: CME-55 Drilling Method: HQ Coring
Total De	ptn: der:	49.5 <u>1</u>		10 (A)		· · · · · · · · · · · · · · · · · · ·		·	Drilling Method: HQ Coring Driving Energy: 140 lb. wt., 30 in. drop





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

SHEET No. G6 OF 18 SHEETS

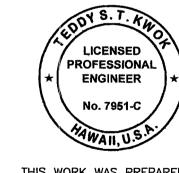
DATE

REVISION

					3S, IN		ı k	K (E/	ŒA/	ΑU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring 12
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
			87	65			40-		・バーバーバーバーバーバーバーバーバーバーバーバーバーバーバーバーバー・バーバー・バーバー・バー		grades to moderately vesicular, slightly fractured, slightly weathered grades to highly vesicular, slightly to moderately fractured, highly weathered, medium hard grades to slightly vesicular, slightly fractured, slightly weathered, hard  Boring terminated at 49.5 feet
Date Starte					r 7, 2004						Water Level:   ■ Not Encountered
Date Comp Logged By			_	cheld	r 7, 2004 Ier						Drill Rig: CME-55
Total Depth			19.5 f							· · · · · ·	Drilling Method: HQ Coring
Work Orde			_		10 (A)						Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		, k	KE (EAA	<b>AAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  13
Other Tests	sture	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	eet)	Sample Graphic		Approximate Ground Surface Elevation (feet MSL): 288.5 *
O E	So So	Ve.	Cor	RQ	Pen Res (blo	Poc (tsf)	Dep	San Gra	nscs	Description
			52	20			-	人名名名名名		Gray moderately vesicular BASALT, moderately to closely fractured, slightly weathered, hard (basalt formation)
			100	67			5- - - -	<b>一个人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人</b>		grades to moderately fractured, medium hard
	21				20/.3'		10-	000	GP	Reddish brown poorly graded GRAVEL with sand, loose, moist
			100	80	Ref.		-	. 公公公公		Gray moderately to slightly vesicular BASALT, slightly to moderately fractured, moderately weathered, hard (basalt formation)
			78	52			15- -	ハー、 ※ × × ハー、 ※ × ハー、		CLINKER layer
							-	各名名名		grades to moderately vesicular, moderately fractured
			100				20-	<b>一次方方方方</b>		grades to closely to moderately fractured, moderately to slightly weathered highly vesicular pockets at 21 and 21.8 feet
			100	100			25- -	这个名字的		grades to slightly vesicular, slightly fractured, slightly weathered, very hard
			98	52			30-	介含含含含含含含		
Date Sta	rted <sup>.</sup>		Septe	embe	r 8, 2004		35-	仑		Water Level:     Not Encountered
Date Cor	nple	ted:	Septe	embe	r 8, 2004					
Logged E Total Dep			B. Ba 50 fe	icheld et	ier					Drill Rig: CME-55 Drilling Method: HQ Coring
Work Ord			<del></del>		10 (A)					Driving Energy: 140 lb. wt., 30 in. drop

FED. ROAD DIST. NO.



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012 June 2012

DATE

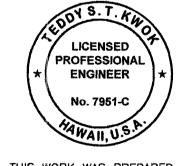
REVISION

SHEET No. G7 OF 18 SHEETS 235

		techi	nical	3S, IN Engine		<sup>l</sup> k	KE EAA	AAŪ	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  13
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
		83	75 33			40-	50次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次		Brown highly vesicular BASALT, closely fractured moderately to slightly weathered, soft (basalt formation)  Gray moderately vesicular BASALT, severely fractured, moderately weathered, medium hard (basalt formation)  grades to slightly fractured, slightly weathered, hard  grades to highly vesicular  grades to slightly vesicular, moderately fractured  grades to highly vesicular, highly weathered  Boring terminated at 50 feet
Date Starte	oleted:	Septe	embe	r 8, 2004 r 8, 2004		55-			Water Level:   Not Encountered
Logged By Total Depth		B. Ba 50 fe		<u>ier</u>	<u> </u>				Drill Rig: CME-55  Drilling Method: HQ Coring
Work Orde			_	10 (A)				<del></del>	Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		k	KI (EA	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE USTRICT OF PUNA, ISLAND OF HAWAII  14
Other Tests	Moisture Content (%)		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 288.5 *
Ď	နိုပ္ပိ	D. We	Col	RC	Re (b)	Po (tst		Sa	Sn	Description
			76	53				ステスト		Gray moderately vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation) possible VOID
			98	73			5- -	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		grades to slightly fractured
			70	22			10-	公公公公公		Gray highly vesicular BASALT, closely fractured, moderately weathered, soft (basalt formation)
			97	83				イベラス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・ス・		Gray moderately vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)
			97	03			15-	いくいくいく		grades to hard
			8				20-		GW	Reddish gray well-graded GRAVEL with sand, medium dense, moist (clinker)
	12		100	30	11/.5' +20/.1' Ref.		25-	000000		Gray moderately vesicular BASALT, moderately to closely fractured, moderately weathered, hard (basalt formation)
			70	70			30-	人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人人		grades to slightly to moderately fractured
			47	15			35-	-X-ACVICAL	X	Reddish gray COBBLES (BASALTIC), dense (clinker)
Date Sta					r 8, 2004					Water Level:   Not Encountered
<u>Date Co</u> Logged I			Septe B. Ba		r 9, 2004 ler					Drill Rig: CME-55
<del></del> .	pth:		49.31	Foot						Drilling Method: HQ Coring

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0130(28)PH.1	2012	236	288



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012 SHEET No. G8 OF 18 SHEETS

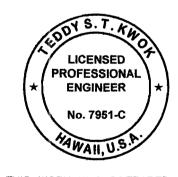
DATE

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				BS, IN		ŀ	KE (EA/	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring 14
Other Tests Moisture	Content (%) Dry Unit	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate)  Description
		97	58			40 45	QUQUQUIX-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-		Gray moderately vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)  grades to highly vesicular  grades to moderately vesicular  grades to highly vesicular, closely fractured  Boring terminated at 49.3 feet
Data Otaria		Const		- 0 0004		55			I Water Level: T. Net Engage to and
Date Starte Date Comp				r 8, 2004 r 9, 2004			_		_ Water Level: ♀ Not Encountered
Logged By:	····	B. Ba					·		Drill Rig: CME-55
Total Depth		49.3	_	101					Drilling Method: HQ Coring
Work Orde	•			10 (A)			· · · · · · · · · · · · · · · · · · ·		Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		KE/	<b>EAAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  15
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	(%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)		Approximate Ground Surface Elevation (feet MSL): 288.5 *
O ţ	Mois Con	Dry	Core	RQD	Pen Res (blo	Poc (tsf)	Dep San	Graphi USCS	Description
			78	67			- i	ンシンシンシン	Gray moderately vesicular BASALT, slightly to moderately fractured, slightly weathered, hard (basalt formation)
			100	100			5	ン・バーバーバーバーバー	grades to massive
			35	0			- 10	バントン	grades to highly vesicular, medium hard
							-		grades to soft, possible VOID
			100	70	15/.0' Ref.		15-	ン・バーバーバーバーバー	Gray moderately vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)  grades to slightly fractured, slightly weathered
	11		37	27	48		20	-1-1-1-1-1-1 GW	Reddish gray well-graded GRAVEL with sand, dense, moist
			100	79			-	000000000000000000000000000000000000000	Gray moderately vesicular BASALT, slightly fractured, slightly weathered, hard (basalt formation)
			100	100			30	ニン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・ン・	grades to massive, moderately weathered
Date Sta	mplet	ed:	Septe	embei	9, <u>2004</u> 9, 2004		35-		Water Level:   Not Encountered
Logged				cheld	er				Drill Rig: CME-55
Total De	ptn: der:	Water Mark	50 fe		10 (A)				Drilling Method: HQ Coring

FISCAL SHEET TOTAL YEAR NO. SHEETS FED. ROAD DIST. NO. FED. AID PROJ. NO. STATE



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012 June 2012

REVISION

DATE

237

SHEET No. *G9* OF *18* SHEETS

					BS, IN			KE		KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE 15
		Geot	techr	nical	Engine		)   k	(EA	4Ú, C	DISTRICT OF PUNA, ISLAND OF 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
			53	35				- Xo - Xo		Reddish gray COBBLES (BASALTIC), dense (clinker)
			82	72			40			Gray moderately vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)
	42		100	74	3/.5' +17/.4' Ref.		45		МН	Gray highly vesicular BASALT, slightly fractured,
								ルルル		slightly weathered, hard (basalt formation) grades to severely fractured, soft
							50			grades to slightly fractured, hard  Boring terminated at 50 feet
							55.	-		
Date Sta		1	<del></del>		r 9, 2004					Water Level:   ■ Not Encountered
Date Co Logged			Septe B. Ba		<u>r 9, 2004</u> ler	<u>-</u>		,		Drill Rig: CME-55
Total De			50 fee					•		Drilling Method: HQ Coring

		eote	echn	ical	BS, IN			KE KEA/	<b>AAU</b>		og of Soring 16		
Other Tests Moisture	Content (%)	Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 298.5 *			
#   %		\ Me	Red	RO	Re (blc	Po (tst	De	Sal	sn	Description			
Ş		14			61 40		5	000000000000000000000000000000000000000	GW	Brown well-graded GRAVEL with sand, dens damp (fill)  Gray BASALT, very dense  Boring terminated at 5 feet	e,		
Date Starte	ed:	/	۱ugus	st 30,	2004					Water Level:   ■ Not Encountered	-		
Date Comp				<u>`</u>	2004								
Logged By:			3. <u>Ba</u>		<u>er                                    </u>	<u>.</u>				Drill Rig: DIEDRICH D-25			
Total Depth Work Order			feet		10 (A)					Drilling Method: 4" Auger  Driving Energy: 140 lb. wt., 30 in. drop			

Driving Energy: 140 lb. wt., 30 in. drop

5189-00 & 10 (A)

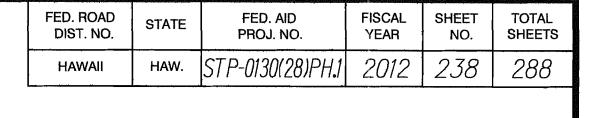
Work Order:

			echr	nical	3S, IN Engine	ering	ŀ	KE KEA/	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  17				
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SOSN	Approximate Ground Surface Elevation (feet MSL): 305.5 *				
A) GPJ GEOLABS, GDT 5/18/10	<u>×o</u> 11 8	111	Q. X.		53/.5' +50/.3' Ref. 36/.5' +30/.2' Ref. 20/.0' Ref.	P. (tt	<u>o</u> 5		SM	Description  Dark grayish brown SILTY SAND with gravel, very dense, damp (fill)  grades with cobbles (basaltic)  Boring terminated at 5 feet				
φ <u> </u>	Date Started: August 25, 2004 Date Completed: August 25, 2004									Water Level:   Not Encountered				
Logged I			Rugu: B. Ba			· · · · · ·				Drill Rig: DIEDRICH D-25				
Total De	pth:	_	5 feet							Drilling Method: 4" Auger				
š Work Or	ork Order: 5189-00 & 10 (A)									Driving Energy: 140 lb. wt., 30 in. drop				

		techr	nical	3S, IN Engine		K	KE (EA/	<b>EAAU</b>	KEAAU - PAHOA ROAD SHOULDER LANE CONVERSION U BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  18							
Other Tests Moisture	Content (%) Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SOSN	Approximate Ground Surface Elevation (feet MSL): 321.5 *							
14			17	31/.4' Ref.	P. (ts	<u>ă</u>	S XI X-バーバーバーバーバーバー	SM	Brown SILTY SAND, medium dense, damp (for Gray slightly to moderately vesicular BASALT moderately fractured, moderately weathered, medium hard (basalt formation)  Boring terminated at 5.4 feet	,						
Date Started Date Compl			<u>-</u>	2004 2004					Water Level:   Not Encountered	· · · · · · · · · · · · · · · · · · ·						
Logged By:		B. Ba	<u>·</u>					<u>.</u>	Drill Rig: DIEDRICH D-25							
Total Depth:		5.4 fe							Drilling Method: 4" Auger & HQ Coring							
Work Order		5189-	-00 &	10 (A)					Driving Energy: 140 lb. wt., 30 in. drop							

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive Fed. Aid Proj. No. STP-0130(28), Phase June 2012

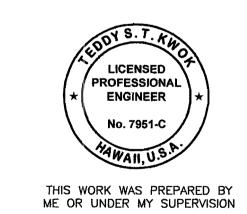
Scale: As Noted

SHEET No. G10 OF 18 SHEETS

	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS	
!	HAWAII	HAW.	STP-0130(28)PH.1	2012	239	288	

	(	Geot	echr	nical	BS, INC Engineeri		K	KEAA	١Ū	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring 19						
Other Tests	Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot) Pocket Pen.	()	Depth (reet)	Sample Graphic USCS	3	Approximate Ground Surface Elevation (feet MSL): 338 *						
Ŏ Ž	ဋိပိ	≷۵	ပ္တင္ထ	<u>~</u>	<u> </u>	<u> </u>	<u> </u>	ဖြင့် ဖြံ့ GI		Description  Description  Description						
			56	12				GI GI	VI	Reddish brown SILTY GRAVEL, dense, damp (fill)  Reddish gray COBBLES AND GRAVEL  (BASALTIC), dense, damp						
							5-	80000 //-		Gray moderately vesicular BASALT, closely						
			85	60			1 1 1			fractured, highly weathered, medium hard (basalt formation) grades to slightly fractured, hard						
	100 68					1	0-	<del>************************************</del>		Reddish gray highly vesicular BASALT, closely fractured, moderately weathered, soft (basalt formation)						
						1	5-	次次公公		Gray moderately vesicular BASALT, slightly to moderately fractured, slightly weathered, medium hard (basalt formation)						
GFJ GEOLABS.GDI STBTD							-			Boring terminated at 16 feet						
Date Starte	ed:		Septe	embe	r 10, 2004		<u> </u>			Water Level:   Not Encountered						
Date Com				September 10, 2004												
Logged By				. Bachelder						Drill Rig: DIEDRICH D-25						
Total Dept			16 feet							Drilling Method: 4" Auger & HQ Coring						
Work Orde	<u>er:</u>		<u>5189-</u>	<u>-00 &amp;</u>	10 (A)					Driving Energy: 140 lb. wt., 30 in. drop						

	L	Geot	echr	nical	3S, IN Engine	eering	ŀ	KE KEA	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII
Other Tests	isture ntent (%)	Dry Unit Weight (pcf)	re covery (%	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 310 *
<del></del>	<u> ಕೆ ಬಿ</u>	Dr.) We	Co Re(	RG	Re (b)	Po (tsf	De	Sa	SN	Description
	17	116			42/.5'			H	ML	Reddish brown SANDY SILT with cobbles (basaltic), very stiff, damp (fill)
	39 8 Ref.									Gray moderately to highly vesicular BASALT very dense (possible cobble and boulder riprap fill)
				12			10 <sup>-</sup>	- <u>0</u>		Gray slightly to moderately vesicular BASALT, severely fractured, highly weathered, medium hard (basalt formation)
			100	77			15	之人,在2000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年,1000年		grades to slightly fractured, slightly to moderately weathered, hard
							00	-		Boring terminated at 17.3 feet
Date Sta	rted.		Augu	st 31	2004		20			Water Level:   Not Encountered
	Date Started: August 31, 2004  Date Completed: August 31, 2004						<del></del>			TAUL EHOUGHLEIGU
	Logged By: B. Bachelder								<del>_</del>	Drill Rig: DIEDRICH D-25
Total De			17.3 1							Drilling Method: 4" Auger & HQ Coring
Work Or	der:		5189-	-00 &	10 (A)			,4		Driving Energy: 140 lb. wt., 30 in. drop



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

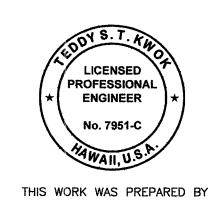
SHEET No. G11 OF 18 SHEETS

DATE

REVISION

	LABS, INC.	KEAAU E	KEAAU - PAHOA ROAD OULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE STRICT OF PUNA, ISLAND OF HAWAII	ring	l l		BS, INC. Engineering	KEA	KEAAU - PAHOA ROAD SHOULDER LANE CONVERSION AU BYPASS ROAD TO SHOWER DRIVE U, DISTRICT OF PUNA, ISLAND OF HAWAII  10
Other Tests  Moisture Content (%)  10  Content (%)  8  Content (%)  Content (%)  Content (%)	QD (QD (	Depth (feet)  Sample  Graphic  M  USCS	Approximate Ground Surface Elevation (feet MSL): 325.5 *  Description  7.5-inch ASPHALTIC CONCRETE  5-inch BASE COURSE  Dark brown SANDY SILT with cobbles (basaltistiff, damp  Hit waterline at 3 feet  Boring terminated at 4 feet	Other Tests	Moisture Content (%) Dry Unit Weight (pcf)	48	Penetration Resistance (blows/foot) Pocket Pen. (tsf)	(feet)	Approximate Ground Surface Elevation (feet MSL): 295.5 *  Description  Gray COBBLES AND BOULDERS (BASALTIC dense  Gray highly vesicular BASALT, moderately fractured, moderately weathered, medium har hard (basalt formation)
Date Completed: Aug Logged By: B. B Total Depth: 4 fe	ust 30, 2004 ust 30, 2004 achelder	10	Water Level:   Not Encountered  Drill Rig: DIEDRICH D-25  Drilling Method: 4" Auger  Driving Energy: 140 lb. wt., 30 in. drop	-	77	35		70-10-10-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	grades to slightly vugular
GEC	DLABS, INC. Inical Engineering	Depth (feet) Sample Graphic Graphic M USCS  1		1A	30	0		15-1次次次	grades to vugular with olivine crystals, severely fractured possible VOID  Gray moderately vesicular to moderately vugulance BASALT with olivine crystals, moderately to
15 96	22		Gray moderately vesicular BASALT, moderate fractured, moderately weathered, medium hard (basalt formation)		100	58		1 (人) - (し) - (b) - (b	severely fractured, moderately weathered, medium hard to hard (basalt formation)
82		-	grades to closely fractured, soft	-	83	45		· · · · · · · · · · · · · · · · · · ·	grades with cinder layers VOID VOID
82		15-12-2	grades to severely fractured	(A) GPJ GEOLABS.GDT 5/18/10	100	75		(1) (2) (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	VOID grades to massive to severely fractured, hard
		20	Boring terminated at 17.3 feet	Date Sta Date Col Date Sta	mpleted: May By: D. G pth: 52 fe		)7		Water Level:   Drill Rig:  MOBILE B-53  Drilling Method:  4" Solid-Stem Auger & HQ Coring  Driving Energy:  140 lb. wt., 30 in. drop
Date Completed: Aug Logged By: B. E	ust 30, 2004 ust 30, 2004 achelder	20	Water Level:   Not Encountered  Drill Rig: DIEDRICH D-25  Drilling Method: 4" Auger & HO Coring						
<u> </u>	9-00 & 10 (A)		Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop						DATE REVISION

FED. ROAD DIST. NO. FED. AID PROJ. NO. STATE Log of Boring HAW. STP-0130(28)PH.1 2012 240 288 HAWAII RSION WER DRIVE ID OF HAWAII round Surface MSL): 295.5 \* ption JLDERS (BASALTIC), ALT, moderately thered, medium hard to ne crystals, severely to moderately vugular als, moderately to ately weathered, alt formation) rely fractured, hard



FISCAL YEAR

SHEET NO.

TOTAL SHEETS

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

SHEET No. G12 OF 18 SHEETS

	(	Geot	echr	nical	3S, IN		,	KE	KE.	AAL	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION J BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  101
Other Tests	Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	ample	Graphic	nscs	(Continued from previous plate)
Ö ≥	ĕŏ	≥۵	ŎĔ	<u>~</u>	<u> </u>	P. P.	۵	Š	á	<u> </u>	Description
		1	40	0					5/5/5/5/3		possible VOID
			77	45			45		× × × × × × × × × × × × × × × × × × ×		Reddish brown highly vesicular CINDER, medium hard to hard (clinker)  VOID  Gray moderately vesicular to moderately vugular BASALT, slightly to severely fractured, moderately weathered, medium hard to hard (basalt formation)
			92	73			50		人名英格兰人名英格兰		possible VOID
OLABS.GDT 5/18/10											Boring terminated at 52 feet
GPJ GE								$\begin{bmatrix} 1 \end{bmatrix}$			
Date Starte	ed:		May 9	200	)7		55	) —			Water Level:   Not Encountered
Date Comp			May 9	-							
Logged By			D. Gr	emm	<del> </del>						Drill Rig: MOBILE B-53
7	Total Depth: 52 feet										Drilling Method: 4" Solid-Stem Auger & HQ Coring
Work Orde	er:		<u>5189-</u>	·00 &	10 (A)			,			Driving Energy: 140 lb. wt., 30 in. drop

			techi	nical	3S, IN Engine		  k	KE (EAA	<b>AAU</b>	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  102
Other Tests	Moisture Content (%)	ك بد∣	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	eet)	Sample Graphic		Approximate Ground Surface Elevation (feet MSL): 289 *
Oth.	Moi	Dry Uni Weight	Core	RQI	Pen Res (blo	Poc (tsf)	Dep	San Gra	nscs	Description
			88	0 25			•	各名各位		Gray highly vesicular BASALT, closely to severely fractured, moderately weathered, medium hard to hard (basalt formation)
			78	73			5-	经济经济		grades to slightly to moderately fractured
			82	78			10-	公公公公公公公公		possible VOID
,			75	65			15-			possible VOID
			78	48			20-	公公公公公公公		Gray highly vesicular to moderately vugular
			83	42			25-	次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次		BASALT with olivine crystals, moderately to severely fractured, moderately weathered, hard (basalt formation)
			87	82			30-	次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次次		grades to vugular
										Boring terminated at 34 feet
Date Sta	rted:	<u> </u>	May 8	3, 200	)7	1	35-			Water Level:   Not Encountered
Date Co	mplet	ed:	May 9	9, 200	)7					
Logged I Total De			D. Gr 34 fe		inger	- to form the state of the stat	<u> </u>			Drill Rig: CONCORE  Drilling Method: NQ Coring
Work Or	der:		5189	-00 &	10 (A)					Driving Energy: 140 lb. wt., 30 in. drop

FED. ROAD DIST. NO.



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012

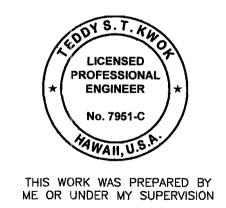
DATE

REVISION

SHEET No. G13 OF 18 SHEETS

geo geo	echn ङा	nical	Engin	neeri	ing 📗 🛱	KE.	KEAAL AAU, I	SHOULDER LANE CONVERSION U BYPASS ROAD TO SHOWER DRIVE DISTRICT OF PUNA, ISLAND OF HAWAII  Approximate Ground Surface	- sts		Geot	techn	ical	Engine	eering	<u></u> <del>(k</del> <del>(k</del> )	KE (EA/	AAL AU, [	BYPASS I DISTRICT C	ROAD T F PUNA	CONVERSION O SHOWER DRIV A, ISLAND OF HA	
Other Tesi Moisture Content (% Dry Unit	& Core	SRQD (%)	Penetratio Resistance (blows/foo	Pocket Pe	(tsf) Depth (fee	Sample	->: Graphic USCS	Approximate Ground Surface Elevation (feet MSL): 288 *  Description  Gray moderately to highly vesicular BASALT,	Other Tes	Moisture Content (º	Dry Unit Weight (po	Core Recovery (	RQD (%)	Penetratio Resistance (blows/foo	Pocket Pe (tsf)	Depth (fee	Sample Se Graphic	∣GW-	Dark gray	Elevation well-gra	imate Ground Sur on (feet MSL): 297 Description ided GRAVEL (BA	7.5 *  SALTIC) w
	89				}	-	177777 177777	moderately fractured, moderately weathered, hard (basalt formation)		8		25		20		-		GIVI		COBBL	dium dense, damp ES AND BOULDE se	. ,
	98	97				5-1	行行が行行					92	42			5- -	NONON		Gray mod	erately v	vesicular BASALT,	, moderate
	57	30			10	- - - - - -	-2-2-2-2-2-	grades to moderately to severely fractured								10-	次次次次		fractured, formation	modera	ately weathered, ha	ard (basalt
						-	2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-					97	73			- -	次次之一次 一次		grades to fractured VOID at 1		esicular, massive t	to closely
	42	10			15	5-11	-2-2-2-2-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3-	grades to closely to severely fractured				60	27			15- -	次金一次次		VOID grades to	slightly t	to severely fracture	ed
	55	40			20	- - D -	行行行行が	Gray moderately vesicular BASALT, slightly to								20-	次次这		possible V		<b>,</b>	
						-	ななななな	severely fractured, moderately weathered, medium hard to hard (basalt formation)				0				- - -			loose, dar	np	ND COBBLES (BA	,
	92	78			25	- - - 	からなってい	grades to moderately vugular				0				25-		СН	Reddish b	rown SI	LTY CLAY, soft, d	amp
	97	82			30	- - - - -	行行というという	grades to highly vesicular to slightly vugular								30-						
						-	ジンン CH	Reddish brown CLAY seam	EOLABS.GDT 5/18/10	4		33	0	37/.3' Ref.		-	スカンスシーン		Gray COE with olivin		AND BOULDERS ( als, dense	BASALTIC
					3	<u>5</u>		Boring terminated at 34 feet	10(A) GPJ C					<b>.</b>		35-	法					
	May 7 May 8	3, 200	7					Water Level:   Not Encountered		Started Comple	ted:	May 1 May 1	0, 200	07				·	Water Leve		Not Encountered	
Logged By: Total Depth:	D. Gre 34 fee		nger		_			Drill Rig: CONCORE  Drilling Method: NQ Coring	Logge Total I	ed By: Depth:		D. Gre 45 fee	t						Drill Rig: Drilling Me		MOBILE B-53 " Solid-Stem Auger & F	IQ Coring
Work Order:	5189-	00 &	10 (A)					Driving Energy: 140 lb. wt., 30 in. drop		Order:		5189-0	00 & ·	10 (A)					Driving En	ergy: 1	40 lb. wt., 30 in. drop	

		and a final			-						
			ka a mada na matika sa sa tili ka a madili			k di same estit e men di palitable per mendi di la			and the second of the second s		FED. ROAD DIST. NO.
		Geot	techr	nical	3S, IN		)   <sub>k</sub>	KE KEA/	S EAAU AU, D	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE OISTRICT OF PUNA, ISLAND OF HAWAII	HAWAII
Other Tests	isture ntent (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SO	Approximate Ground Surface Elevation (feet MSL): 297.5 *	
<u></u>	ŠÖ	Dry	Cor	RQ	Reg Option	Poc (tsf	Del	Sar	SOSO	Description	
	8				20			000	GM	Dark gray well-graded GRAVEL (BASALTIC) with silt and sand, medium dense, damp (fill)	
			25				5-			Dark gray COBBLES AND BOULDERS (BASALTIC), dense	
			92	42						Gray moderately vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)	
			97	73			10	からなる。		grades to highly vesicular, massive to closely	
				. •			4.5	在次次		fractured VOID at 12.5 feet	
			60	27			15			VOID grades to slightly to severely fractured	
			\ \ -				20-	· · · · · · · · · · · · · · · · · · ·		possible VOID	
			0			ı.			СН	Gray GRAVEL AND COBBLES (BASALTIC), loose, damp  Reddish brown SILTY CLAY, soft, damp	
			0				25			- Solt, Wallip	
	A				27/0		30				
	4		33	0	37/.3' Ref.					Gray COBBLES AND BOULDERS (BASALTIC) with olivine crystals, dense	



GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

# BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012 SHEET No. G14 OF 18 SHEETS

242

REVISION

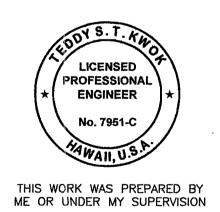
	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
,	HAWAII	HAW.	STP-0130(28)PH.1	2012	243	288

		eote	chni	ical	SS, IN		ŀ	KEAAU - PAHOA ROAD SHOULDER LANE CONVERSION KEAAU BYPASS ROAD TO SHOWER DRIVE KEAAU, DISTRICT OF PUNA, ISLAND OF HAWAII							
Other Tests Moisture	Content (%)	Weight (pcf)	Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate)  Description					
				35			40			Gray moderately vesicular BASALT with olivine crystals, moderately to severely fractured, moderately weathered, hard (basalt formation)					
5	55	7	79	62				公公公公司公	СН	grades to highly vesicular to slightly vugular, slightly to closely fractured CLAY seam					
PPJ GEOLABS,GDT 5/18/10							45			Boring terminated at 45 feet					
Date Starte	-d.	N/I:	ay 10	20	07		50			Water Level:   Not Encountered					
Date Comp			ay 10							_ value cover. 4 rate chiesantered					
Logged By:					nger					Drill Rig: MOBILE B-53					
Total Depth			feet							Drilling Method: 4" Solid-Stem Auger & HQ Coring					
Work Orde					10 (A)					Driving Energy: 140 lb. wt., 30 in. drop					

		Geot	echr	nical	3S, IN Engine	ering	'   k	KE KEA/	EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII  Log of Boring BYPASS ROAD TO SHOWER DRIVE 106								
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): 311.5 *  Description								
0	5	U V	OIL		54	а ()	<u> </u>	000	GW- GM	4.5-inch ASPHALTIC CONCRETE  Dark gray well-graded GRAVEL with silt and sand, very dense, damp (fill)								
	6				33/.5' Ref.		5	0000		Gray BASALT, dense								
					15/.0' Ref.			-		Boring terminated at 5 feet								
								-										
Date Sta	rted:		May 3	200	7		10			Water Level:   Not Encountered								
·	Date Started: May 3, 2007 Date Completed: May 3, 2007 Dogged By: D. Gremminger Total Depth: 5 feet									TVALOI ECVOI. # 1101 ETIODUITICICU								
										Drill Rig: MOBILE B-53								
Total De										Drilling Method: 4" Solid-Stem Auger								
Work Order: 5189-00 & 10 (A)										Driving Energy: 140 lb. wt., 30 in. drop								

					3S, IN Engine		K		EAAU	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF 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): 305 *				
Ö	<del>န</del> ိပိ	ج م	<u> </u>	RG	P Re D	Po (ts	_ <u>_</u> _	Sa	<u> </u>	Description				
	5				28			0	SW- SM	A-inch ASPHALTIC CONCRETE  Dark gray well-graded SAND with silt and gravel, medium dense, damp (fill)				
	4				27/.0' Ref.			0	2	Gray BASALT, dense				
10					15/.0' Ref.		5-	-		Boring terminated at 5 feet				
),GPJ GEOLABS.GDT 5/18/			:				10-	-						
Date Sta	rted:		May 3	3, 200	)7	_				Water Level:   Not Encountered				
Date Cor			May 3		<del></del>					Drill Rig: MOBILE B-53				
Logged E			D. Gremminger 5 feet							Drill Rig: MOBILE B-53 Drilling Method: 4" Solid-Stem Auger				
Work Ord			5189-00 & 10 (A)							Driving Energy: 140 lb. wt., 30 in. drop				

				3S, IN Engine		<sup> </sup>	KE KEA/	KEAAU - PAHOA ROAD HOULDER LANE CONVERSION BYPASS ROAD TO SHOWER DRIVE ISTRICT OF PUNA, ISLAND OF HAWAII				
Other Tests	Moisture Content (%) Dry Unit	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 321 *			
0	7	ÖĞ	R	56	g #	Δ	10000	⊃ GW- GM	Description  4-inch ASPHALTIC CONCRETE  Dark gray well-graded GRAVEL with silt and sand, very dense, damp (fill)			
	4		:	27/.3' Ref.			00000		Gray BASALT, dense			
				15/.0' Ref.		5			Boring terminated at 5 feet			
						10·						
Date Star Date Con	<del></del>	May 3 May 3							Water Level:   Not Encountered			
Logged E		D. Gr							Drill Rig: MOBILE B-53			
Total Dep		5 feet							Drilling Method: 4" Solid-Stem Auger			
Work Ord	Work Order: 5189-00 & 10 (A)								Driving Energy: 140 lb. wt., 30 in. drop			



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KEAAU-PAHOA ROAD, SHOULDER

LANE CONVERSION PHASE 1

Keaau Bypass Road to Shower Drive

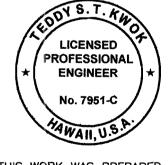
Fed. Aid Proj. No. STP-0130(28), Phase 1

Scale: As Noted Date: June 2012 SHEET No. G15 OF 18 SHEETS

DATE

REVISION

A			FO	<u> </u>	DC.		NC.					KEAAU-PAHOA ROAD	Log of		29		EO! /	) D C	 S, INC.	Ţ			KEAAU-P	AHC	A ROAD		Log of	FED. RO. DIST. N HAWAI	10.	FED. AID PROJ. NO. W. <i>STP-0130(28</i>
		Geo				-				ķ	<b>EAA</b>	OUTHBOUND SHOULDER LANE AU BYPASS TO SHOWER DRIVE AU, DISTRICT OF PUNA, HAWAII	Boring 201						ngineerir			KEA	OUTHBOUND AAU BYPASS AAU, DISTRIC	TO S	SHOWER DR	IVE	Boring 202		FIA	1917-0130128
Other Tests	Moisture Content (%)	Dry Unit	Core Recovery (%)	RQD (%)	Penetration	Resistance (blows/foot)	Pocket Pen.	(tst)	Depth (feet)		USCS	Approximate Ground Surface Elevation (feet ): 325 *  Description  10-inch ASPHALTIC CONCRETE	ce	Other Tests	Moisture	Content (%) Dry Unit Weight (pcf)	Core Recovery (%)	העט (%) Penetration	Resistance (blows/foot) Pocket Pen.	Depth (feet)	ample iraphic	SOSN	Ap	oprox Ele	cimate Ground vation (feet ): Description	d Surfac 342 *	e			
									-	000000000000000000000000000000000000000	W [	Dark gray SANDY GRAVEL (BASALT some silt, medium dense, damp (base	IC) with -		7	,			34		000	GW	Dark gray SA damp (base of Dark grayish	(ND)	( GRAVEL (B. se)	ASALTI				
	25	5			3	35				000	(	Dark brown with multi-color mottling Sa GRAVEL (BASALTIC) with traces of s dense, damp (fill)							34				(BASALTIC) (fill)	with	some silt, me	edium de	ense, damp			
	18					14			-	000000000000000000000000000000000000000			-				98 8		8/1"		000000000000000000000000000000000000000	GP	Gray with mu (BASALTIC) damp (clinke	er)			-			
	5					11			5-	000000000000000000000000000000000000000		grades with cobbles	-							5	いる。これでは、たいとうなったとうなった。これでは、これできないなった。これできないないないないないないない。		Gray vesicula weathered, v			y fractur	red, slightly			
									l i	000000000000000000000000000000000000000		grades with cobbles	<b>-</b>		,						次次次次次 -									
										000000000000000000000000000000000000000			-		·		100 10	00			次次次次 -						; -			
											(	Reddish brown with gray mottling SILT (BASALTIC) with some gravel, dense (cinder)									<b>广泛公公公</b>						-			
	17	,			15	5/3"		1	10			Boring terminated at 10.75 feet		16						10			Boring termin	nate	d at 10 feet					
									-			* Elevations estimated from Roadway transmitted by Wilson Okamoto Corp March 25 and April 9, 2009.															- -			
													-														-			
									15—					GEOLABS.GDT 5/18/1						_ 15										
Date Sta Date Co Logged	mple		Febr Febr Y. C	uary					1.0			Water Level:   Not Encountered  Drill Rig: MOBILE B-80		Date	Started Compl ged By:	leted:	Februar Februar Y. Chiba	y 19,			)		Water Level:   Drill Rig:		Not Encountered				DE	STAT PARTMENT ( HIGHW
Total De Work O	epth:		10.7 5189		t							Drilling Method: 4" Auger Driving Energy: 140 lb. wt.,30 in. drop		ੂੰ Tota	l Depth k Order	•	10 feet 5189-20	)					Drilling Method Driving Energy		4" Auger 140 lb. wt.,30 in. o	drop				BORI.
																													KEAA LAI	NU-PAHOA NE CONVE
																												Fed	eaau d. Aid de: As	Bypass Ro Proj. No. Noted
																								DATE		REVI	ISION	1		HEET No. G



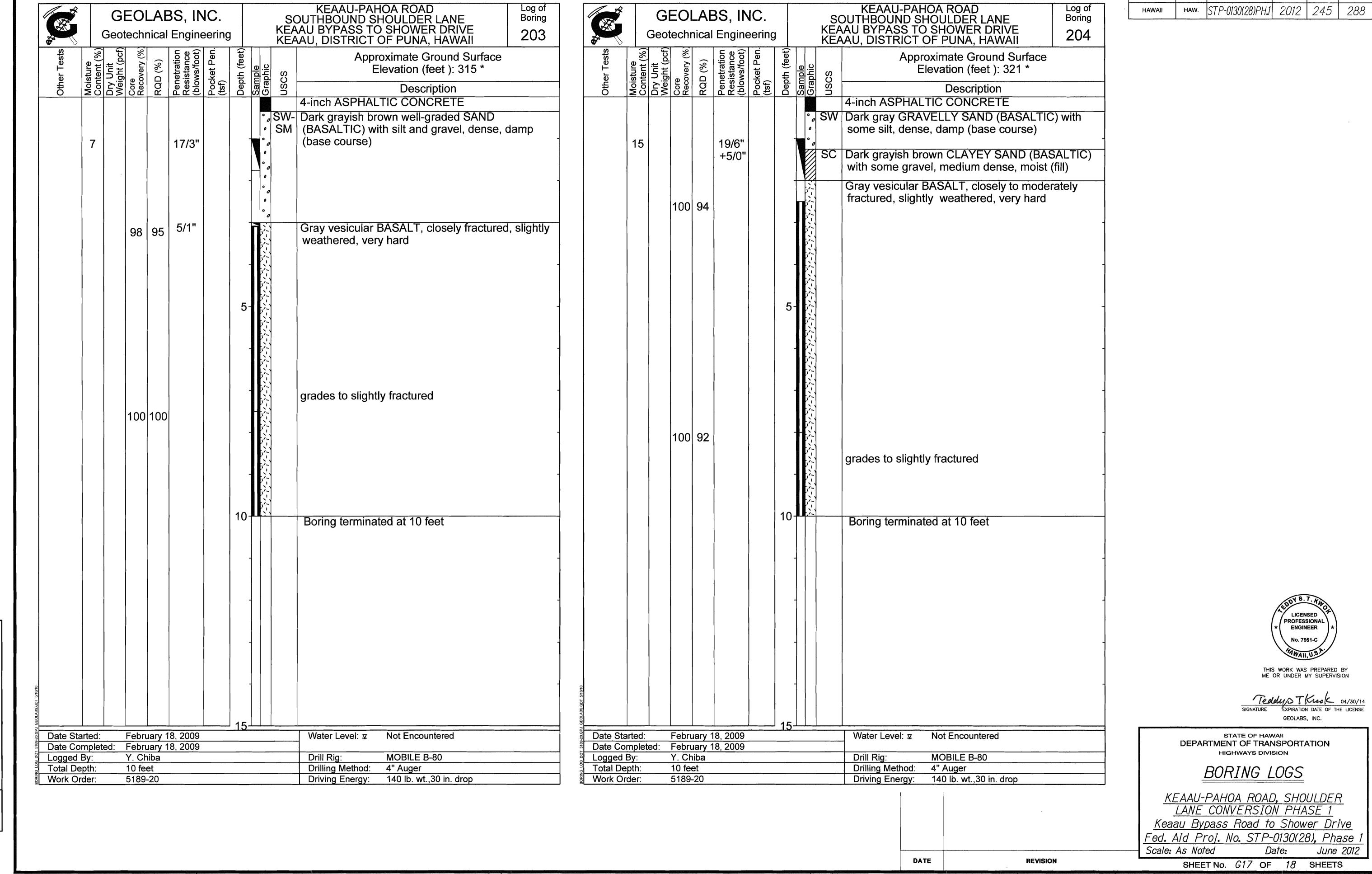
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Teddys T Knok 04/30/14
SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

STATE OF HAWAII ENT OF TRANSPORTATION IIGHWAYS DIVISION

RING LOGS

EAAU-PAHOA ROAD, SHOULDER
LANE CONVERSION PHASE 1
au Bypass Road to Shower Drive
Aid Proj. No. STP-0130(28), Phase 1
As Noted Date: June 2012
SHEET No. G16 OF 18 SHEETS



245

FED. ROAD DIST. NO.

FED. AID PROJ. NO.

FISCAL YEAR

SHEET NO.

GEDLASS, INC.  General Response of the control surprise of the control surpris		FED. ROAD STATE FED. AID FISCAL SHEET TOTAL PROJ. NO. YEAR NO. SHEETS
Approximate forward below interesting and participated an	Boring   GEOLABS, INC.   SOUTHBOUND SHOULDER LANE   Boring   GEOLABS, INC.   SOUTHBOUND SHOULDER LANE   Boring	
Service Control Control (Control Control Contr	Approximate Ground Surface    Content of the conten	
Too 100  Too	4-inch ASPHALTIC CONCRETE  By SW Dark gray GRAVELLY SAND (BASALTIC), dense, damp (base course)  4-inch ASPHALTIC CONCRETE  By SW Dark gray GRAVELLY SAND (BASALTIC), dense, damp (base course)	
Cray Vealcular Excuser, 1,993  Tool 100  Tool	° SW- Dark gravish brown well graded SAND	
Care States   State	87 50	
Care States   State		
Boring terminated at 10 feet    Deep Started   February 18, 2009   15   15   15   15   15   15   15   1		
Boring terminated at 10 feet    Deep Started   February 18, 2009   15   15   15   15   15   15   15   1		
Date Started: February 19, 2009 15  Date Started: February 19, 2009 15  Date Started: February 19, 2009 15  Date Completed: February 19, 2009		
Date Started: February 19, 2009 15  Date Started: February 19, 2009 15  Date Started: February 19, 2009 15  Date Completed: February 19, 2009		SOY S. T. KW
Date Started: February 18, 2009 Date Completed: February 18, 2009 Date Com		No. 7951-C
Date Completed: February 18, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Driving Energy: 140 lb. wt.,30 in. drop  Date Completed: February 19, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Driving Energy: 140 lb. wt.,30 in. drop  Date Completed: February 19, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Driving Energy: 140 lb. wt.,30 in. drop  Date Completed: February 19, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Driving Energy: 140 lb. wt.,30 in. drop  MORILE B-80  BORING LOGS  KEAAU-PAHOA ROAD, SHOULDER LANE CONVERSION PHASE 1 Keaau Bypass Road to Shower Drive Fed. Aid Proj. No. STP-0130(28), Phase 1 Scale: As Noted Date: June 2012		Teddystkink 04/30/14  SIGNATURE EXPIRATION DATE OF THE LICENSE  GEOLABS, INC.
LANE CONVERSION PHASE 1  Keaau Bypass Road to Shower Drive  Fed. Aid Proj. No. STP-0130(28), Phase 1  Scale: As Noted Date: June 2012	Date Completed: February 18, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Date Completed: February 19, 2009 Logged By: Y. Chiba Drill Rig: MOBILE B-80 Total Depth: 10 feet Drilling Method: 4" Auger  Date Completed: February 19, 2009 Logged By: Y. Chiba Drilling Method: 4" Auger	DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION  BORING LOGS
REVISION SHEET No. G18 OF 18 SHEETS	DATE REVISION	LANE CONVERSION PHASE 1  Keaau Bypass Road to Shower Drive  Fed. Aid Proj. No. STP-0130(28), Phase 1  Scale: As Noted Date: June 2012