

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-00M	2001	38	42

Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS		TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	SANDS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
		MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
				MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

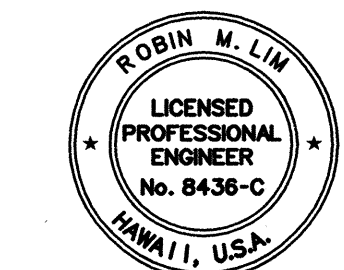
LEGEND

	2-INCH O.D. STANDARD PENETRATION TEST	LL	LIQUID LIMIT
	3-INCH O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX
	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
	GRAB SAMPLE	PEN	POCKET PENETROMETER (tsf)
	CORE SAMPLE	W	WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Route 360 Hana Highway, Repairs and Maintenance at Various Locations, Hana, Maui, Hawaii" dated April 11, 2001 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the engineer for review by the contractor.
- For boring locations, see Sheets 12-14.
- 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.
- 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.
- 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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ORIGINAL PLAN	
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No.	

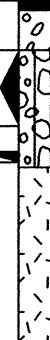



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Robin M. Lim
GEOLABS, INC.


STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
HANA HIGHWAY REPAIRS AND MAINTENANCE PROJECT NO. 360AB-01-00M
Scale: NTS Date: March, 2001
SHEET No. 1 OF 5 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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		GEOLABS, INC.				ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII				Log of Boring 1	
		Geotechnical Engineering									
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:	
										Description	
	29	82			20/5'				GW	6-INCH ASPHALT CONCRETE	
	24	83			Ref.				ML	SILTY BASALT GRAVEL AND SAND (base course)	
	25				25					Brown mottled orange SANDY SILT with traces of highly weathered basalt gravel, stiff, moist (fill)	
	40	78			6/5' +20/4'		5			grades to soft	
	64				4		10				
	50	76			20		15			grades to medium stiff to stiff	
	61				6		20			grades to soft to medium stiff	
	48	73			48		25			grades to very stiff	
	49				24		30				
	59	66			16		35			grades to medium stiff to stiff	
	45				28		40			Brown mottled orange SANDY SILT with traces of highly weathered basalt gravel, stiff, moist (fill)	
	33	87			83		45			grades to very stiff	
	52				32		50			grades to grayish brown, with traces of highly to extremely weathered basalt gravel	
							55			Boring terminated at 50 feet	
Date Started:		December 20, 2000				Water Level: ∇		7 ft. 12/20/00 HRS			
Date Completed:		December 20, 2000						4.4 ft. 12/20/00 HRS			
Logged By:		E. Shinsato				Drill Rig:		MOBILE B-53			
Total Depth:		50 feet				Drilling Method:		4" Auger			
Work Order:		4554-00				Driving Energy:		140 lb. wt., 30 in. drop			

GEOLABS, INC.		ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII							Log of Boring 2	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation: Description
	33	83			46				GW	2-INCH ASPHALT CONCRETE
					30/2'		5		GM	SILTY BASALT GRAVEL (base course)
					Ref.					Grayish brown SILTY BASALT GRAVEL with some basalt sand, and traces of moderately weathered cobbles, dense, damp
					25/0'					Grayish brown BASALT, hard (basalt formation)
							10			Boring terminated at 7 feet
							15			
							20			
Date Started: December 11, 2000								Water Level: ∇ Not Encountered		
Date Completed: December 11, 2000										
Logged By: E. Shinsato								Drill Rig: MOBILE B-53		
Total Depth: 7 feet								Drilling Method: 4" Auger		
Work Order: 4554-00								Driving Energy: 140 lb. wt., 30 in. drop		

GEOLABS, INC.				ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII					Log of Boring 3		
Geotechnical Engineering											
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)		USCS	Approximate Ground Surface Elevation:	
										Description	
	26				31				GM	2-INCH ASPHALT CONCRETE	
	25				3				SW-SM	Grayish brown SILTY BASALT GRAVEL (base course)	
	40	73			11		5			Brown SILTY BASALT SAND with traces of highly weathered cobbles, medium dense, very moist (water seepage at 1.5')	
	20				7		10		MH	Grayish brown with white mottling BASALT, highly to extremely weathered, soft, breaks down to clayey silt (saprolite)	
							15			Boring terminated at 11.5 feet	
							20				
Date Started: December 11, 2000							Water Level: ∇ Not Encountered				
Date Completed: December 11, 2000											
Logged By: E. Shinsato							Drill Rig: MOBILE B-53				
Total Depth: 11.5 feet							Drilling Method: 4" Auger				
Work Order: 4554-00							Driving Energy: 140 lb. wt., 30 in. drop				





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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION					
BORING LOGS					
HANA HIGHWAY REPAIRS AND MAINTENANCE PROJECT NO. 360AB-01-00M					
Scale: NTS			Date: March, 2001		
SHEET No. 2 OF 5 SHEETS					

GEOLABS, INC.		ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII						Log of Boring 4	
Geotechnical Engineering									
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:									
Description									
	23	95			59/.5' Ref.		5	GW	6-INCH ASPHALT CONCRETE
								SM	SILTY BASALT GRAVEL AND SAND (base course)
			100	100					Grayish brown SILTY BASALT SAND with some basalt cobbles and gravel
			100	97					Gray BASALT, slightly fractured, slightly weathered, hard (basalt formation)
			80	43			10		grades to severely to closely fractured, moderately weathered
			70	65			15		grades to closely fractured, slightly weathered
			17				20		
							25	SM	Gray BASALT, severely fractured, extremely weathered, soft, breaks down to silty sand (saprolite)
	53		21		13		30		
	65		21		14		35		
	31		53	30	50/.3' Ref.		40		Gray BASALT, severely fractured, extremely weathered, soft, breaks down to silty sand (saprolite)
	48		31		25		45		grades to moderately weathered, medium hard
							50		grades to extremely weathered, soft
	51		90	79	36		55		Brownish gray VOCANIC BRECCIA, closely fractured, highly weathered, medium hard (volcanic breccia)
									Boring terminated at 51 feet

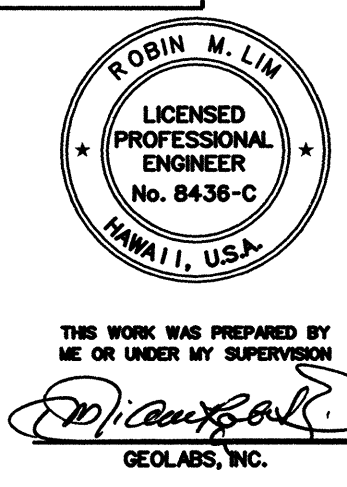
Date Started:	December 19, 2000	Water Level:	Not Encountered
Date Completed:	December 19, 2000	Drill Rig:	MOBILE B-53
Logged By:	E. Shinsato	Drilling Method:	4" Auger & HQ Coring
Total Depth:	51 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	4554-00		

GEOLABS, INC.		ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII						Log of Boring 5	
Geotechnical Engineering									
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:									
Description									
	51	64			19		5	GW	6-INCH ASPHALT CONCRETE
	61				13			CL	SILTY BASALT GRAVEL AND SAND (base course)
	68	59			39		5	SM	Brown SILTY CLAY with traces of extremely weathered basalt gravel and sand, medium stiff to stiff, moist
									Gray with white mottling BASALT, extremely weathered, soft, breaks down to silty sand (saprolite)
	31				76		10		
	20				50/.3' Ref.		15		
	62	57			49		20		
	39				29/.5' +30/.2' Ref.		25		grades to grayish brown
	42				75		30		
	46				35/.5' +30/.2' Ref.		35		Gray with white mottling BASALT, extremely weathered, soft, breaks down to silty sand (saprolite)
	50				72		40		
	63				50/.3' Ref.		45		
	56				50/.3' Ref.		50		Boring terminated at 50.8 feet

Date Started:	December 18, 2000	Water Level:	Not Encountered
Date Completed:	December 18, 2000	Drill Rig:	MOBILE B-53
Logged By:	E. Shinsato	Drilling Method:	4" Auger
Total Depth:	50.8 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	4554-00		

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FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-00M	2001	40	42



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HANA HIGHWAY
REPAIRS AND MAINTENANCE
PROJECT NO. 360AB-01-00M

Scale: NTS Date: March, 2001

SHEET No. 3 OF 5 SHEETS

SURVEY PLOTTED BY	DATE
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GEOLABS, INC.		ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII										Log of Boring 6
Geotechnical Engineering												
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: Description		
	46	65			25/.2' Ref. 19				GW	4-INCH ASPHALT CONCRETE		
					50/.3' Ref.		5		SM	SILTY BASALT GRAVEL AND SAND (base course)		
			100	100						Reddish gray-brown SILTY BASALT SAND with gravel, loose to medium dense, moist		
			90	90						Gray VESICULAR BASALT, closely fractured, moderately weathered, medium hard (basalt formation)		
							10					
			92	75								
							15			grades with reddish highly weathered, severely fractured seams		
			100	100						grades back to gray, moderately weathered, severely fractured, medium hard		
							20					
			100	97								
							25			grades with some reddish brown, highly weathered seams		
			100	100								
							30			grades to severely fractured		
			97	97								
							35			Gray VESICULAR BASALT, closely fractured, moderately weathered, medium hard (basalt formation)		
			92	92						grades to closely fractured		
							40					
			85	85								
							45			Boring terminated at 45 feet		
							50					
							55					
Date Started: December 15, 2000					Water Level: ∇ Not Encountered							
Date Completed: December 15, 2000												
Logged By: E. Shinsato					Drill Rig: MOBILE B-53							
Total Depth: 45 feet					Drilling Method: 4" Auger & HQ Coring							
Work Order: 4554-00					Driving Energy: 140 lb. wt., 30 in. drop							

GEOLABS, INC.		ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII										Log of Boring 7
Geotechnical Engineering												
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: Description		
	52	62			9				GW	3-INCH ASPHALT CONCRETE		
	59				3				CL	SILTY BASALT GRAVEL AND SAND (base course)		
	52	61			16		5		GM	Brown with orange mottling SILTY CLAY with highly to extremely weathered basalt gravel and sand, soft, very moist		
										Brown with orange mottling SILTY BASALT GRAVEL AND SAND medium dense, very moist (saprolite)		
	50				25		10			grades to medium dense		
	24	93			50		15					
	42				37		20					
	41	73			40/.3' Ref.		25		ML	Grayish brown BASALT, severely fractured, highly weathered, soft, breaks down to sandy silt (saprolite)		
	28				50/.3' Ref.		30		SM	Reddish gray-brown BASALT, extremely weathered, break down to silty sand (saprolite)		
	16				30/.2' Ref.		35			Reddish brown BASALT, extremely weathered, breaks down to silty sand (saprolite)		
					56/.3' Ref.		40					
					50/.2' Ref.		45			grades to moderately weathered basalt, medium hard		
										Boring terminated at 47 feet		
							50					
							55					
Date Started: December 14, 2000					Water Level: ∇ Not Encountered							
Date Completed: December 14, 2000												
Logged By: E. Shinsato					Drill Rig: MOBILE B-53							
Total Depth: 47 feet					Drilling Method: 4" Auger							
Work Order: 4554-00					Driving Energy: 140 lb. wt., 30 in. drop							



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FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-00M	2001	41	42

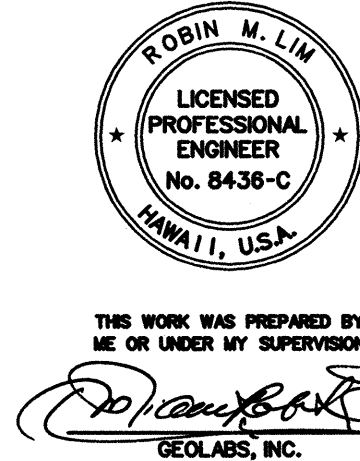
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BORING LOGS

HANA HIGHWAY
REPAIRS AND MAINTENANCE
PROJECT NO. 360AB-01-00M
Scale: NTS Date: March, 2001
SHEET No. 4 OF 5 SHEETS

GEOLABS, INC. Geotechnical Engineering										ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII										Log of Boring 8	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation:											
										Description											
LL-64 PI-15	38	78			16	1.5			GW	4.5-INCH ASPHALT CONCRETE											
	36				15				MH	SILTY BASALT GRAVEL AND COBBLES (base course)											
	30	83			8		5			Grayish brown CLAYEY SILT with some highly weathered basalt gravel and sand, medium stiff to stiff, very moist (saprolite) grades with multi-color mottling, with some extremely weathered gravel											
	40				50/.5' Ref.		10			grades to purplish gray-brown, with white mottled areas, very stiff											
					50/.0' Ref.		15		GM	Purplish gray-brown SILTY BASALT GRAVEL AND SAND medium dense, very moist (saprolite)											
	32	85			58		20														
	26				32/.5' +40/.3' Ref.		25			grades to very dense											
					40/.1' Ref.		30			Gray BASALT, moderately weathered, hard (basalt formation)											
				100 100	100 87			35			grades to moderately fractured, slightly weathered										
				80	43			40			Gray BASALT, moderately fractured, slightly weathered, hard (basalt formation)										
			77	57			45			grades to severely fractured, moderately to highly weathered, medium hard											
							50			grades back to medium weathered, hard											
							55			Boring terminated at 48 feet											
Date Started: December 12, 2000										Water Level: ∇ Not Encountered											
Date Completed: December 12, 2000																					
Logged By: E. Shinsato										Drill Rig: MOBILE B-53											
Total Depth: 48 feet										Drilling Method: 4" Auger & HQ Coring											
Work Order: 4554-00										Driving Energy: 140 lb. wt., 30 in. drop											

GEOLABS, INC. Geotechnical Engineering										ROUTE 360 HANA HIGHWAY REPAIRS & MAINTENANCE AT VAR. LOCATIONS HANA, MAUI, HAWAII										Log of Boring 9	
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:											
										Description											
LL-46 PI-0	43	78			43	3			GW	4.5-INCH ASPHALT CONCRETE											
	31				37/.5' +30/.3' Ref.				ML	SILTY BASALT GRAVEL AND SAND (base course)											
	43	75			35/.5' +50/.3' Ref.		5			Grayish brown SANDY SILT with some highly weathered basalt gravel, very stiff, moist (saprolite)											
	35				85		10														
	37	79			91		15														
	48				25/.5' +50/.3' Ref.		20		GM	Grayish brown BASALT, highly to extremely weathered, soft, breaks down to silty gravel with sand (saprolite)											
	26	94			36		25			grades to moderately to highly weathered											
	27				50/.5' Ref.		30			grades to extremely weathered											
	27	87			33/.3' Ref.		35			Grayish brown BASALT, highly weathered, soft, breaks down to silty gravel with sand (saprolite)											
	29				40		40														
23	97			50/.5' Ref.		45			grades with yellow mottled seams												
27				34/.3' Ref.		50			Boring terminated at 50.8 feet												
Date Started: December 13, 2000										Water Level: ∇ Not Encountered											
Date Completed: December 13, 2000																					
Logged By: E. Shinsato										Drill Rig: MOBILE B-53											
Total Depth: 50.8 feet										Drilling Method: 4" Auger											
Work Order: 4554-00										Driving Energy: 140 lb. wt., 30 in. drop											

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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
HANA HIGHWAY REPAIRS AND MAINTENANCE PROJECT NO. 360AB-01-00M	
Scale: NTS	Date: March, 2001
SHEET No. 5 OF 5 SHEETS	