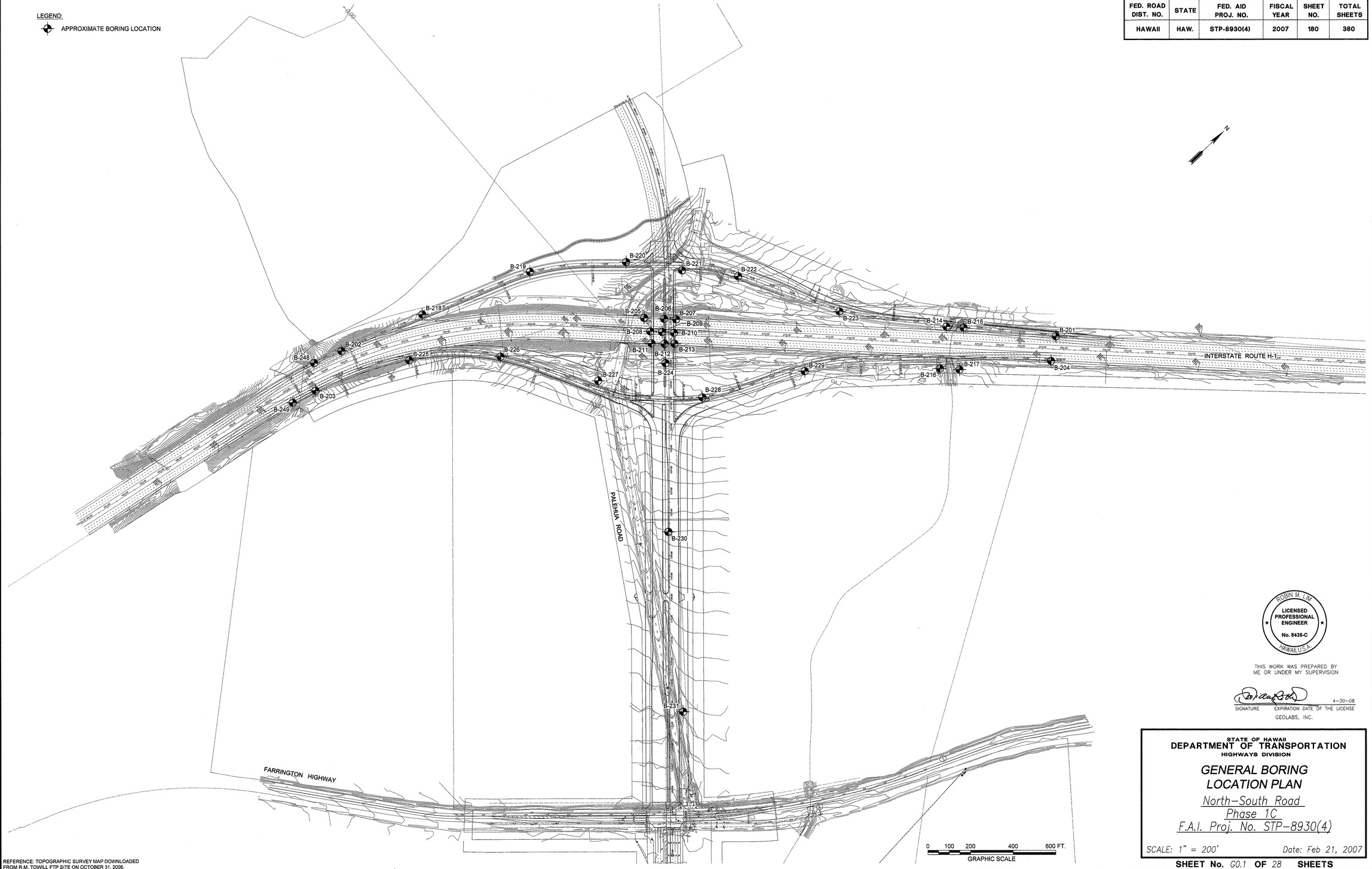
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	180	380

LEGEND:

APPROXIMATE BORING LOCATION



REFERENCE: TOPOGRAPHIC SURVEY MAP DOWNLOADED FROM R.M. TOWILL FTP SITE ON OCTOBER 31, 2006.

ORIGINAL PLAN

NOTE BOOK No.

SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

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

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SIGNATURE 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL BORING LOCATION PLAN

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

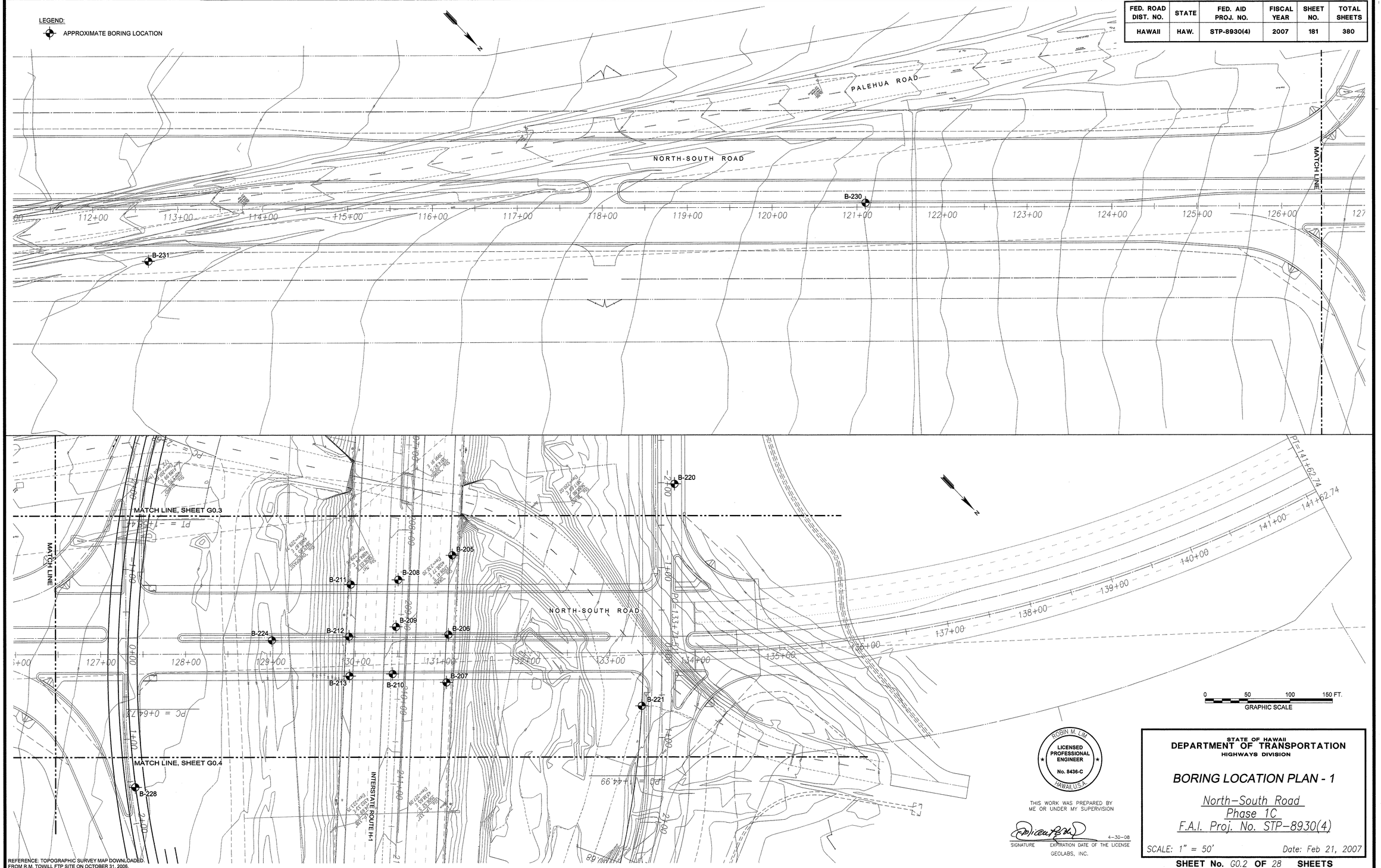
SCALE: 1" = 200' Date: Feb 21, 2007

SHEET No. G0.1 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	181	380

LEGEND:

APPROXIMATE BORING LOCATION



REFERENCE: TOPOGRAPHIC SURVEY MAP DOWNLOADED FROM R.M. TOWILL FTP SITE ON OCTOBER 31, 2005.

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 1

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

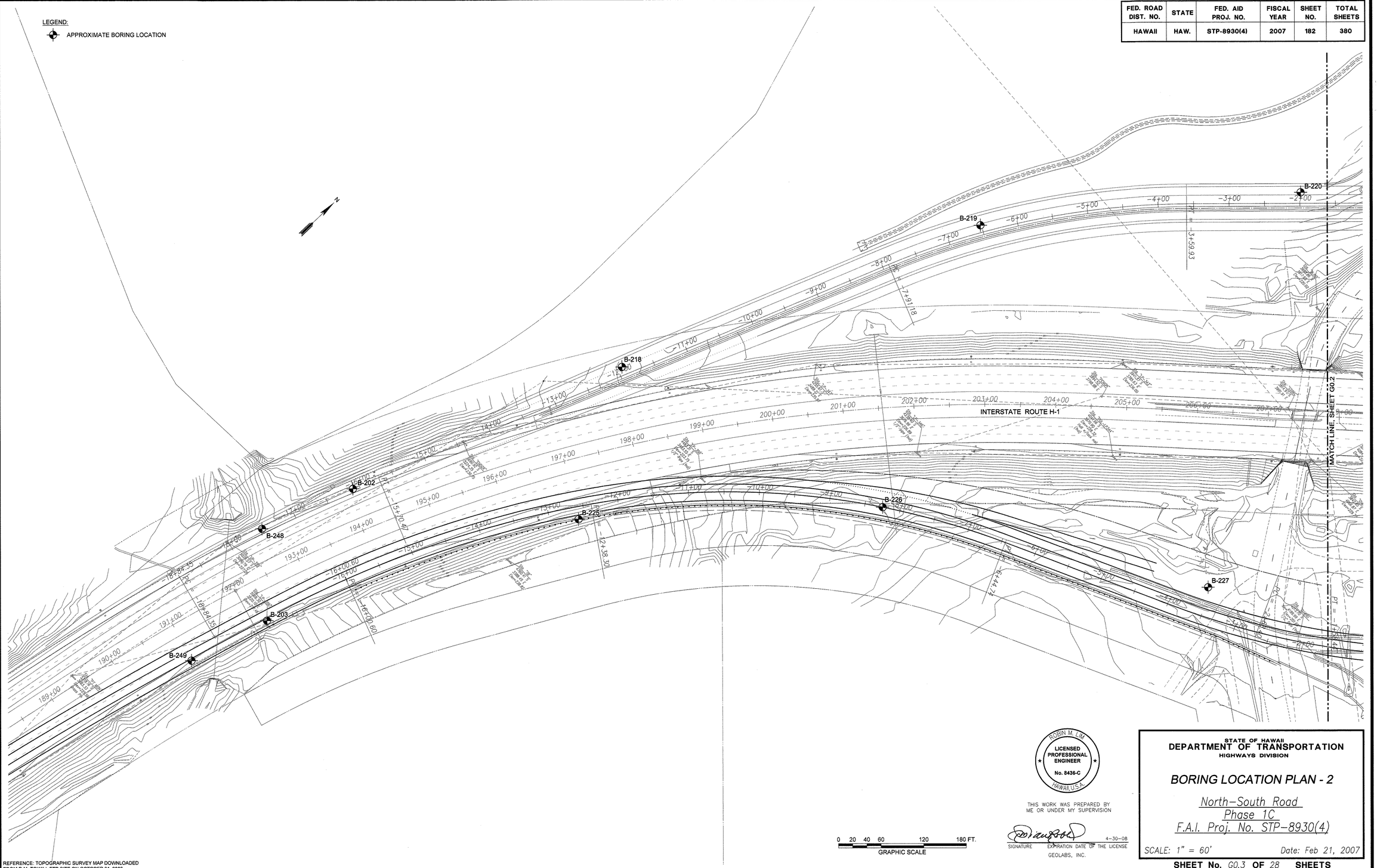
SCALE: 1" = 50' *Date: Feb 21, 2007*

SHEET No. *G0.2* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	182	380

LEGEND:

APPROXIMATE BORING LOCATION



REFERENCE: TOPOGRAPHIC SURVEY MAP DOWNLOADED FROM R.M. TOWILL FTP SITE ON OCTOBER 31, 2006.

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

0 20 40 60 120 180 FT.

GRAPHIC SCALE

ROBIN M. LIM
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 2

North–South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

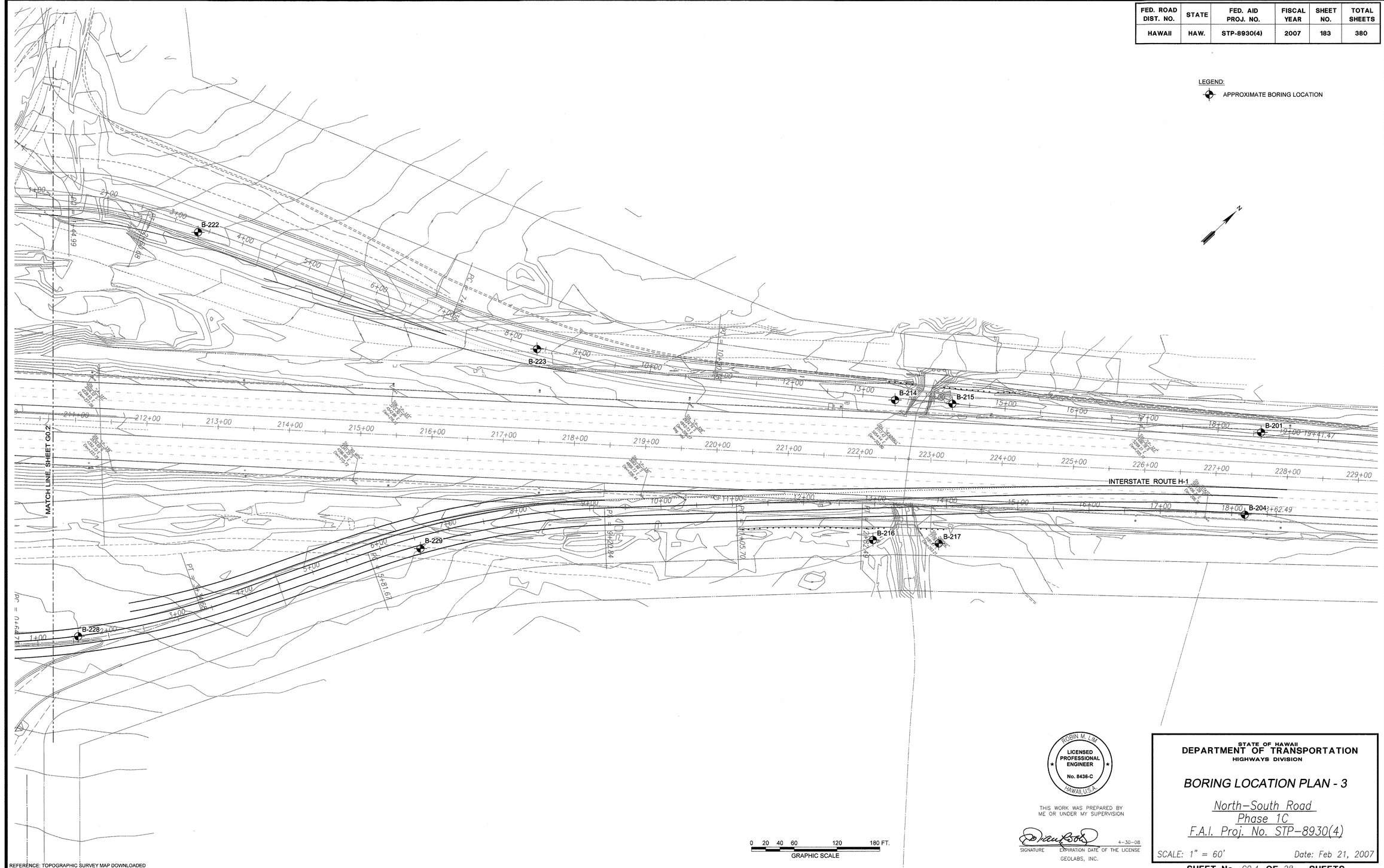
SCALE: 1" = 60' *Date: Feb 21, 2007*

SHEET No. *G0.3* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	183	380

LEGEND:

APPROXIMATE BORING LOCATION



REFERENCE: TOPOGRAPHIC SURVEY MAP DOWNLOADED FROM R.M. TOWILL FTP SITE ON OCTOBER 31, 2006.

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

ROBIN M. LIM
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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 3

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

SCALE: 1" = 60' *Date: Feb 21, 2007*

SHEET No. *G0.4* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	184	380

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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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
	SANDS	CLEAN SANDS	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE		LESS THAN 5% FINES	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	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
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE	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
- 3-INCH O.D. MODIFIED CALIFORNIA SAMPLE
- S — SHELBY TUBE SAMPLE
- G — GRAB SAMPLE
- CORE SAMPLE

- LL — LIQUID LIMIT
- PI — PLASTICITY INDEX
- TV — TORVANE SHEAR (tsf)
- PEN — POCKET PENETROMETER (tsf)
- UC — UNCONFINED COMPRESSION (psi)
- WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, North-South Road, Phase 1C, Ewa, Oahu, Hawaii" dated February 8, 2007 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.

2. For boring locations, see Sheets G0.1 to G0.4.

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.

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

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

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SIGNATURE 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOG LEGEND & NOTES

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. *G1.1* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	185	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 201

Approximate Ground Surface Elevation (feet MSL): 207 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GM	2.5-inch ASPHALTIC CONCRETE
	21	101			30	3.5				MH	Reddish brown SILTY GRAVEL (BASALTIC) with sand, medium dense, dry (fill)
	22				14	2.5					Reddish brown CLAYEY SILT, hard, damp
											grades to very stiff at 2.5 feet
	22	90			10/.5' +15/.3' Ref.	2.5	5			MH	Brownish orange CLAYEY SILT with boulders, very stiff, damp (residual soil)
					8						grades to medium stiff
							10				
	27	74			30/.3' Ref.						Dark gray vesicular BASALT with olivine, highly to extremely weathered, breaks down to sandy gravel, dense, damp to dry (basalt formation)
							15				
	28				18/.5' +20/.3' Ref.						Gray extremely weathered BASALT, breaks down to silty sand, dense, damp (basalt formation)
							20				
			87	80	15/.1' Ref.						Tannish gray vesicular BASALT with olivine, closely fractured, moderately to highly weathered, hard (basalt formation)
							25				
											grades to moderately fractured, moderately weathered, very hard
			100	76	10/.1' Ref.		30				
											grades to closely to severely fractured, moderately to highly weathered, hard
					10/.0' Ref.		35				Boring terminated at 35.5 feet
											* Elevations estimated from Topographic Survey Map downloaded from R.M. Towill FTP site on October 31, 2006.
							40				
							45				
							50				

Date Started:	November 7, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 7, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 202

Approximate Ground Surface Elevation (feet MSL): 229 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GW	2.5-inch ASPHALTIC CONCRETE
	25	95			10/.2' Ref.					CH	Dark brown SANDY GRAVEL (BASALTIC) in a silt matrix, medium dense, damp (fill)
			86	56							Dark brown with red mottling SILTY CLAY with gravel and sand (basaltic), medium stiff, moist (fill)
							5				
			45	15							Gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
											Reddish brown with black mottling vesicular BASALT, closely to severely fractured, highly weathered, medium hard (basalt formation)
			77	72			10				Gray vesicular BASALT, moderately fractured, moderately to slightly weathered, hard (basalt formation)
							15				
			64	44	15/.1' Ref.						Gray with reddish brown mottling vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
										GP	Gray with multi-color mottling vesicular and scoriaceous GRAVEL (BASALTIC) with sand, dense (clinker)
	21		35	19	20/.3' Ref.		20				
											Gray with brown and white mottling vesicular BASALT, slightly fractured, moderately weathered, hard (basalt formation)
			100	97	15/.0' Ref.		25				grades to gray
			83	65			30				grades to closely to severely fractured
											Gray vesicular BASALT, moderately fractured, moderately to slightly weathered, hard (basalt formation)
							35				Boring terminated at 35.5 feet
							40				
							45				
							50				

Date Started:	November 7, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 7, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 1

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.1 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	186	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 203

Approximate Ground Surface Elevation (feet MSL): 218 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
								GW	2.5-inch ASPHALTIC CONCRETE
	10	90			20/.3' Ref.			CL	Light reddish gray SANDY GRAVEL (BASALTIC) in a silt matrix, dense, dry (fill)
LL=47 PI=21	19	86			14/.5' +17/.3' Ref.		5		Light reddish gray SILTY CLAY with sand and gravel (basaltic), hard, dry (fill)
	13				10/.3' Ref.		10	CH	Reddish brown with multi-color mottling SILTY CLAY with gravel and cobbles (basaltic), very hard, damp to dry (fill)
	7				25/.5' +30/.3' Ref.		15	MH	Reddish brown with gray mottling CLAYEY SILT with sand (basaltic) and some gravel, hard, dry to damp (fill)
	11				50/.5' +20/.3' Ref.		20	ML	Reddish brown with gray mottling fine SANDY SILT with highly weathered basaltic gravel and sand, very hard, dry (fill)
	9	89			30/.3' Ref.		25		
					10/.0' Ref.		30	GM	Reddish brown with multi-color mottling SILTY GRAVEL AND SAND (BASALTIC), very dense, damp (weathered clinker/a'a basalt)
	12				20/.3' Ref.		35		Boring terminated at 34.3 feet
							40		
							45		
							50		

Date Started:	November 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 8, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	34.3 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 204

Approximate Ground Surface Elevation (feet MSL): 207 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
								SW	Reddish gray GRAVELLY SAND (BASALTIC) with silt, medium dense, damp (fill)
LL=42 PI=20	25	100			16	3.0		CL	
	22				21	>4.5			Reddish brown SILTY CLAY, hard, damp (alluvium)
	21	110			54	>4.5	5		grades with some rounded coarse sand
			36						Gray BOULDERS (BASALTIC)
							10	ML	Orangish brown SANDY SILT with some clay and some highly weathered gravel (basaltic), medium stiff, damp (residual soil)
	37				5		15		
			0	0					
	26				40/.5' +10/.0' Ref.		20		Gray with brown mottling vesicular BASALT, closely fractured, highly weathered, medium hard (basalt formation)
			100	50					grades to gray, moderately weathered
			83	57			25		
									Gray vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)
			90	52			30		
							35		grades to closely to severely fractured
									Boring terminated at 35.5 feet
							40		
							45		
							50		

Date Started:	December 5, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 5, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

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

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 2

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.2 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	187	380

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 205

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): 232.5 * Description
	15	101			31/.5' +15/.1' Ref.					GM	Reddish brown SILTY GRAVEL AND SAND (BASALTIC), medium dense, dry (fill) grades with cobbles/boulders (basaltic), very dense
	2 10	92			15/.3' Ref. 15/.3' Ref.		5			SC	Reddish brown CLAYEY SAND AND GRAVEL (BASALTIC), dense, dry (fill)
	9				20/.5' +18/.3' Ref.		10			SM	Reddish brown SILTY SAND with gravel (basaltic), dense, dry (fill)
	11	98			26/.5' +20/.3' Ref.		15				
	7				10/.0' Ref.	3.5	20			CH	Reddish brown SILTY CLAY with sand and some rounded gravel (basaltic), hard, damp (fill)
			33		10/.0' Ref.		25				Brown with gray mottling COBBLES AND BOULDERS (BASALTIC) in a silty clay matrix, dense (alluvium)
	12		63		20/.3' Ref.		30				
UC= 15600			100	90	10/.0' Ref.		35				Gray vesicular to dense BASALT, moderately fractured, moderately to slightly weathered, very hard (basalt formation)
UC= 2000			75	37			40			GP	Brownish gray with black and brown mottling vesicular GRAVEL (BASALTIC) with sand, medium dense (clinker)
			100	97	15/.0' Ref.		45				Gray with orange mottling vesicular BASALT, closely to severely fractured, moderately weathered, hard (basalt formation)
							50				Gray with black mottling vesicular BASALT, slightly fractured, slightly to moderately weathered, very hard (basalt formation)

Date Started:	October 20, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 21, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	67 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG SOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 205

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
			25	0							
UC= 13700	25		89	61	30/.3' Ref.		55				Brownish gray with orange mottling highly to extremely weathered vesicular BASALT, friable, breaks down to silty gravel and sand, dense (basalt formation)
UC= 6000			37	13			60				Gray with orange mottling vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation) grades to closely fractured
	28				21		65			SM	Brownish gray with orange mottling vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
							70				Brownish gray with orange and brown mottling SILTY SAND AND GRAVEL, medium dense, damp (weathered clinker)
							75				Boring terminated at 67 feet
							80				
							85				
							90				
							95				
							100				

Date Started:	October 20, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 21, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	67 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG SOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-08

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 3

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.3 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	188	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 206

Approximate Ground Surface Elevation (feet MSL): 231 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
							0	GW	3-inch ASPHALTIC CONCRETE
	13	95			54	3.5		ML	Gray with brown mottling SANDY GRAVEL (BASALTIC) in a clayey silt matrix, dense (fill)
	9				10/.0'				Brown fine SANDY SILT with some gravel (basaltic), hard, dry to damp (fill)
	9				Ref.		5		
					23				grades with some highly weathered cobbles (basaltic) at 3 feet
									Dark brown with gray mottling COBBLES AND BOULDERS (BASALTIC) in a silty clay matrix, hard, damp (fill)
			53		15/.0'		10		
					Ref.	>4.5		CL	Dark brown with gray mottling SILTY CLAY with sand and cobbles and gravel (basaltic), very hard (fill)
LL=39 PI=22	21				20	>4.5	15		
			21					MH	Dark brown with gray mottling CLAYEY SILT with some gravel and cobbles (basaltic) (fill)
	12				8/.5'	4.0	20	CL	Dark brown SANDY CLAY with gravel (basaltic), hard (alluvium)
			91		+15/.3'				Gray with brown mottling BOULDERS AND COBBLES (BASALTIC) in a silty clay matrix, very dense (alluvium)
					Ref.		25		
	2		39		11/.3'				
					Ref.		30		
	5		82		15/.3'				
					Ref.				
			40		10/.0'		35		
					Ref.				
								GP	Brown with gray mottling rounded to well rounded GRAVEL with some cobbles in a silty sand matrix, dense (alluvium)
	5				32		40		
			86						
							45		Gray with orangish brown mottling densely cemented COBBLES (BASALTIC) AND POORLY GRADED COARSE SAND AND GRAVEL (BASALTIC), slightly fractured, moderately weathered, hard (alluvium)
UC= 17200			100	75	10/.0'				
					Ref.		50		

Date Started:	October 18, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 20, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	85.8 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 206

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
			100	80					Gray with brown mottling vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)
UC= 9500			57	40			55		Gray vesicular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)
							60		Brownish gray with light orange mottling vesicular BASALT, severely fractured, highly weathered, medium hard (basalt formation)
			52	17					Gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
								GW	Brownish gray with orange and brown mottling scoriaceous to vesicular SANDY GRAVEL (BASALTIC), medium dense (clinker)
	25		70	23	10/.1'		65		Gray with orange mottling vesicular BASALT, closely fractured, moderately to highly weathered, hard to medium hard (basalt formation)
					Ref.			GP	Gray with orange mottling scoriaceous to vesicular GRAVEL (BASALTIC) with sand, medium dense (clinker)
			40	0	15/.0'		70		
					Ref.				
			100	75	12/.0'		75		Gray with orange mottling vesicular to scoriaceous COBBLES AND GRAVEL (BASALTIC) with sand, medium dense (clinker)
					Ref.				Brownish gray vesicular BASALT, moderately fractured, moderately to slightly weathered, hard (basalt formation)
			47	0			80		
									Gray with orange mottling vesicular to scoriaceous COBBLES AND GRAVEL (BASALTIC) with some sand, medium dense (clinker)
					15/.3'		85		
					Ref.				Boring terminated at 85.8 feet
							90		
							95		
							100		

Date Started:	October 18, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 20, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	85.8 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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

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SIGNATURE — 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 4

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.4 OF 28 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	189	380

GEOLABS, INC. — Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 207

Approximate Ground Surface Elevation (feet MSL): 230 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GW	3-inch ASPHALTIC CONCRETE
	12				32					MH	Light gray GRAVEL (BASALTIC) with sand (fill)
											Dark brown and gray CLAYEY SILT with sand and gravel (basaltic), hard, moist (fill)
	8				91		5			CH	Dark brown and gray SILTY CLAY with sand and gravel (basaltic), very hard, moist (fill)
										CH	Dark brown and gray SILTY CLAY with sand and gravel (basaltic), very stiff, moist (fill)
	13				25	>4.5	10				
										CH	Brown SILTY CLAY with traces of fine sand and gravel (basaltic), very stiff, moist (fill)
	21	102			40	>4.5	15				
	13				20/.3' Ref.	>4.5	20				Light gray BOULDER AND COBBLES (BASALTIC) in a clayey silt matrix, very dense, moist (alluvium)
	7				45	2.8	25				
	1				20/.2' Ref.		30				
UC= 13700	3		63		15/.1' Ref.		35				
			28		10/.0' Ref.		40				
	24		90		15/.2' Ref.		45			SM	Orangish red with multi-color mottling moderately cemented SILTY SAND with rounded gravel and cobbles (basaltic), dense (alluvium)
							50				

Date Started:	October 17, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 18, 2005		
Logged By:	D. Sjolund & Y. Chiba	Drill Rig:	CME-75
Total Depth:	85 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC. — Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 207

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	17		67		24/.3' Ref.					SM	
	13		39		10/.0' Ref.		55				grades with some boulders (basaltic)
						>4.5				ML	Reddish brown fine SANDY SILT with some blocky gravel (basaltic), very hard (residual soil)
	24				35/.5' +25/.3' Ref.	>4.5	60				
			13								grades with some cobbles (basaltic)
UC= 10800			100	80	10/.0' Ref.		65				Gray vesicular BASALT, moderately fractured, moderately weathered, very hard (basalt formation)
											grades to closely fractured, hard
UC= 3400			73	30			70				Gray with orange mottling vesicular to scoriaceous BASALT, closely to severely fractured, moderately to highly weathered, medium hard (basalt formation)
			100	51	10/.3' Ref.		75				
											Gray dense BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
UC= 16500			100	50			80				Gray dense to vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
							85				Brownish gray with light orange and black mottling vesicular BASALT, closely to severely fractured, highly to moderately weathered, medium hard (basalt formation)
											Boring terminated at 85 feet
							90				
							95				
							100				

Date Started:	October 17, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 18, 2005		
Logged By:	D. Sjolund & Y. Chiba	Drill Rig:	CME-75
Total Depth:	85 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-08

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 5

North–South Road
Phase 1C
F.A.I. Proj. No. STP–8930(4)

Date: Feb 21, 2007

SHEET No. G2.5 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	190	380

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 208

Approximate Ground Surface Elevation (feet MSL): 229 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	12	92			97			GM	Brown and light gray SILTY GRAVEL (BASALTIC) with sand and concrete gravel, very dense, moist (fill)
	9				29		5		grades to medium dense
								CH	Brown and light gray SILTY CLAY with gravel and boulders (basaltic) and traces of sand, very stiff, moist (fill)
	18				29	>4.5	10		
	25				20/.3' Ref.	4.0	15		
	8				51		20		grades to hard
	10				31		25	MH-CH	Medium brown and gray SILTY CLAY with sand and traces of gravel and boulders (basaltic), very stiff, dry (fill)
	4		60		27/.3' Ref.		30		Brown with gray mottling rounded COBBLES AND BOULDERS (BASALTIC) with gravel in a clayey silt matrix, dense (alluvium)
			40		10/.0' Ref.		35		
			33		10/.0' Ref.		40		
			100	26	10/.3' Ref.		45		
							50		

Date Started:	October 14, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 6, 2005		
Logged By:	D. Sjolund & Y. Chiba	Drill Rig:	CME-75
Total Depth:	85.5 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG (OCT 3860-40.GPJ GEOLABS.GDT 10/9/07)

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 208

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
			83	0					Brown with multi-color mottling highly to extremely weathered BASALT, friable, breaks down to silty sand, medium dense (basalt formation)
UC= 8100			90	73			55		Brownish gray with tan mottling vugular BASALT, closely fractured, highly to moderately weathered, medium hard (basalt formation)
									Reddish brown with gray mottling scoriaceous to vesicular BASALT, closely to severely fractured, highly weathered, medium hard (basalt formation)
UC= 16400			100	100			60		Gray vesicular to vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
									Gray dense BASALT, massive, slightly weathered, very hard (basalt formation)
			75	67			65		
								GP	Gray with brown mottling scoriaceous GRAVEL (BASALTIC), medium dense (clinker)
UC= 18100			97	67			70		Gray vesicular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
			100	30			75		Brownish gray vesicular BASALT, severely to closely fractured, highly to moderately weathered, medium hard (basalt formation)
			100	75			80		
							85		Gray vesicular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)
									Boring terminated at 85.5 feet
							90		
							95		
							100		

Date Started:	October 14, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 6, 2005		
Logged By:	D. Sjolund & Y. Chiba	Drill Rig:	CME-75
Total Depth:	85.5 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG (OCT 3860-40.GPJ GEOLABS.GDT 10/9/07)

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

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

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 6

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.6 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	191	380

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 209

Approximate Ground Surface Elevation (feet MSL): 228.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	8				24/.5' +21/.3'			GM	Light brown and gray SILTY GRAVEL (BASALTIC) with sand and traces of clay, very dense, dry (fill)
	11				38		5	SM	Dark brown and light gray SILTY SAND with cobbles and gravel (basaltic), dense, moist (fill)
LL=37 PI=16	25				9	1.5	10	CL	Dark brown SILTY CLAY with fine sand and cobbles and gravel (basaltic), medium stiff, moist (fill)
	24	92			21	3.5	15		grades to very stiff
	14				31/.5' +10/.0'	2.0	20	CH	Brown and light gray SILTY CLAY with cobbles and gravel (basaltic), very hard, moist (fill)
	7				40		25	SM	Dark brown and gray SILTY SAND with cobbles and gravel (basaltic), dense, moist (fill)
	15				26/.3' Ref.		30		Gray and brown BOULDERS AND COBBLES (BASALTIC) in clayey silt matrix, very dense (alluvium)
	11				70		35		
	11				25/.2' Ref.		40		
					10/.0' Ref.		45		
	18						50		

Date Started:	October 13, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 14, 2005		
Logged By:	D. Sjolund	Drill Rig:	CME-75
Total Depth:	75.5 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_3860-40.GPJ GEOLABS.GDT 1/30/07

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 209

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
					50/.5' Ref.				Gray BASALT, highly weathered, very hard, moist (basalt formation)
	19				50/.5' Ref.		55		
	27				10/.5' +25/.3'		60		
	29				32/.3' Ref.		65		grades to moderately weathered
	37				59		70		grades to highly weathered
	28				26		75		Boring terminated at 75.5 feet
							80		
							85		
							90		
							95		
							100		

Date Started:	October 13, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 14, 2005		
Logged By:	D. Sjolund	Drill Rig:	CME-75
Total Depth:	75.5 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_3860-40.GPJ GEOLABS.GDT 1/30/07

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

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

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 7

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. *G2.7* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	192	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 210

Approximate Ground Surface Elevation (feet MSL): 227.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	5				26/.3' Ref.		0		SM	Light brown SILTY FINE SAND with traces of gravel (basaltic) (fill)
	11				17				GM	
									SM	Light brownish gray SILTY GRAVEL (BASALTIC) with traces of fine sand, very dense, moist (fill)
							5			Dark brown and light gray SILTY SAND with gravel (basaltic), medium dense, moist (fill)
									CH	Dark brown SILTY CLAY with traces of gravel (basaltic), medium stiff, moist (fill)
	54	71			8	1.5	10			
	26				11	1.5	15		CH	Dark brown and gray SILTY CLAY with gravel and boulders (basaltic) and traces of completely weathered gravel (basaltic), stiff, moist (fill)
UC= 16400			43							
							20			Gray and brown BOULDER (BASALTIC) with sand and gravel, closely to severely fractured, moderately weathered, medium hard to hard (fill)
			33							
	12				30		25			
UC= 17000			62							
							30		CH	Reddish brown SILTY CLAY with gravel (basaltic), very stiff, moist (fill)
	23		39		24/.3' Ref.	1.3				Gray BOULDERS (BASALTIC) with traces of clay and silt, closely to severely fractured, slightly weathered, medium hard (alluvium)
			25				35			
	29				62	>4.5	40		ML-MH	Dark brown and gray CLAYEY SILT AND BOULDERS (BASALTIC) with traces of fine sand, very hard (alluvium)
			19							Brown with gray mottling BOULDERS AND COBBLES (BASALTIC) in clayey silt matrix, hard to very hard (alluvium)
	18		28		32/.5' Ref.	1.8	45			
							50			

Date Started:	October 11, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 12, 2005		
Logged By:	D. Sjolund	Drill Rig:	CME-75
Total Depth:	75 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 210

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	26				57	4.0	50			
			62							
UC= 10900	20		76		25/.3' Ref.	>4.5 2.0	55		MH-CH	Dark brown with black mottling SILTY CLAY with boulders and traces of gravel and fine sand (basaltic), very hard, moist (residual soil)
			25	10	16/.0' Ref.		60			Gray BASALT, moderately to severely fractured, slightly to moderately weathered, hard (basalt rock formation)
UC= 7200	7		63	59	29/.5' Ref.		65			
										grades to slightly to closely fractured, moderately weathered, medium hard
UC= 8800	5		84	40	23/.3'		70			
										grades to hard to medium hard
							75			Boring terminated at 75 feet
							80			
							85			
							90			
							95			
							100			

Date Started:	October 11, 2005	Water Level: ▽	Not Encountered
Date Completed:	October 12, 2005		
Logged By:	D. Sjolund	Drill Rig:	CME-75
Total Depth:	75 feet	Drilling Method:	4" Solid-Stem Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

ROBIN M. LIM
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HAWAII, U.S.A.

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 8

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.8 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	193	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 211

Approximate Ground Surface Elevation (feet MSL): 228.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
							0	GW	3-inch ASPHALTIC CONCRETE
	13	109			38/.5' +30/.3'			SW-SC	Light reddish gray SANDY GRAVEL (BASALTIC) in a silt matrix, dense, dry (fill)
	10				Ref. 18/.3' Ref.		5		Dark brown with multi-color mottling CLAYEY SAND with gravel (basaltic), very dense, dry (fill) grades with cobbles (basaltic) at 2.8 feet
							10	CH	Brown with multi-color mottling SILTY CLAY with gravel, sand, boulders, and cobbles (basaltic), very hard, dry to damp (fill)
	11				51		15		
	16	87			25		20	MH	Dark brown with multi-color mottling CLAYEY SILT with gravel and sand (basaltic), hard, damp (fill)
							25	GP	Dark brown with gray and red mottling rounded GRAVEL AND COBBLES (BASALTIC) in a silt matrix, medium dense (alluvium)
	2	100			10/.0' Ref. 27				
		22					30		grades with boulders (basaltic), very dense
		37			10/.0' Ref.		35		
		7			15/.0' Ref.			MH	Brown SILTY CLAY with sand and gravel (basaltic), very stiff (alluvium)
	12				50		40		
		100							Brown and gray BOULDERS AND COBBLES (BASALTIC) in a silt matrix, very hard (alluvium)
		35			10/.0' Ref.		45	ML	Orangish brown with black mottling densely cemented friable SANDY SILT, very hard (alluvium)
							50		

Date Started:	November 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 10, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	101 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 1/30/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 211

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	24		0		32/.5' +27/.3' Ref.	>4.5		ML	
							55	SM	Orangish dark brown SILTY SAND with some gravel (basaltic), dense (alluvium)
	23		44		10/.0' Ref.				grades with boulders and cobbles (basaltic)
			20		10/.0' Ref.		60		
	30		29		20		65	GW	Grayish dark brown SANDY GRAVEL (BASALTIC) in a silt matrix, medium dense (weathered basalt)
			50		10/.0' Ref.		70		
								GP	Grayish light red with multi-color mottling highly weathered GRAVEL (BASALTIC) with sand in a silt matrix, dense (weathered basalt)
			72	17	15/.2' Ref.		75		
									Grayish light red vesicular BASALT, closely fractured, moderately to highly weathered, medium hard (basalt formation)
			42	25			80		
								GW	Brownish gray with multi-color mottling highly weathered SANDY GRAVEL (BASALTIC) with silt, medium dense (weathered clinker)
	UC= 7400		100	80	10/.0' Ref.		85		Gray vesicular to dense BASALT, moderately fractured, moderately to slightly weathered, very hard (basalt formation)
			70	33			90		grades to severely fractured, moderately weathered, hard
									Gray with bright red mottling dense BASALT, closely fractured, moderately weathered, hard (basalt formation)
	UC= 15000		100	75			95		grades to slightly fractured, very hard
							100		

Date Started:	November 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 10, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	101 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 1/30/07

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

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 9

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.9 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	194	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 211

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											(Continued from previous plate)
											grades to closely fractured
											Boring terminated at 101 feet
							105				
							110				
							115				
							120				
							125				
							130				
							135				
							140				
							145				
							150				

Date Started:	November 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 10, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	101 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 212

Approximate Ground Surface Elevation (feet MSL): 228 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GM	3-inch ASPHALTIC CONCRETE
	12	100			10/.3' Ref.	3.5				CH	Reddish dark brown SILTY GRAVEL (BASALTIC) with sand, dense, damp (fill)
	10				41					ML	Brown with gray mottling SILTY CLAY with gravel and sand (basaltic), hard, damp (fill)
	13	92			40		5				grades with some cobbles (basaltic) at 2.3 feet
						2.0				CH	Brown with gray and white mottling fine SANDY SILT with gravel (basaltic and coralline), very stiff, dry (fill)
	19				10		10				Brown CLAY, very stiff, damp (fill)
										ML	Brown fine SANDY SILT with gravel (basaltic), very stiff, dry (fill)
	15	91			15/.3' Ref.		15			CL	Brown with multi-color mottling SILTY CLAY with gravel and sand (basaltic), very hard, dry (fill)
LL=37 PI=18	15		67		28		20				
							25				grades with cobbles and boulders (basaltic)
			40								
							30				Gray with brown mottling COBBLES AND BOULDERS (BASALTIC) in a clayey silt matrix, very dense (alluvium)
			33		10/.0' Ref.						
			37		15/.1' Ref.		35				
	1		39		20/.3' Ref.		40				
											Gray with brown mottling COBBLES AND BOULDERS (BASALTIC) in a silty clay matrix, dense (alluvium)
			30		10/.0' Ref.		45				
							50				

Date Started:	November 28, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 30, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	102.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 10

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.10 OF 28 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	195	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 212

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
			20		15/.0' Ref.		55		CH	Brown with gray mottling SILTY CLAY with rounded cobbles and gravel (basaltic), very stiff (alluvium)
			38		15/.2' Ref.				ML	Orangish dark brown with black mottling fine SANDY SILT, hard (alluvium)
	26		0		34		60			
							65			
	3		37		10/.0' Ref.				MH	Dark brown with gray mottling CLAYEY SILT with rounded cobbles and gravel (basaltic), very stiff (alluvium)
			50	7	10/.0' Ref.		70			
UC= 4900			63	25			75			Gray dense BASALT, closely to severely fractured, highly to moderately weathered, medium hard (basalt formation) grades to brownish gray vesicular at 76.2 feet
			55	10			80			Gray with orange mottling vesicular BASALT, closely fractured, moderately to highly weathered, hard (basalt formation)
									GP	Gray with orange mottling GRAVEL AND COBBLES (BASALTIC) with sand, medium dense (clinker)
			100	75			85			Light tannish gray vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)
UC= 14500			100	83			90			
			50		10/.0' Ref.		95		CH	Dark grayish brown with gray mottling SILTY CLAY with cobbles and gravel (basaltic), medium stiff (weathered clinker)
							100		CL	

Date Started:	November 28, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 30, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	102.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 212

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	(Continued from previous plate) Description
	41				14				CL	Brown with multi-color mottling SANDY CLAY AND COBBLES AND GRAVEL (BASALTIC), medium stiff (weathered clinker)
							105			Boring terminated at 102.5 feet
							110			
							115			
							120			
							125			
							130			
							135			
							140			
							145			
							150			

Date Started:	November 28, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 30, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	102.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 11

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.11 OF 28 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	196	380

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 213

Approximate Ground Surface Elevation (feet MSL): 227 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GW	3-inch ASPHALTIC CONCRETE
	21	83			25/.5'	3.0				CH	Grayish brown SANDY GRAVEL (BASALTIC) in s silt matrix, medium dense, dry (fill)
	12				+18/.3' Ref.					MH	Brown SILTY CLAY, hard, damp (fill)
	13	96			24		5				Brown with gray mottling CLAYEY SILT with sand and gravel (basaltic), hard, dry (fill)
			20		13/.3' Ref.					CL	Brown with gray mottling SANDY CLAY with cobbles and gravel (basaltic), very stiff (fill)
							10				
	4				39						
			48								
							15			CH	Brown with gray mottling SILTY CLAY with cobbles and gravel (basaltic), very stiff (fill)
	24				32						
			43								
							20				
			37		15/.0' Ref.						Gray with brown mottling rounded COBBLES AND GRAVEL (BASALTIC) in a clayey silt matrix, dense (alluvium)
							25				
			60		10/.0' Ref.						
							30				
			60		15/.3' Ref.						grades with some boulders (basaltic)
							35				
			37		10/.0' Ref.						
							40				
			33		10/.0' Ref.						Gray with brown mottling rounded COBBLES AND GRAVEL (BASALTIC) in a clayey silt matrix, dense (alluvium)
							45				
			10							CH	
							50				

Date Started:	November 30, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	111 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 1/26/07

GEOLABS, INC. Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 213

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	20		56		10/.0' Ref.	>4.5				CH	Orangish brown SILTY CLAY with fine sand and some rounded gravel (basaltic), very hard (alluvium)
							55			MH	Orangish brown CLAYEY SILT with sand, very hard (alluvium)
	20		43		30/.3' Ref.	4.0					
							60				grades with some gravel (basaltic)
	21		35		20/.3' Ref.						
							65			SM	Orange-brown densely cemented SILTY SAND, very dense (alluvium)
	8		16		20/.3' Ref.					SM	Orangish brown SILTY SAND with rounded gravel (basaltic), medium dense (alluvium)
							70				
			60		10/.0' Ref.						
							75				grades with rounded cobbles (basaltic)
			0								
							80			ML	Orangish brown with black and gray mottling fine SANDY SILT with some clay and gravel (basaltic), very hard
	23		0		10/.0' Ref.						
							85				
			0		10/.0' Ref.						
							90				
	14		29		63						Dark gray with orange and brown mottling highly weathered COBBLES AND GRAVEL (BASALTIC) in a silty clay matrix, dense (weathered clinker)
							95				
			20		10/.0' Ref.						
							100				

Date Started:	November 30, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	111 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 1/26/07

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

ROBIN M. LIM
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SIGNATURE — 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 12

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.12 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	197	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 213

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
			100		15/.2' Ref.		105			GW	Dark grayish brown with gray and orange mottling SANDY GRAVEL (BASALTIC) with some cobbles in a silty clay matrix, dense (weathered clinker)
			83				110				grades with some boulders (basaltic)
					10/.0' Ref.						Boring terminated at 111 feet
							115				
							120				
							125				
							130				
							135				
							140				
							145				
							150				

Date Started:	November 30, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	111 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_2007_3860-40.GPJ GEOLABS.GDT 1/30/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 214

Approximate Ground Surface Elevation (feet MSL): 204 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	15	98			46					ML	Reddish brown fine SANDY SILT with some gravel (basaltic) and some sand (coralline), hard, dry (fill)
	9	113			57		5			MH	Reddish brown CLAYEY SILT with gravel (basaltic), very hard, dry to damp (fill)
	4				27		10			ML	Reddish brown with gray mottling fine SANDY SILT with gravel (basaltic), very stiff, damp (alluvium)
	15	93			10/.0' Ref.	>4.5	15				grades to very hard
	21				35	>4.5	20				
	21	93			30/.3' Ref.	>4.5	25				
	13				15/.1' Ref.		30				grades with less gravel
										SM	Reddish brown with multi-color mottling SILTY SAND with rounded coarse sand and gravel, very dense, damp (alluvium)
	11				40/.3' Ref.		35				Boring terminated at 35.8 feet
							40				
							45				
							50				

Date Started:	November 3, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 3, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35.8 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_2007_3860-40.GPJ GEOLABS.GDT 1/30/07

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

ROBIN M. LIM
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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 13

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. *G2.13* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	198	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 215

Approximate Ground Surface Elevation (feet MSL): 202 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	16	98			49	>4.5		CH	Reddish brown SILTY CLAY with some gravel (basaltic), very hard, dry to damp (fill)
	6				25/.3' Ref.		5	SM	Brown with multi-color mottling SILTY SAND (BASALTIC) with gravel, very dense, dry (fill)
	3		45		10/.0' Ref.		10		Brown with multi-color mottling rounded BOULDERS AND COBBLES (BASALTIC) with some gravel in a sandy silt matrix, dense (alluvium)
			67	40	10/.0' Ref.		15		Tannish gray with multi-color mottling vesicular olivine BASALT, closely fractured, moderately to highly weathered, hard to medium hard (basalt formation)
UC= 1700			92	30			20		Grayish tan with multi-color mottling vesicular olivine BASALT, closely to severely fractured, highly to extremely weathered, medium hard (basalt formation)
			98	49	15/.3' Ref.		25		grades to closely fractured, highly weathered
									Tannish gray with multi-color mottling vesicular olivine BASALT, moderately fractured, moderately to highly weathered, hard to medium hard (basalt formation)
			90	0			30		Reddish brown with black mottling vesicular BASALT, closely to severely fractured, moderately to highly weathered, medium hard to hard (basalt formation)
							35		Boring terminated at 35 feet
							40		
							45		
							50		

Date Started:	November 4, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 4, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 216

Approximate Ground Surface Elevation (feet MSL): 198 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	4	108			26/.5' +20/.3' Ref.			ML	Brown with gray mottling fine SANDY SILT with gravel and cobbles (basaltic), medium stiff, dry (fill)
			61					GP	Brown with gray mottling rounded GRAVEL AND COBBLES (BASALTIC) in a fine sandy silt matrix, dense (alluvium)
			37		15/.0' Ref.		5		Brown with multi-color mottling rounded COBBLES AND BOULDERS (BASALTIC) with gravel in a silty clay matrix, dense (alluvium)
			32		10/.3' Ref.		10		
	25				59		15	ML	Dark orangish brown with black mottling friable fine SANDY SILT, very hard, damp (alluvium)
			19					SM	Dark reddish brown SILTY FRIABLE SAND with rounded gravel, dense, damp (alluvium)
	24		7		52		20		
	3		39		20/.3' Ref.		25		Reddish brown with multi-color mottling rounded COBBLES AND BOULDERS (BASALTIC) with gravel in a silty sand matrix, dense (alluvium)
			10		10/.0' Ref.		30		
	9				15/.0' Ref.		35	SM	Orangish red densely cemented SILTY SAND, friable, dense (alluvium)
									Boring terminated at 37 feet
							40		
							45		
							50		

Date Started:	November 2, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 3, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	37 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGN BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-08

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 14

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.14 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	199	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 217

Approximate Ground Surface Elevation (feet MSL): 197 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	17	103			55	>4.5				CH	Dark reddish brown SILTY CLAY with some coarse sand (basaltic), very hard, dry (fill)
	11				15/.3' Ref.						grades with some cobbles (basaltic)
	17	96			25		5			CH	Dark brown with multi-color mottling SILTY CLAY with sand (basaltic), very hard, dry to damp (fill)
			30							MH	Brown with multi-color mottling CLAYEY SILT with gravel, cobbles, and boulders (basaltic), very stiff (fill/alluvium)
			30		10/.0' Ref.		10				
UC= 5700	34		89	44	18/.3' Ref.		15				Gray with multi-color mottling vesicular olivine BASALT, closely fractured, highly weathered, medium hard (basalt formation)
UC= 2900			73	17			20				Brownish red with black mottling vesicular BASALT, severely fractured, highly weathered, medium hard (basalt formation)
			70	0	10/.3' Ref.		25				
			100	63	15/.3' Ref.		30				Light gray with black and orange mottling vesicular BASALT, severely fractured, highly to moderately weathered, medium hard (basalt formation)
							35				Gray vesicular BASALT, slightly fractured, slightly to moderately weathered, hard (basalt formation)
											Boring terminated at 36 feet
							40				
							45				
							50				

Date Started:	November 2, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	36 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 218

Approximate Ground Surface Elevation (feet MSL): 229 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	18				13	1.0				CH	Orangish brown SILTY CLAY, medium stiff, dry (residual soil)
						2.0					grades to very stiff, damp
										CL	Dark reddish brown SILTY CLAY, very stiff, damp
LL=47 PI=27	21	105			23	2.0	5				
	30				11	1.0	10			CH	Reddish brown with multi-color mottling SILTY CLAY with extremely weathered gravel (basaltic), medium stiff, moist (residual soil)
	5				30/.3' Ref.		15				
										GP	Dark brown highly to extremely weathered GRAVEL (BASALTIC) in a silty clay matrix, medium dense, damp (saprolite)
	12				19		20				
											Grayish brown with multi-color mottling BASALT, severely fractured, highly weathered, soft to medium hard (highly weathered basalt formation)
	13		30	0	40/.3' Ref.		25				
											Gray vesicular to dense BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
UC= 11800			100	100	10/.0' Ref.		30				
							35				Boring terminated at 35.5 feet
							40				
							45				
							50				

Date Started:	April 25, 2006	Water Level: ▽	Not Encountered
Date Completed:	April 25, 2006		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-80
Total Depth:	35.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 1/29/07

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

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

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SIGNATURE — 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 15

North–South Road
Phase 1C
F.A.I. Proj. No. STP–8930(4)

Date: Feb 21, 2007

SHEET No. G2.15 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	200	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 219

Approximate Ground Surface Elevation (feet MSL): 243 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	23	95			42			CH	Orangish brown SILTY CLAY with some highly weathered gravel (basaltic), very stiff, dry (residual soil)
						1.5			Brown and gray BASALT, severely fractured, highly weathered, medium hard (highly weathered basalt clinker)
			38	17			5		
			92	83					Gray non-vesicular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
							10		
			20	17					
							15		Brownish gray BASALT, severely fractured, highly weathered, soft to medium hard rock (weathered basalt clinker)
	36				5				
UC= 14100			100	71			20		Gray with multi-color mottling BASALT, closely fractured, highly to moderately weathered, medium hard (basalt formation)
			33	20					Gray vesicular BASALT, closely fractured, slightly weathered, very hard (basalt formation)
							25		Gray with multi-color mottling BASALT, severely fractured, highly weathered, soft rock (clinker)
UC= 12100			100	82	10/.0' Ref.				Reddish brown vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
							30		Gray vesicular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
UC= 13400			100	100					
							35		Boring terminated at 35 feet
							40		
							45		
							50		

Date Started:	April 25, 2006	Water Level: ▽	Not Encountered
Date Completed:	April 26, 2006		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-80
Total Depth:	35 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG (DOT 3860-40.GPJ GEOLABS.GDT 10/9/07)

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 220

Approximate Ground Surface Elevation (feet MSL): 245.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	18	92			66	3.5		CH	Orangish brown SILTY CLAY, very stiff, dry (residual soil)
	24				31	3.5			
	16	76			20/.3'		5		Gray with light gray mottling BASALT, severely fractured, highly weathered, medium hard (highly weathered basalt formation)
			100	25	Ref.				
UC= 12400			100	50					Gray non-vesicular BASALT, severely to closely fractured, moderately weathered, hard (basalt formation)
							10		
			30	0					
							15		Reddish brown with gray mottling BASALT, severely fractured, highly weathered, soft to medium hard (clinker)
UC= 3100			100	91	20/.3' Ref.				Gray vesicular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)
							20		
			100	100					Gray vesicular BASALT, massive, unweathered, very hard (basalt formation)
							25		
UC= 19100			100	100					grades to non-vesicular
			100	100			30		
							35		Boring terminated at 35 feet
							40		
							45		
							50		

Date Started:	April 26, 2006	Water Level: ▽	Not Encountered
Date Completed:	April 27, 2006		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-80
Total Depth:	35 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG (DOT 3860-40.GPJ GEOLABS.GDT 10/9/07)

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

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

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SIGNATURE — 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 16

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.16 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	201	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring **221**

Approximate Ground Surface Elevation (feet MSL): 222.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
								ML	Orangish brown fine SANDY SILT, medium stiff, dry (fill)
	9				34	2.0		GP/CL	Brown with gray mottling GRAVEL (BASALTIC) in a silt matrix, medium dense, dry (fill)
			61				5		Brown with gray and white mottling fine SANDY CLAY with gravel (basaltic and coralline), very stiff, dry (fill)
			60						Brown with gray mottling COBBLES (BASALTIC) with gravel and boulders in clayey matrix, dense (alluvium)
			60		10/.0' Ref.		10		
			92		15/.1' Ref.		15	GP	Brown with gray mottling cemented SANDY GRAVEL (BASALTIC) with some boulders, very dense (clinker)
			60				20		
	27				38		25		
									Boring terminated at 28.5 feet
							30		
							35		
							40		
							45		
							50		

Date Started:	December 9, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 13, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	28.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring **222**

Approximate Ground Surface Elevation (feet MSL): 227 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	21	93			14/.3' Ref.			CH	Dark brown SILTY CLAY with gravel (basaltic), hard, damp (alluvium)
			80					GC	Brown with gray COBBLES AND GRAVEL (BASALTIC) in a silty clay matrix, dense (alluvium)
			73				5		
			37				10		
			0				15	SM	Dark brown with gray mottling SILTY SAND with rounded gravel (basaltic), medium dense (alluvium)
	7		39		20/.3' Ref.		20	GM	Gray with brown mottling GRAVEL (BASALTIC) with some cobbles in a silty sand matrix, dense (alluvium)
			80		10/.0' Ref.		25		grades with boulders (basaltic)
	23		89		10/.0' Ref.		30	SM	Orangish brown cemented SILTY SAND with some rounded gravel, dense (cemented ash/cinder)
	20				38		35		
									Boring terminated at 36.5 feet
							40		
							45		
							50		

Date Started:	December 9, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 9, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	36.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

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

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

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SIGNATURE — 4-30-08 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 17

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. *G2.17* **OF** *28* **SHEETS**

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	202	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 223

Approximate Ground Surface Elevation (feet MSL): 210 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
							0	GM	2-inch ASPHALTIC CONCRETE
	21	98			40			CH	Reddish brown SILTY GRAVEL (BASALTIC) with sand, medium dense, damp (fill)
	15				19	>4.5			Brown with multi-color mottling CLAY with gravel (coralline and basaltic) and some sand, very hard, dry to damp (fill)
	5	106			45/.5'		5		
			67		+10/.0' Ref.			GM	Brown with gray mottling GRAVEL AND COBBLES (BASALTIC) in a clayey silt matrix, dense (alluvium)
			67	0	10/.0' Ref.		10		Gray BASALT, closely to moderately fractured, slightly weathered, hard to very hard (basalt formation)
			96	28	15/.3' Ref.		15		Gray BASALT, slightly fractured, slightly weathered, very hard (basalt formation)
			100	93			20		Gray vesicular BASALT, slightly fractured, moderately weathered, hard (basalt formation)
			100	60			25		
			100	0			30		Light grayish tan with multi-color mottling vesicular BASALT, closely fractured, highly weathered, medium hard (basalt formation)
							35	SM	Brownish orange with black mottling cemented SILTY SAND, friable, dense (volcanic cinder)
									Boring terminated at 35.5 feet
							40		
							45		
							50		

Date Started:	December 9, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 9, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	35.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 224

Approximate Ground Surface Elevation (feet MSL): 206 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	10	87			20/.3'		0	ML	Light brown SANDY SILT with gravel (basaltic), medium stiff, dry (fill)
			50		Ref.				Brown with gray mottling BOULDERS AND COBBLES (BASALTIC) in a clayey silt matrix, very dense (alluvium)
			67				5		
			60		10/.0' Ref.		10		
			50		10/.0' Ref.		15		
			37		10/.0' Ref.		20		
					20/.3' Ref.		25		Boring terminated at 26.3 feet
							30		
							35		
							40		
							45		
							50		

Date Started:	December 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 8, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	26.3 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

ROBIN M. LIM
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HAWAII, U.S.A.

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SIGNATURE — EXPIRATION DATE OF THE LICENSE: 4-30-08

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 18

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.18 OF 28 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	203	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 225

Approximate Ground Surface Elevation (feet MSL): 236 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	18				21	2.0		ML	Light brown fine SANDY SILT with traces of clay and some gravel (basaltic), very stiff, dry (residual soil)
UC= 13000			42	42			5		Gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
			10					GP	Grayish brown with black mottling vesicular GRAVEL AND SAND (BASALTIC), medium dense (clinker)
UC= 5600	4		61	51	10/.1' Ref.		10		Gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
			60	38			15	GP	Tannish brown highly weathered GRAVEL (BASALTIC), medium dense (clinker)
UC= 3000			50	33			20		Gray with light tan mottling vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
	12		14		33		25	GP	Orangish brown with black mottling highly weathered GRAVEL AND SAND (BASALTIC), medium dense (clinker) grades to gray with brown mottling
			93	47	5/.0' Ref.		30	GP	Grayish tan GRAVELLY SAND (BASALTIC) with some cobbles, medium dense (clinker)
			55	20			35		Gray with black mottling dense BASALT, closely fractured, moderately weathered, very hard (basalt formation)
					10/.0' Ref.		40	GP	Brownish gray vesicular to scoriaceous highly weathered GRAVEL (BASALTIC) with sand, dense (clinker)
							45		Boring terminated at 43 feet
							50		

Date Started:	December 12, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 12, 2005		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-80
Total Depth:	43 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 226

Approximate Ground Surface Elevation (feet MSL): 205 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	15	75			16	4.0		MH	Dark orangish brown CLAYEY SILT with some fine sand, hard, dry (residual soil)
	15				20	>4.5			
UC= 83	16	109			43/.5' +25/.3' Ref.	>4.5	5	CH	Dark orangish brown SILTY CLAY, very hard, dry (residual soil)
	13				29		10	MH	Orangish brown with white mottling CLAYEY SILT with some extremely weathered gravel (basaltic), very hard, dry (residual soil)
	10				10/.0' Ref.		15		
					45/.3' Ref.	>4.5	20	MH	Dark reddish brown with black mottling CLAYEY SILT, very hard, dry (residual soil)
	22				45/.5' +30/.3' Ref.	>4.5	25	ML	Dark reddish brown SANDY SILT with some extremely weathered gravel (basaltic), very hard, dry to damp (residual soil)
	24	75			10/.0' Ref.		30		grades with vesicular cobbles (basaltic) Boring terminated at 30.5 feet
							35		
							40		
							45		
							50		

Date Started:	December 7, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 7, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	30.5 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

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

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 19

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.19 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	204	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 227

Approximate Ground Surface Elevation (feet MSL): 201 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
LL=35 PI=17	7	89			32	>4.5		CL	Dark brown SILTY CLAY with gravel and sand (basaltic), very hard, dry to damp (fill)
	13				23				grades with some cobbles
					15/.3' Ref.		5		Brown and gray COBBLES AND BOULDERS (BASALTIC) in a silty clay matrix (alluvium)
							10		
	16				16/.5' +10/.3' Ref.		15	MH	Brown with gray mottling CLAYEY SILT with fine sand and gravel (basaltic), hard, damp (alluvium)
									grades with cobbles (basaltic)
	14				10/.0' Ref.		20	ML	Reddish brown with black mottling SANDY SILT,, very hard, dry (residual soil)
								MH	Reddish brown CLAYEY SILT, very hard, damp (residual soil)
	18				33	>4.5	25		
								ML	Reddish brown fine SANDY SILT, very hard, damp (residual soil)
	18				20/.3' Ref.	>4.5	30		Boring terminated at 30.8 feet
							35		
							40		
							45		
							50		

Date Started:	November 23, 2005	Water Level: ▽	Not Encountered
Date Completed:	November 28, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	30.8 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 1/29/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 228

Approximate Ground Surface Elevation (feet MSL): 202 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	6				60/.5' +10/.0' Ref.			ML	Brown SANDY SILT (BASALTIC) with gravel (basaltic), very stiff, dry (alluvium)
	3				23/.5' +10/.0' Ref.				
			49				5		Brown with gray mottling rounded COBBLES AND GRAVEL (BASALTIC) in a clayey silt matrix, dense (alluvium)
							10		Brown and gray rounded COBBLES AND BOULDERS (BASALTIC) AND SOME GRAVEL in a silty clay matrix, very hard (alluvium)
			70		10/.0' Ref.				
			60				15		
			37				20	SM	Orangish brown with black and gray mottling densely cemented SILTY SAND with cobbles and gravel (basaltic), dense (alluvium)
			0		10/.0' Ref.		25		
								ML	Orangish brown fine SANDY SILT with some gravel (basaltic), very hard (alluvium)
	24				50/.5' +10/.0' Ref.		30		Boring terminated at 32 feet
							35		
							40		
							45		
							50		

Date Started:	December 8, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 8, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	32 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 1/29/07

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 20

North–South Road
Phase 1C
F.A.I. Proj. No. STP–8930(4)

Date: Feb 21, 2007

SHEET No. G2.20 OF 28 SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
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DESIGNED BY
QUANTITIES BY
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DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	205	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 229

Approximate Ground Surface Elevation (feet MSL): 207 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
					10	2.5		CH	Dark brown SILTY CLAY with sand, very stiff, damp (alluvium)
	10				30/.3' Ref.				grades to orangish brown with cobbles and gravel (basaltic)
			37				5		Brown with gray mottling COBBLES AND BOULDERS (BASALTIC) in a silty clay matrix, dense (alluvium)
			30		10/.0' Ref.		10		
			17		10/.0' Ref.		15		
								GW	Brown with gray mottling SANDY GRAVEL (BASALTIC) with some cobbles in a silty clay matrix, dense (alluvium)
	14		70		30/.3' Ref.		20		
			37		10/.1' Ref.		25		Brown and gray BOULDERS AND COBBLES (BASALTIC) in a silty clay matrix, very dense (alluvium)
							30		Boring terminated at 30.6 feet
							35		
							40		
							45		
							50		

Date Started:	December 7, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 7, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	30.6 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 230

Approximate Ground Surface Elevation (feet MSL): 181 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	20	101			35			CH	Brown SILTY CLAY with some sand, very hard, damp (alluvium)
	14				15/.3' Ref.				grades with cobbles (basaltic)
					10/.1' Ref.		5		grades with boulders (basaltic)
					10/.0' Ref.		10		Gray with brown mottling BOULDERS AND COBBLES (BASALTIC) in a silty clay matrix, very dense, dry (alluvium)
					15/.0' Ref.		15		
	3				20/.3' Ref.		20		
					10/.0' Ref.		25		Boring terminated at 25 feet
							30		
							35		
							40		
							45		
							50		

Date Started:	November 23, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	25 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 10/9/07

ORIGINAL PLAN
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 21

North-South Road
Phase 1C
F.A.I. Proj. No. STP-8930(4)

Date: Feb 21, 2007

SHEET No. G2.21 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	206	380

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Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 231

Approximate Ground Surface Elevation (feet MSL): 165 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
LL=53 PI=36	14	112			53			CH	Brown SILTY CLAY with fine sand, very hard, dry (alluvium)
	14				23				grades with white mottling
	7	117			20/.3' Ref.		5	MH	Brown with multi-color mottling CLAYEY SILT with gravel (basaltic) and some cobbles, very hard, dry (alluvium)
	18				26	3.5	10	CH	Brown SILTY CLAY with some highly weathered gravel (basaltic), hard, damp (alluvium)
								GP	Brown with multi-color mottling rounded GRAVEL AND SAND (BASALTIC) in a clayey silt matrix, very dense, dry (alluvium)
	5				10/.0' Ref.		15		
								MH	Brown with multi-color mottling CLAYEY SILT with sand and gravel (basaltic) and some cobbles, very hard, dry (alluvium)
	10				10/.0' Ref.		20		grades with some boulders (basaltic)
	4				20/.3' Ref.		25		Boring terminated at 25.3 feet
							30		
							35		
							40		
							45		
							50		

Date Started:	December 2, 2005	Water Level: ▽	Not Encountered
Date Completed:	December 2, 2005		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	25.3 feet	Drilling Method:	4" Auger
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_3860-40(SH_GEOLABS).GDT 1/30/07

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring 248

Approximate Ground Surface Elevation (feet MSL): 227 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
									6-inch ASPHALTIC CONCRETE
	24				29			GM ML	Brownish gray SILTY GRAVEL (BASALTIC) with sand, dense, damp (fill)
									Dark brown with multi-color mottling SANDY SILT with clay and gravel (basaltic), very stiff, damp (fill)
	24		88		8/.3' Ref.		5		Gray with brown mottling dense BOULDERS AND COBBLES (BASALTIC) in a silty clay matrix, dense, damp (fill)
			47		10/.0' Ref.		10		
	18				46	2.0		MH	Orangish brown with gray mottling CLAYEY SILT with gravel and sand (basaltic), very stiff, damp (residual soil)
			100	0		1.5	15		grades to medium stiff
			55	50					Gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)
							20		Gray dense BASALT, moderately fractured, moderately weathered, very hard (basalt formation)
			33	7					Light reddish gray with brown mottling vesicular BASALT, closely fractured, highly weathered, medium hard (basalt formation)
			88	83			25		
							30		Gray vesicular to dense BASALT, moderately fractured, moderately weathered, very hard (basalt formation)
			40	20					
							35	GP	Gray with orange and brown mottling scoriaceous GRAVEL AND SOME COBBLES (BASALTIC), loose (clinker)
			26	0	15/.1' Ref. 15/.3' Ref.				
	13						40	CL	Grayish dark brown with orange and gray mottling SANDY CLAY AND GRAVEL (BASALTIC), medium stiff (weathered clinker)
									Boring terminated at 40.8 feet
							45		
							50		

Date Started:	July 31, 2006	Water Level: ▽	Not Encountered
Date Completed:	August 1, 2006		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-90
Total Depth:	40.8 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_3860-40(SH_GEOLABS).GDT 1/30/07

ORIGINAL PLAN
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BORING LOGS - 22

North–South Road
Phase 1C
F.A.I. Proj. No. STP–8930(4)

Date: Feb 21, 2007

SHEET No. G2.22 OF 28 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(4)	2007	207	380

GEOLABS, INC.
Geotechnical Engineering

NORTH-SOUTH ROAD, PHASE 1C
F.A.I. PROJECT NO. STP-8930(4)
EWA, OAHU, HAWAII

Log of Boring **249**

Approximate Ground Surface Elevation (feet MSL): 217 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										GW	4-inch ASPHALTIC CONCRETE
	26				24	1.5				CL	Brownish gray SANDY GRAVEL (BASALTIC) in a silt matrix, dense, dry (fill)
											Dark brown with gray mottling SANDY CLAY (BASALTIC) with gravel (basaltic), medium stiff,
	21				15	0.5	5			CL	damp (fill)
											Dark brown GRAVELLY CLAY (BASALTIC) with sand, soft, damp (fill)
	19				47	3.0	10			CH	Reddish orange with gray mottling SILTY CLAY with gravel and sand (basaltic), hard, damp
										CL	Reddish brown SILTY CLAY, very hard, dry
LL=42 PI=23	17		52		65	>4.5	15				
						4.0	20				
										GM	Reddish orange with gray mottling SILTY GRAVEL AND SAND (BASALTIC), dense, dry (alluvium)
	13		75		16/.5' +10/.0' Ref.		25				Reddish orange with gray mottling moderately cemented SANDY COBBLES AND GRAVEL (BASALTIC), very dense (alluvium)
			63				30				grades with some boulder (basaltic)
			15				35				Reddish orange with gray mottling SILTY BOULDERS AND COBBLES (BASALTIC), dense (alluvium)
					10/.0' Ref.		40				Boring terminated at 40 feet
							45				
							50				

Date Started:	August 2, 2006	Water Level: ▽	Not Encountered
Date Completed:	August 2, 2006		
Logged By:	Y. Chiba	Drill Rig:	MOBILE B-80
Total Depth:	40 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	3860-40	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 3860-40.GPJ GEOLABS.GDT 1/30/07

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BORING LOGS - 23

North–South Road
Phase 1C
F.A.I. Proj. No. STP–8930(4)

Date: Feb 21, 2007

SHEET No. *G2.23* **OF** *28* **SHEETS**