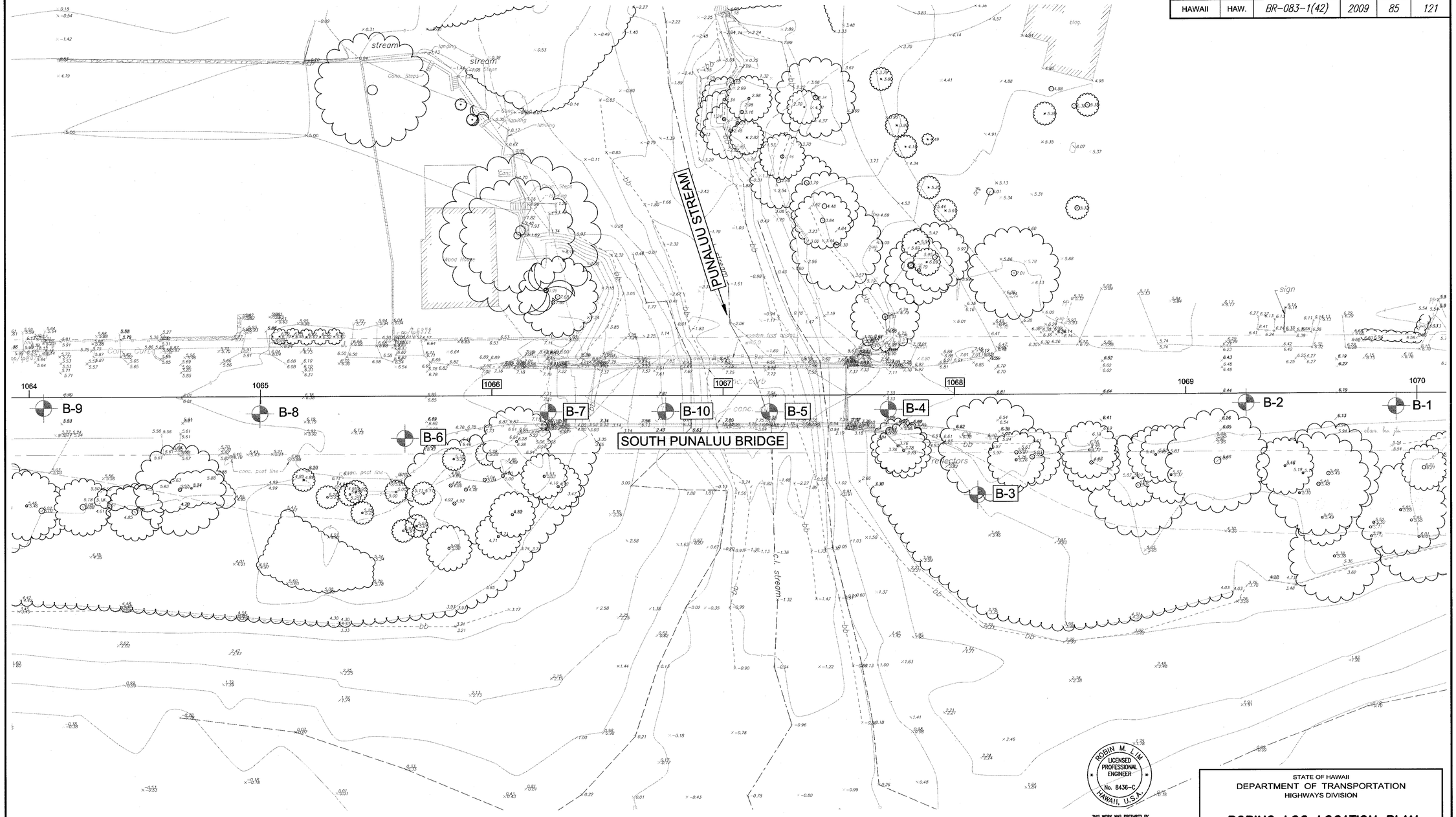
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	85	121



ORIGINAL PLAN

NOTE BOOK

No.

SURVEY PLOTTED BY _____ DATE

DRAWN BY _____

TRACED BY _____

DESIGNED BY _____

QUANTITIES BY _____

CHECKED BY _____

LEGEND:

APPROXIMATE BORING LOCATION

0 20 40 80 120 FT.

GRAPHIC SCALE

REFERENCE: SITE PLAN PROVIDED BY M & E PACIFIC INC. ON JULY 8, 2002.

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 4-30-10

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LOCATION PLAN

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: 1" = 20' Date: May 2009

SHEET No. B1 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	86	121

Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		LESS THAN 5% FINES	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		MORE THAN 12% FINES	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	SANDS	CLEAN SANDS	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		LESS THAN 5% FINES	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	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	LL	LIQUID LIMIT
	3-INCH O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX
S	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
G	GRAB SAMPLE	PEN	POCKET PENETROMETER (tsf)
	CORE SAMPLE	UC	UNCONFINED COMPRESSION (psi)
		▽	WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Kamehameha Highway Replacement of South Punaluu Bridge, Proj. No. BR-083-1(42) Punaluu, Oahu, Hawaii" dated April 3, 2006 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 Sheet B1.

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.

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 04-30-10

GEOLABS, INC.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B2 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	87	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 1

Approximate Ground Surface Elevation" "(feet MSL): 6.1 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											6-inch ASPHALTIC CONCRETE
										SP	6-inch CONCRETE
	11	101			42/.5'						Tannish brown SAND with some silt and some basaltic gravel, dense, moist (fill)
	10				+20/.3'						
					Ref.						
	21	93			27		5			SP	Whitish tan coarse SAND with shell fragments and well rounded gravel, medium dense (beach sand)
					21						
											Whitish gray CORAL, breaks down to silty coralline gravel with sand, very dense (coral formation)
	13				20/.1'		10				
					Ref.						
	10				35/.2'		15				Whitish gray CORAL, breaks down to coarse sand with some silt and coralline gravel, very dense (coral formation)
					Ref.						
	11				52		20				Boring terminated at 21.5 feet
											* Elevations estimated from Topographic Plan received from M & E Pacific, Inc. on July 8, 2002.
							25				
							30				
							35				
							40				
							45				
							50				

Date Started:	June 17, 2002	Water Level: ⧗	4.6 ft. 6/17/02 1046 HRS
Date Completed:	June 17, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	21.5 feet	Drilling Method:	6" Hollow-Stem Auger
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.GPJ GEOLABS.GDT 10/25/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 2

Approximate Ground Surface Elevation" "(feet MSL): 6.3 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											6.5-inch ASPHALTIC CONCRETE
										SP	7-inch CONCRETE
	13	93			32						Brownish tan SAND with coralline gravel, medium dense, damp (fill)
	14				31					SC	
										SP	Grayish brown CLAYEY SAND with some well rounded gravel, medium dense, damp
	20	86			50		5			SP	Brownish tan SAND, dense, damp
											Whitish gray coarse SAND with some shell fragments and coralline gravel, dense (beach sand)
										SM	
	34				4		10				Gray SILTY FINE SAND, loose
										SW	Gray GRAVELLY SAND AND SOME SILT, very loose to loose (reef detritus)
					30/.1'		15				Grayish white CORAL, breaks down to cemented coralline sand with some shell fragments, dense (coral formation)
					Ref.						
	6				30/.3'		20				Boring terminated at 20.8 feet
					Ref.						
							25				
							30				
							35				
							40				
							45				
							50				

Date Started:	June 18, 2002	Water Level: ⧗	5.1 ft. 6/18/02 0941 HRS
Date Completed:	June 18, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	20.8 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.GPJ GEOLABS.GDT 10/25/02

ORIGINAL PLAN
NOTE BOOK
SURVEY PLOTTED BY ____ DATE ____
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
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 4-30-16

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 1 & 2

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None — Date: May 2009

SHEET No. B3 OF 15 SHEETS

87

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	88	121

GEOLABS, INC. Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42) PUNALUU, OAHU, HAWAII

Log of Boring 3

Approximate Ground Surface Elevation" "(feet MSL): 3.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	23	87			36					SP	Tan CORALLINE SAND with some basaltic gravel, medium dense, damp (fill/beach sand)
	25				29						grades to tannish brown with some silt, moist
	15	114			28		5				
					8		10			SM	Gray SILTY FINE CORALLINE SAND with traces of coralline gravel and subrounded basaltic gravel, loose to very loose (lagoonal deposit)
	13				32		15			GM	Gray SILTY BASALTIC GRAVEL with some coralline gravel and sand, medium dense (alluvium/lagoonal deposit)
	22				21		20			GP	Light gray SANDY CORALLINE GRAVEL with traces of silt, loose to medium dense (reef detritus)
	31				16		25				grades with some cemented sand
	22	115			41		30				grades to medium dense
	49				5		35			GM	Light gray SILTY CORALLINE GRAVEL with sand, loose (lagoonal deposit)
	32				20		40			GP	Light gray CORALLINE GRAVEL with some sand and shells, loose
										SM	Grayish brown SILTY BASALTIC SAND with traces of subrounded basaltic gravel, coralline gravel and shells, very loose (lagoonal/alluvium)
	56				Wt. of Hammer /2'		45				
							50				

Date Started:	May 23, 2002	Water Level: ▼	2.8 ft. 5/23/02 1500 HRS 2.6 ft. 5/24/02 1523 HRS
Date Completed:	May 24, 2002		
Logged By:	E. Shinsato	Drill Rig:	CME-75
Total Depth:	110.2 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLABS.GDT 10/23/02

GEOLABS, INC. Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42) PUNALUU, OAHU, HAWAII

Log of Boring 3

(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
	34				13					GM	Grayish brown SILTY BASALTIC GRAVEL with traces of sand and coralline gravel, loose (alluvium)
	83				19	2.0	55			MH-ML	Dark brown with orange-brown seams CLAYEY SILT with some highly weathered subrounded basaltic gravel and sand, very stiff (older alluvium)
	54	62			70	4.5	60			MH	Dark brown with red mottling CLAYEY SILT with highly weathered subrounded basaltic gravel and sand, very stiff (older alluvium)
LL=96 PI=47 LL=96 PI=47	65				21	3.0	65				grades with multi-colored layers
	60	62			86		70			SM	Grayish brown to brown with multi-color mottling SILTY BASALTIC SAND with some highly weathered gravel, dense (older alluvium)
	54				35		75				
	79				17		80			MH	Orange-brown to brown CLAYEY SILT with some highly weathered gravel and sand, very stiff (older alluvium)
	35	82			93		85			GM	Grayish brown with multi-color mottling SILTY BASALTIC GRAVEL with sand, dense (older alluvium)
											grades with basaltic cobbles and boulders
	13				27/.5' +40/.3' Ref.		90				grades to very dense
	11				37/.5' +50/.3' Ref.		95				
							100				

Date Started:	May 23, 2002	Water Level: ▼	2.8 ft. 5/23/02 1500 HRS 2.6 ft. 5/24/02 1523 HRS
Date Completed:	May 24, 2002		
Logged By:	E. Shinsato	Drill Rig:	CME-75
Total Depth:	110.2 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLABS.GDT 10/23/02

ORIGINAL PLANS
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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — 4-30-10 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 3

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None — Date: May 2009

SHEET No. B4 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	89	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 3

(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
	18				52/.5' Ref.					GM	
	13				40/.3' Ref.		105				
					50/.2' Ref.		110				Boring terminated at 110.2 feet
							115				
							120				
							125				
							130				
							135				
							140				
							145				
							150				

Date Started:	May 23, 2002	Water Level: ⧗	2.8 ft. 5/23/02 1500 HRS 2.6 ft. 5/24/02 1523 HRS
Date Completed:	May 24, 2002		
Logged By:	E. Shinsato	Drill Rig:	CME-75
Total Depth:	110.2 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ GEOLABS.GDT 10/29/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 4

Approximate Ground Surface Elevation" "(feet MSL): 7.2 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											6-inch ASPHALTIC CONCRETE
										GM	6-inch CONCRETE
	10		13	0	10/.1' Ref.					ML	Brownish tan SILTY GRAVEL with sand, medium dense, moist (fill)
							5				Tannish brown SANDY SILT with gravel, dense, damp (fill)
										SP	COBBLES AND BOULDERS (fill)
	30				22					SM	Tan SAND with some well rounded sand and gravel, medium dense, saturated (alluvium/beach sand)
							10				Whitish gray SILTY SAND with some coralline gravel, medium dense (alluvium/beach sand)
	22				11					GW-GM	Gray GRAVEL with sand and silt, medium dense (alluvium/beach sand)
							15			GP-GM	Light gray GRAVEL with coralline sand and silt, loose to very loose (lagoonal deposit)
	12				4						
	38				6		20				
					3		25				
	57				1		30				
	40				4		35				
							40			GW-GM	Light gray CORALLINE SANDY GRAVEL with silt, very loose to loose (lagoonal deposit)
	41				2						grades to very loose
							45				
	36				2					SC	
							50				

Date Started:	June 6, 2002	Water Level: ⧗	7.2 ft. 6/6/02 1418 HRS
Date Completed:	June 7, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	114 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ GEOLABS.GDT 10/25/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE 4-30-10 EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 3 & 4

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B5 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	90	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 4

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
										SC	Gray CLAYEY SAND with shell fragments, very loose (lagoonal deposit)
	60				1/2'		55			SM	Dark gray SILTY SAND with shell fragments and well rounded gravel, very loose (lagoonal deposit)
	55	69			5		60				
	66				3		65			GM	Dark gray SILTY CORALLINE GRAVEL with sand and shell fragments, medium dense (lagoonal deposit)
	38	75			33		70			GM	Dark gray SILTY BASALTIC GRAVEL with some moderately weathered basaltic cobbles, dense (older alluvium)
	35		10		47		75			SM	Brown with multi-color mottling SILTY SAND with well rounded extremely weathered basaltic gravel, medium dense (older alluvium)
	55		0		25		80				
	50		71		32		85				grades to dense
	42		0		27/.5' +30/.3' Ref.		90			GW	Brown with multi-color mottling SANDY BASALTIC GRAVEL AND COBBLES, very dense (older alluvium)
	60		83		47		95			SM	Dark brown with multi-color mottling SILTY SAND with some well rounded gravel, dense (older alluvium)
	62		48		61		100				

Date Started:	June 6, 2002	Water Level: ⧗	7.2 ft. 6/6/02 1418 HRS
Date Completed:	June 7, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	114 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.dgn GEOLABS.DGT 10/25/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 4

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
	39		42		20/.3' Ref.		105			GM	Tannish brown with multi-color mottling well rounded SILTY GRAVEL AND COBBLES with sand, highly to extremely weathered, very dense (older alluvium)
	51		83		31		110				grades to dense
	47				46		115				Boring terminated at 114 feet
							120				
							125				
							130				
							135				
							140				
							145				
							150				

Date Started:	June 6, 2002	Water Level: ⧗	7.2 ft. 6/6/02 1418 HRS
Date Completed:	June 7, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	114 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.dgn GEOLABS.DGT 10/25/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-16

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 4

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None — Date: May 2009

SHEET No. B6 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	91	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 5

Approximate Ground Surface Elevation" "(feet MSL): 7.8 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0				2-inch ASPHALTIC CONCRETE
											16-inch CONCRETE (bridge deck)
											Space below bridge
							5				
											Stream water surface at 7.5 feet
											Mudline at 9.7 feet
	14		0		9		10			GW	Dark brown well rounded SANDY GRAVEL with some silt, medium dense (alluvium)
							15				
	12		0		9		20			SM	Gray SILTY SAND with coralline gravel and shell fragments, very loose (lagoonal deposit)
							25				drill rods dropped from 23 to 42 feet.
							30				
							35				
							40				
	40				2						grades with some clay
							45				
	40				1/1'						
							50				

Date Started:	June 4, 2002	Water Level: ▼	7.5 ft. 6/4/02 0958 HRS
Date Completed:	June 6, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	134.5 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLABS.GDT 10/29/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 5

(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
TV=0.05	57				1/2'		55			MH	Gray CLAYEY SILT with fine sand, shell fragments and coralline gravel and organic material, very soft (lagoonal deposit)
	39				4						
	33				1/1' +1/.5'		60				
	59				1/1.5'		65				
TV=0.05	65				1/1.5'		70			CH	Dark gray SILTY CLAY with fine sand and shell fragments, very soft (lagoonal deposit)
											drill rods dropped from 70 to 75 feet
TV=0.4	68	60			4		75				
							80				
TV=0.25	66				3		85				
							90			CH	Grayish dark brown with bluish gray mottling SILTY CLAY with well rounded gravel, sand and some organic material, medium stiff (lagoonal deposit)
	58	62			9		95				
	73				7					CH	Dark gray SILTY CLAY with fine sand, some organic material and shell fragments, medium stiff (lagoonal deposit)
							100				

Date Started:	June 4, 2002	Water Level: ▼	7.5 ft. 6/4/02 0958 HRS
Date Completed:	June 6, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	134.5 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLABS.GDT 10/29/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-10

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 5

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None — Date: May 2009

SHEET No. 87 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	92	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 5

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
	78	49			12	2.0	105			CL	Bluish gray SANDY CLAY with well rounded sand, organic material, and shell fragments, medium stiff (lagoonal deposit)
	54				4		110			SC	Dark gray CLAYEY SAND with rounded sand, subangular basaltic gravel and shell fragments, very loose (lagoonal/alluvium)
	47	38	40		30/.5' +30/.3' Ref.		115			GC	Brownish gray with blue CLAYEY GRAVEL AND SAND, dense (older alluvium) grades with some highly weathered basaltic cobbles
	51		26		51		120				
	52		100		51		125			SC	Gray-brown CLAYEY SAND with well rounded sand, gravel and cobbles, very dense (older alluvium)
	68		88		50		130				
	46				53		135				Boring terminated at 134.5 feet
							140				
							145				
							150				

Date Started:	June 4, 2002	Water Level: ▼	7.5 ft. 6/4/02 0958 HRS
Date Completed:	June 6, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	134.5 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.GPJ GEOLABS.GDT 9/25/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 6

Approximate Ground Surface Elevation" "(feet MSL): 6.4 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										SM	Tannish brown SILTY SAND, medium dense, moist (fill)
	8	86			10					SP	
	11				10						Tan CORALLINE FINE SAND, loose to medium dense, damp (fill) grades to tannish brown with some silt and traces of coralline gravel
	8	100			59		5			SP	Tannish brown SAND with traces of basaltic and coralline gravel, medium dense to dense, damp (beach sand)
	20				4		10				grades with some basaltic gravel, loose
	15				14		15			SM	Dark gray fine SILTY SAND with some coralline and basaltic gravel, loose (lagoonal deposit)
	43				10		20				grades with coralline gravel
	48	73			8		25				
	52				4		30				
TV=0.1	52	66			5		35			SM	Dark gray SILTY FINE SAND, loose to very loose (lagoonal deposit)
	50				2		40				grades to very loose
TV=0.3	55	63			6		45			ML-MH	Dark gray SANDY SILT with some clay, soft (lagoonal deposit)
							50				

Date Started:	May 20, 2002	Water Level: ▼	6.4 ft. 5/20/02 1051 HRS 5 ft. 5/20/02 1330 HRS
Date Completed:	May 23, 2002		
Logged By:	G. Barut	Drill Rig:	CME-75
Total Depth:	181.3 feet	Drilling Method:	4" Solid-Stem Auger & 4" Wash Boring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 4867-00.GPJ GEOLABS.GDT 9/25/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — EXPIRATION DATE OF THE LICENSE 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 5 & 6

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None — Date: May 2009

SHEET No. 88 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	93	121

GEOLABS, INC. Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42) PUNALUU, OAHU, HAWAII

Log of Boring 6

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
	54				1/1' +3/.5'					ML-MH	
TV=.25	54	66			4		55				
	61				5		60				grades with traces of coralline gravel, shell fragments and organic material, soft to medium stiff
TV=0.45	64	60			9		65				
	65				7		70				
TV=0.3	61	62			18		75			MH	Dark gray CLAYEY SILT with fine sand, medium stiff (lagoonal deposit)
	65				7		80				grades with traces of coralline gravel
TV=0.3	70	58			19	0.75	85				
	69				12	0.5	90				
TV=0.3	56	68			19		95			SM	Dark gray SILTY SAND with traces of gravel, shell fragments and organic material, loose to medium dense (lagoonal deposit)
							100				

Date Started:	May 20, 2002	Water Level: ▽	6.4 ft. 5/20/02 1051 HRS 5 ft. 5/20/02 1330 HRS
Date Completed:	May 23, 2002		
Logged By:	G. Barut	Drill Rig:	CME-75
Total Depth:	181.3 feet	Drilling Method:	4" Solid-Stem Auger & 4" Wash Boring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ, GEOLABS.GDT 10/25/02

GEOLABS, INC. Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42) PUNALUU, OAHU, HAWAII

Log of Boring 6

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
	53				14					SM	
	72	55			38	1.5	105				grades with some basaltic gravel, medium dense
										MH	Brownish gray CLAYEY SILT with some sand and organic material, medium stiff to stiff (lagoonal deposit)
					46		110				
	47	69			33		115			MH	Gray CLAYEY SILT with seams of basaltic gravel and sand and traces of shell fragments, stiff (lagoonal deposit)
	19				25		120			GP-GM	Dark gray BASALTIC GRAVEL with some sand and seams of clayey silt, medium dense (lagoonal deposit)
					35/.5' +50/.4' Ref.		125				grades with cobbles
										SM	Dark gray SILTY SAND with some gravel, dense (lagoonal deposit)
	33				23		130				
	46	81			16		135				grades to medium dense
										SC	Gray CLAYEY SAND with some gravel, medium dense (lagoonal deposit)
	43				19		140				
	46	76			73		145				grades with traces of highly weathered subrounded basaltic gravel
			93							SM	Grayish brown with multi-color mottling SILTY BASALTIC SAND with traces of highly weathered subrounded basaltic gravel, very dense (older alluvium)
							150				

Date Started:	May 20, 2002	Water Level: ▽	6.4 ft. 5/20/02 1051 HRS 5 ft. 5/20/02 1330 HRS
Date Completed:	May 23, 2002		
Logged By:	G. Barut	Drill Rig:	CME-75
Total Depth:	181.3 feet	Drilling Method:	4" Solid-Stem Auger & 4" Wash Boring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ, GEO-LAB.GDT 10/25/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE — 30-10 EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 6

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B9 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	94	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring **6**

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
			65				155				Gray vesicular BASALTIC BOULDERS with some alluvial cobbles and gravel, very dense (older alluvium)
			0							CH	Grayish brown with multi-color mottling SILTY CLAY with fine basaltic sand and some highly weathered alluvial gravel, very stiff to hard (older alluvium)
	47		24		58		160				
	60		48		39		165				
	53		50		44		170			SC	Grayish brown with multi-color mottling CLAYEY BASALTIC SAND with some highly weathered alluvial gravel, dense (older alluvium)
	38		96		50/.3' Ref.		175			GC	Brown with multi-color mottling CLAYEY BASALTIC GRAVEL with some silty sand seams, dense to very dense (older alluvium)
	55				13/.5' +50/.3'		180				Boring terminated at 181.3 feet
							185				
							190				
							195				
							200				

Date Started:	May 20, 2002	Water Level: ▼	6.4 ft. 5/20/02 1051 HRS 5 ft. 5/20/02 1330 HRS
Date Completed:	May 23, 2002		
Logged By:	G. Barut	Drill Rig:	CME-75
Total Depth:	181.3 feet	Drilling Method:	4" Solid-Stem Auger & 4" Wash Boring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 4867-00.DGN GEOLABS.DOT 10/29/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring **7**

Approximate Ground Surface Elevation" "(feet MSL): 7.0 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	13				30	0.5				SP	4-inch ASPHALTIC CONCRETE
											6-inch CONCRETE
										CH	Brownish tan SAND with some basaltic gravel, medium dense, damp (fill)
										SC	Dark brown SILTY CLAY with sand and gravel, stiff, moist (fill)
	33	81			24		5				Tannish brown CLAYEY SAND with some gravel and traces of silt, medium dense, wet (fill)
							10			SM	Dark gray SILTY SAND with rounded basaltic gravel, medium dense (alluvium)
	18				16		15			GW-GM	Gray SANDY CORALLINE GRAVEL in a silt matrix, loose (lagoonal deposit)
	38				8		20			MH	Grayish brown CLAYEY SILT with fine sand, soft (lagoonal deposit)
	62				10					SM	Gray fine SILTY SAND, loose (lagoonal deposit)
							25				
	47				3						grades to very loose
							30				
	54				5						grades to very loose
							35				
TV=0.1	52	75			5						
							40			ML	Dark gray fine SANDY SILT, very soft (lagoonal deposit)
TV=0.1	66				1						
							45			SM	Dark gray SILTY FINE SAND, loose (lagoonal deposit)
TV=0.1	53	72			9						
							50				

Date Started:	June 11, 2002	Water Level: ▼	5.2 ft. 6/12/02 0912 HRS 6.4 ft. 6/13/02 0840 HRS
Date Completed:	June 14, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	178.1 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DOT 4867-00.DGN GEOLABS.DOT 10/29/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE 4-30-16 EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 6 & 7

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B10 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	95	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 7

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
										ML	Dark gray fine SANDY SILT, medium stiff (lagoonal deposit)
TV=0.1	59				5		55				
TV=0.1	53	67			14		60				grades to stiff
TV=0.1	63				4		65				grades to soft
TV=0.2	63	61			14		70				grades to stiff
TV=0.15	57				6		75				grades to medium stiff
										MH	Dark gray CLAYEY SILT with fine sand with some shell fragments, stiff (lagoonal deposit)
TV=0.35	58	63			19	0.5	80				
TV=0.3	67				7	0.5	85				grades to medium stiff
	65	59			20	1.0	90				grades to very stiff
	72				11	<0.5	95				grades with sand and rounded gravel, stiff
										SM	Dark gray SILTY FINE SAND with some clay and well rounded gravel and some organic material, loose (lagoonal deposit)
	65				6		100				

Date Started:	June 11, 2002	Water Level: ▼	5.2 ft. 6/12/02 0912 HRS 6.4 ft. 6/13/02 0840 HRS
Date Completed:	June 14, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	178.1 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG.DGT 4867-00.GPJ GEOLABS.GDT 10/29/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 7

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
	70				8	0.5	105			MH	Dark gray CLAYEY SILT with fine sand, medium stiff (lagoonal deposit)
	65	62			25		110			SM	Dark gray SILTY FINE SAND, medium dense
	67				22		115				grades with well rounded gravel and interbedded with clayey silt lenses
	19		2		50		120			GW	Dark gray SANDY BASALTIC GRAVEL AND COBBLES, rounded to well rounded, highly weathered, dense (older alluvium)
	26		0		30		125			SM	Dark gray SILTY SAND with well rounded sand with some highly weathered gravels, medium dense (older alluvium)
	4		7		20/.0' Ref.		130			SP-SM	Brown with multi-color mottling coarse SAND with silt and some well rounded gravel and cobbles, very dense (older alluvium)
	29		0		58		135				
	17		21		55		140			GM	Grayish brown SILTY GRAVEL with sand, very dense (older alluvium)
			17		20/.0' Ref.		145				grades with cobbles and boulders, very dense
	15				74		150				

Date Started:	June 11, 2002	Water Level: ▼	5.2 ft. 6/12/02 0912 HRS 6.4 ft. 6/13/02 0840 HRS
Date Completed:	June 14, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	178.1 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG.DGT 4867-00.GPJ GEOLABS.GDT 10/29/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE 4-30-16 EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 7

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B11 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	96	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 7

(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
			52							GM	
	11		57		10/.0' Ref.		155				
	24		44		40/.3' Ref.		160				
			65		20/.0' Ref.		165				grades with slightly to moderately weathered, dense to vesicular basaltic boulders and cobbles
			83		10/.0' Ref.		170				
			50		10/.0' Ref.		175				grades with highly to moderately weathered gravel and cobbles
					30/.1' Ref.						Boring terminated at 178.1 feet
							180				
							185				
							190				
							195				
							200				

Date Started:	June 11, 2002	Water Level: ▼	5.2 ft. 6/12/02 0912 HRS 6.4 ft. 6/13/02 0840 HRS
Date Completed:	June 14, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	178.1 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLAB.GDT 6/20/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 8

Approximate Ground Surface Elevation" "(feet MSL): 6.1 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											6-inch ASPHALTIC CONCRETE
										SP	7-inch CONCRETE
	14	95			40						Tannish brown SAND with some gravel and traces of silt, medium dense, damp (fill)
	21				10						
	28	75			18		5			SP	Whitish gray coarse SAND with well rounded sand and some shell fragments, medium dense, saturated (beach sand/alluvium)
	54				8		10			MH	Brownish dark gray CLAYEY SILT with fine sand and traces of shell fragments, soft to medium stiff (lagoonal deposit)
	15				20		15			SM	Brownish dark gray SILTY FINE SAND with some clay and some basaltic gravel, medium dense (lagoonal deposit)
	54				13		20				
											Boring terminated at 21.5 feet
							25				
							30				
							35				
							40				
							45				
							50				

Date Started:	June 18, 2002	Water Level: ▼	5.4 ft. 6/18/02 1300 HRS
Date Completed:	June 18, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	21.5 feet	Drilling Method:	5" Auger & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4867-00.GPJ GEOLAB.GDT 6/20/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE 4-30-16 EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 7 & 8

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B12 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	97	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 9

Approximate Ground Surface Elevation" "(feet MSL): 5.6 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											6.5-inch ASPHALTIC CONCRETE
										SM	7-inch CONCRETE
	29	86			36	0.5				CH	Tannish brown SILTY SAND, medium dense,
	22				29					SP	moist (fill)
	33	87			25		5				Brown with orange mottling SILTY CLAY with sand and some highly weathered basaltic gravel, very stiff, moist (fill)
											Brownish tan SAND, medium dense, moist (beach sand)
										SM	grades to whitish gray, saturated at 5.5 feet
	13				8		10				Dark gray SILTY SAND with rounded basaltic gravel, loose (lagoonal deposit)
										SP-SM	Dark gray fine SAND with silt and some coralline gravel, very loose (lagoonal deposit)
	51				3		15				
	45				1/1' +1/.5'		20				
											Boring terminated at 21.5 feet
							25				
							30				
							35				
							40				
							45				
							50				

Date Started:	June 19, 2002	Water Level: ▼	5.3 ft. 6/19/02 1020 HRS
Date Completed:	June 19, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	21.5 feet	Drilling Method:	5" Auger
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ GEOLABS.GDT 10/29/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 10

Approximate Ground Surface Elevation" "(feet MSL): 7.7 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											2-inch ASPHALTIC CONCRETE
											14-inch CONCRETE (bridge deck)
											Space below bridge
							5				
											Water surface at 7.3 feet
											Mudline at 9.8 feet
							10			GP	Dark gray well rounded to subrounded GRAVEL with sand, loose (alluvium)
	10				7						
							15				
							20			SM	Gray SILTY SAND with some coralline gravel and shell fragments and clay, very loose (lagoonal deposit)
	44				2/1' +1/.5'						
							25				
							30				
	31				2						grades to silty fine sand
							40				
	47				1/1.5'						
							45			ML	Brownish dark gray fine SANDY SILT with clay and shell fragments, very soft (lagoonal deposit)
							50				

Date Started:	July 5, 2002	Water Level: ▼	7.3 ft. 7/5/02 0940 HRS
Date Completed:	July 8, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	162.8 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT_4867-00.GPJ GEOLABS.GDT 10/29/02

ORIGINAL PLAN PREPARED BY
NOTE BOOK
No.
SURVEY PLOTTED 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 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS 9 & 10

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B13 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	98	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 10

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
										ML	
TV=0.15	58				1/1.5'		55				
							60				
TV=0.25	67				1/1' +1/.5'		65				
							70				
TV=0.2	56	63			11		75				grades to medium stiff
							80				
TV=0.2	63				6		85				
							90				
	58	56			14		95			SM	Brownish dark gray SILTY SAND with well rounded sand and gravel, shell fragments, organic material and coralline gravel, medium dense (lagoonal deposit)
							100				

Date Started:	July 5, 2002	Water Level: ▼	7.3 ft. 7/5/02 0940 HRS
Date Completed:	July 8, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	162.8 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG 2001 4867-00.GPJ GEOLABS.GDT 10/25/02

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 10

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
										SM	
TV=0.3	71				8	<0.5	105			MH	Dark gray CLAYEY SILT with fine sand, organic material and shell fragments, medium stiff (lagoonal deposit)
	59	67			17		110			SM	Dark gray SILTY COARSE SAND with some clay and shell fragments, medium dense (lagoonal deposit)
	46		14		62		115			GW-GM	Bluish dark gray with brown mottling SANDY BASALTIC GRAVEL AND SOME SILT, extremely weathered, subrounded, very dense (older alluvium)
	73		14		37	2.5	120			SM	Brown with gray mottling SILTY SAND, dense (older alluvium)
	70		48		13/.5' +50/.4' Ref.		125				grades with multi-color mottling with well rounded sand and gravel, and some gray highly weathered basaltic cobbles
	38		25		60/.5' +10/.0' Ref.		130				
	50				30/.3' Ref.		135				grades with cobbles and boulders
	67		76		48		140				
							145				
							150				

Date Started:	July 5, 2002	Water Level: ▼	7.3 ft. 7/5/02 0940 HRS
Date Completed:	July 8, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	162.8 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG 2001 4867-00.GPJ GEOLABS.GDT 10/25/02

ORIGINAL PLAN
NOTE BOOK
SURVEY PLOTTED BY ____ DATE
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
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 4-30-16 EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 10

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

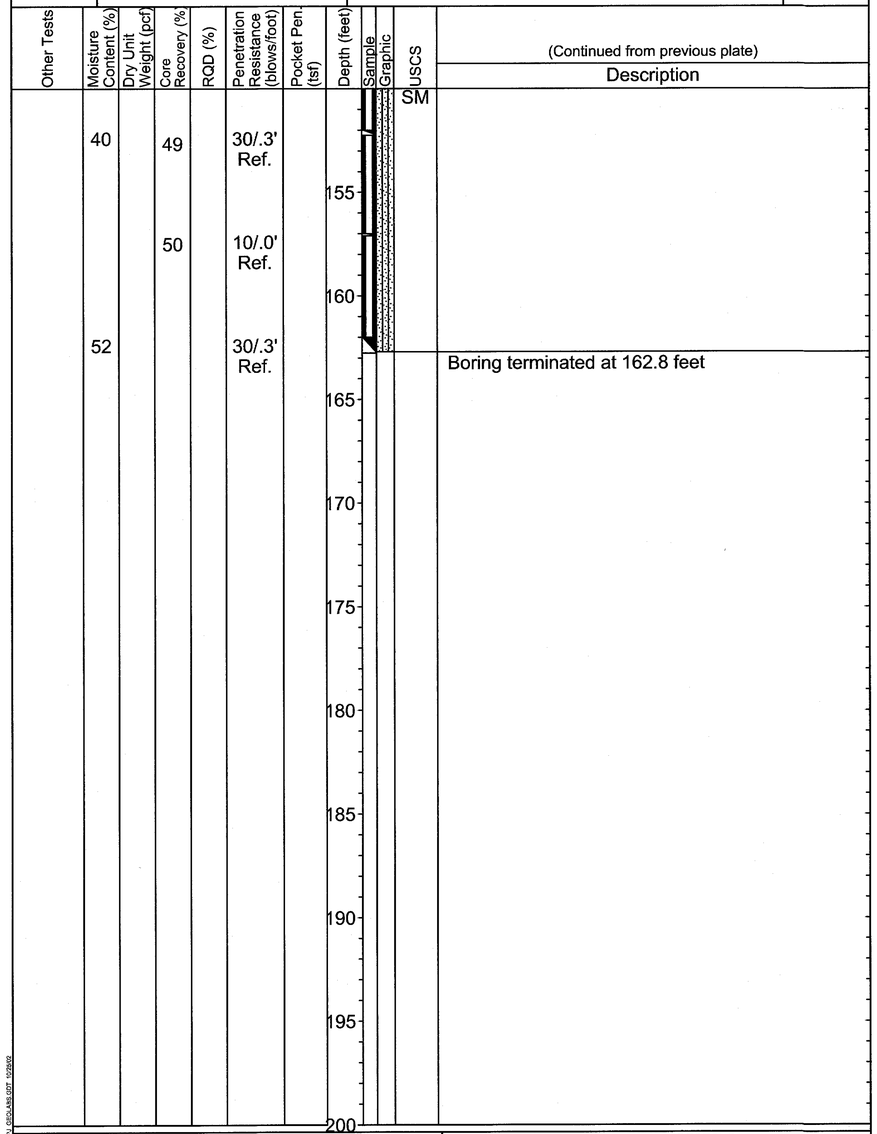
SHEET No. B14 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(42)	2009	99	121

GEOLABS, INC.
Geotechnical Engineering

KAMEHAMEHA HWY. REPLACEMENT OF SOUTH PUNALUU BRIDGE PROJ. NO. BR-083-1 (42)
PUNALUU, OAHU, HAWAII

Log of Boring 10



Date Started:	July 5, 2002	Water Level: ⧗	7.3 ft. 7/5/02 0940 HRS
Date Completed:	July 8, 2002		
Logged By:	Y. Chiba	Drill Rig:	CME-75
Total Depth:	162.8 feet	Drilling Method:	6" Concrete Core & PQ Coring
Work Order:	4867-00(B)	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG.DGN 4867-00.DGN GEOLABS.GDT 10/28/02

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.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
SIGNATURE
4-30-15
EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG 10

KAMEHAMEHA HIGHWAY – REPLACEMENT OF SOUTH PUNALUU STREAM BRIDGE
Federal Aid Project No. BR-083-1(42)

Scale: None Date: May 2009

SHEET No. B15 OF 15 SHEETS