FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-92	1992	63	167

BORING LOG

BORING NO. B1 — SURFACE ELEV. 43+ * — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 11-26-88 — WATER LEVEL @ 27 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	75	90	26		Silty CLAY - Brown, moist, stiff, with sand and gravel.
5			27/9"	86	14		Grading with cobbles from 4 feet.
10							BASALT - Gray, hard, slightly vesicular. Begin NX coring from 11 feet. 100% Recovery from 11 to 16 feet. (RQD 100%)
15							100% Recovery from 16 to 21 feet. (RQD 100%)
20							100% Recovery from 21 to 26 feet. (RQD 100%)
25							*56% Recovery from 26 to 31 feet. (RQD 8%) Fractured with clay seams from 26 feet.
30							80% Recovery from 31 to 36 feet. (RQD 0%)
35							End boring at 36 feet.
40							* Elevations based on Preliminary Plan & Profile provided by Engineers Surveyors Hawaii, Inc.
45							
50							
55							
60							

BORING LOG

BORING NO. B2 — SURFACE ELEV. 10± — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 11-9-88 — WATER LEVEL @ 1.8 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	8	69	49		Silty CLAY - Brown, moist, firm to medium stiff.
5		ML	2	47	94		Clayey SILT - Gray, soft, with sand.
10			3	60	70		
15			6	75	47		Grading with gravels from 15 feet.
20			15	77	40		Grading medium stiff from 19 feet.
25			86	Tip Recovery			HIGHLY WEATHERED ROCK - Orange brown, dense to medium hard.
30			82/11"	74	45		
35			10/No Penetration				BASALT - Gray, hard. Begin NX coring from 34 feet. 100% Recovery from 34 to 39 feet. (RQD 66%)
40							100% Recovery from 39 to 44 feet. (RQD 74%)
45							88% Recovery from 44 to 49 feet. (RQD 66%) Grading to weathered condition from 44 feet.
50							End boring at 49 feet.
55							
60							

BORING LOG

BORING NO. B3 — SURFACE ELEV. 7± — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 11-11-88 — WATER LEVEL @ 2.8 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	6	69	53		Silty CLAY - Brown, moist , firm.
5		ML-OL	2	37	130		Clayey SILT - Dark gray, soft to firm, organic.
10			5	81	39		Grading with sand and gravels from 10 feet.
15			24	Tip Recovery			
20			5	No Recovery			
25			5	52	109		Shell fragments at 24 feet.
30			5	49	85		
35		CL	31	No Recovery			Silty CLAY - Mottled grayish brown, medium stiff.
40			64	84	39		
45			18	83	53		
50			19	72	56		HIGHLY WEATHERED ROCK - Mottled orange brown, dense.
55			20	63	68		
60			18	71	54		

BORING LOG

BORING NO. B3 (Cont.) — SURFACE ELEV. 7± — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 11-14-88 — WATER LEVEL @ 2.8 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60			30	76	48		Grading medium dense from 65 feet.
65			35	68	50		
70			27	62	67		
75			46	60	68		
80			25	58	73		
85			36	63	64		
90			31	No Recovery			
95			38	68	58		
100							End boring at 100.5 feet.
105							
110							
115							
120							

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

ROBERT T. WATARI — REGISTERED PROFESSIONAL ENGINEER — No. 4560-C — HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Robert T. Watari

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK
(ROADWAY)
PROJ. NO. 83A-01-92

SHEET No. 63 OF 85 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-92	1992	64	165

BORING LOG

BORING NO. B4 — DRIVING WT. 140 lb. — W.O. 88-1693
SURFACE ELEV. 7± — DROP 30 in. — DATE OF DRILLING 11-23-88
WATER LEVEL @ 4.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	19	86	34		Silty CLAY - Brown, moist, medium stiff, with sand.
5		SM	2	85	35		Silty SAND - Grayish brown, loose, with gravels.
10			6	No Recovery			
15			3	94	32		Grading to dark gray color from 15 feet.
20			10	76	44		
25		ML	4	Tip Recovery			Clayey SILT - Dark gray, soft, with shell fragments.
30			4	No Recovery			
35			25	75	43		Grading medium stiff from 34 feet.
40			13	76	48		
45			62/8"	106	21		Grading dense with gravels from 44 feet.
50			40	No Recovery			
55			50/11"	78	45		HIGHLY WEATHERED ROCK - Mottled brown, medium dense to dense.
60			59	No Recovery			

BORING LOG

BORING NO. B4 (Cont.) — DRIVING WT. 140 lb. — DATE OF DRILLING 11-23-88
SURFACE ELEV. 7± — DROP 30 in. — WATER LEVEL @ 4.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65			27/11"	70	54		
70			27	68	54		
75			24	54	80		
80			37	61	73		Grading to dark gray color from 79 feet.
85			50	64	64		
90			36	59	72		
95			54	70	56		
100			56	70	54		End boring at 100.5 feet.
105							
110							
115							
120							

BORING LOG

BORING NO. B5 — DRIVING WT. 140 lb. — W.O. 88-1693
SURFACE ELEV. 6± — DROP 30 in. — DATE OF DRILLING 11-17-88
WATER LEVEL @ 4.3 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	17	79	36		Silty CLAY - Brown, moist, medium stiff.
5			2	60	72		Grading soft from 5 feet.
10			3	No Recovery			
15		SM	4	No Recovery			Silty SAND - Black, loose, with gravels.
20			4	81	42		
25		ML-OL	4	58	70		Clayey SILT - Dark gray, soft, with shell fragments, organic.
30			4	55	79		
35			34	83	39		Grading medium stiff to stiff from 34 feet.
40			80/9"	Tip Recovery			HIGHLY WEATHERED ROCK - Mottled gray, medium hard to hard.
45							Begin NX coring from 44 feet. 94% Recovery from 44 to 49 feet. (RQD 32%)
50							56% Recovery from 49 to 54 feet. (RQD 0%)
55			75	Tip Recovery			End NX coring at 54 feet.
60			73/11"	87	37		

BORING LOG

BORING NO. B5 (Cont.) — DRIVING WT. 140 lb. — DATE OF DRILLING 11-21-88
SURFACE ELEV. 6± — DROP 30 in. — WATER LEVEL @ 4.3 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT	RELATIVE COMPACTION (%)	DESCRIPTION
60							Grading hard from 62.5 feet.
65			53	78	44		Begin NX coring from 64 feet. 100% Recovery from 64 to 66.5 feet. (RQD 0%)
70							End NX coring at 66.5 feet.
75			56	No recovery			
80			65/5"	No Recovery			
85			81	Tip Recovery			
90			95	Tip Recovery			
95			52/11"	55	76		
100			45	64	61		
105			57/8"	71	47		End boring at 100 feet.
110							
115							
120							

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

ROBERT T. WATARI
REGISTERED PROFESSIONAL ENGINEER
No. 4560-C
HAWAII U.S.A.

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Robert T. Watari

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ.NO. 83A-01-92

SHEET No. C64 OF 85 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-07	1992	65	167

BORING LOG

BORING NO. B6 — SURFACE ELEV. 5± — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 11-15-88 — WATER LEVEL @ 4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	15	72	46		Silty CLAY - Mottled brown, moist, firm to medium stiff.
							Grading soft from 4 feet. Grading to grayish brown color from 5 feet.
5			4	64	62		
							Organic material at 9 feet.
10			5	74	113		
15		SM	4	78	30		Silty SAND - Mottled black, loose, with gravels.
20		ML-OL	3	61	68		Clayey SILT - Dark gray, soft, with sand and shell fragments, organic.
							Weathered gravel at 24 feet.
25			5	58	69		
30			3	No Recovery			
35			4	59	72		Decayed wood at 34 feet.
40			6	47	98		
45			6	58	67		
50			23	73	48		
55							BASALT - Gray, hard, slightly vesicular, slightly fractured. Begin NX coring from 54 feet. 100% Recovery from 54 to 59 feet. (RQD 100%) Weathered seam from 56.5 to 57 feet.
60							100% Recovery from 59 to 64 feet. (RQD 56%)
65							100% Recovery from 64 to 69 feet. (RQD 52%) Grading to reddish brown color from 67 feet.
70							End boring at 69 feet.
75							

BORING LOG

BORING NO. B7 — SURFACE ELEV. 9± — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 1-6-89 — WATER LEVEL @ 3.6 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	11	69	51		Silty CLAY - Brown, moist, firm to medium stiff.
5		ML-OL	2	58	70		Clayey SILT - Dark gray, soft, with sand, organic.
10			3	53	87		
15			3	54	81		
20			4	55	74		Grading with shell fragments from 20 feet.
25			8	Tip Recovery			Cobbles at 23 feet.
30			9	No Recovery			
35			13	No Recovery			
40			6	62	71		
45			12	No Recovery			
50			14	No Recovery			
55							Basalt- Gray, hard, slightly vesicular. Begin NX coring from 52 feet. 100% Recovery from 52 to 57 feet. (RQD 100%)
60							100% Recovery from 57 to 62 feet. (RQD 96%) 100% Recovery from 62 to 64 feet. (RQD 100%)
65							End boring at 64 feet.
70							
75							

BORING LOG

BORING NO. B7A — SURFACE ELEV. 8+ — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 5-16-89 — WATER LEVEL @ 4 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	6	75	43		Silty CLAY - Brown to reddish brown, moist, firm.
5		ML-OL	3	65	62		Clayey SILT - Gray, soft, with sand.
10			1	58	63		End boring at 10.5 feet.
15							
20							

BORING LOG

BORING NO. B7B — SURFACE ELEV. 10+ — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 5-16-89 — WATER LEVEL @ 3 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	21	73	46		Silty CLAY - Brown, moist, medium stiff.
5		ML-OL	4	54	76		Clayey SILT - Gray, soft, with sand.
10			4	45	98		End boring at 10.5 feet.
15							
20							

BORING LOG

BORING NO. B7C — SURFACE ELEV. 13+ — DRIVING WT. 140 lb. — DROP 30 in. — W.O. 88-1693 — DATE OF DRILLING 5-16-89 — WATER LEVEL @ 5.5 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	17	80	38		Silty CLAY - Brown, moist, medium stiff.
5		ML-SM	3	66	61		Sandy SILT - Brown, moist, firm to soft.
10			9	70	55		Grading to mottled brown color and firm to medium stiff from 10 feet.
15		MH	24	92	33		Silty CLAY - Mottled brown, stiff to medium stiff.
20			45	94	31		
25			14	83	41		Grading with sand and highly weathered rock fragments from 25 feet.
30			29	77	49		
35							BASALT - Gray, hard, slightly vesicular. Begin NX coring from 31 feet. 98% Recovery from 31 feet. (RQD = 96%) 88% Recovery from 36 to 41 feet. (RQD = 12%)
40							End boring at 41 feet.
45							

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

ROBERT T. WATARI REGISTERED PROFESSIONAL ENGINEER No. 4560-C HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Robert T Watari

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 LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-07

SHEET No. C65 OF 86 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-08	1988	66	167

BORING LOG

BORING NO. B8 — DRIVING WT. 140 lb. — DATE OF DRILLING 12-15-88 — W.O. 88-1693
SURFACE ELEV. 18± — DROP 30 in. — WATER LEVEL @ 12 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	108/11"	94	29		Silty CLAY - Brown, moist, stiff, with weathered rock fragments.
5			100/10"	93	30		Grading to mottled orange and gray color from 7.5 feet.
10		SM	17	80	31		Silty SAND - Mottled brown, moist, medium dense, with gravels.
15			10	No Recovery			Grading loose from 15 feet.
20			58	92	26		Slightly cemented from 19 to 22 feet.
25			13	No Recovery			
30			8	No Recovery			
35		CL	16	70	51		Silty CLAY - Mottled grayish brown, firm to medium stiff, with highly weathered rock fragments.
40			13	76	48		Grading stiff from 43 feet.
45			85/7"	No Recovery			HIGHLY WEATHERED ROCK - Light gray, medium hard to hard.
50							Grading hard from 49 feet. Begin NX coring from 49 feet. 90% Recovery from 49 to 54 feet. (RQD 66%)
55							15% Recovery from 54 to 59 feet. (RQD 6%)
60							End NX coring at 59 feet.

BORING LOG

BORING NO. B8 (Cont.) — DRIVING WT. 140 lb. — DATE OF DRILLING 12-15-88
SURFACE ELEV. 18± — DROP 30 in. — WATER LEVEL @ 12 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60			62	No Recovery			
65			50/3"	No Recovery			
70							BASALT - Gray, hard, slightly vesicular, fractured. Begin NX coring from 69.5 feet. 95% Recovery from 69.5 to 74.5 feet. (RQD 77%) 87% Recovery from 74.5 to 79.5 feet. (RQD 67%)
75							
80							End boring at 79.5 feet.
85							
90							

BORING LOG

BORING NO. B9 — DRIVING WT. 140 lb. — DATE OF DRILLING 1-31-89 — W.O. 88-1693
SURFACE ELEV. 10± — DROP 30 in. — WATER LEVEL @ 6.7 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	17	77	44		Silty CLAY - Brown, moist, medium stiff.
5			11	72	53		
10		SM	5	74	55		Silty SAND - Brown, loose.
15			17/7"	95	21		Grading medium dense with coral fragments from 14 feet.
20		ML-OL	11	61	73		Clayey SILT - Dark gray, medium stiff, with sand, organic.
25			16	Disturbed Sample			
30			29	No Recovery			
35			32	Disturbed Sample			
40			20	66	70		
45			22	60	71		
50			23	63	66		
55			31	65	68		
60			49	No Recovery			

BORING LOG

BORING NO. B9 (Cont.) — DRIVING WT. 140 lb. — DATE OF DRILLING 2-1-89 — W.O. 88-1693
SURFACE ELEV. 10± — DROP 30 in. — WATER LEVEL @ 6.7 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65							BASALT - Gray, hard, slightly vesicular, fractured. Begin NX coring from 62 feet. 100% Recovery from 62 to 67 feet. (RQD 70%) 100% Recovery from 67 to 72 feet. (RQD 94%)
70							
75							End boring at 72 feet.
80							
85							
90							

ROBERT T. WATARI
REGISTERED PROFESSIONAL ENGINEER
No. 4560-C
HAWAII U.S.A.

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ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY — DATE
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CHECKED BY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-08

SHEET No. 66 OF 85 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-98	1998	67	165

BORING LOG

W.O. 88-1693

BORING NO. B10 | DRIVING WT. 140 lb. | DATE OF DRILLING 12-30-88
SURFACE ELEV. 23± | DROP 30 in. | WATER LEVEL @ 9 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	31	81	40		Silty CLAY - Mottled brown, moist, stiff.
5			43	88	41		
▽							
10		SM	11	77	41		Sandy SILT - Mottled brown, medium stiff.
15		MH	73	No Recovery			Silty CLAY - Mottled orange brown, stiff.
20			43	72	52		
25			25	73	53		
30			42	82	41		
35			43	69	58		
40			51	75	48		
45			58	74	48		
50		ML-OL	60	66	59		Clayey SILT - Dark gray, stiff, with rock fragments, organic.
55			37	61	57		Decayed wood at 54 feet.
60			32	82	41		

BORING NO. B10 (Cont.) | DRIVING WT. 140 lb. | DATE OF DRILLING 12-30-88
SURFACE ELEV. 23± | DROP 30 in. | WATER LEVEL @ 9 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65			57	88	30		
70			31	71	56		
75			70	82	50		
80			80	73	52		HIGHLY WEATHERED ROCK - Mottled orange brown, dense.
85			85/9"	74	50		
90			33	63	63		
95			45	60	64		End boring at 95.5 feet.
100							
105							
110							
115							
120							

BORING LOG

W.O. 88-1693

BORING NO. B11 | DRIVING WT. 140 lb. | DATE OF DRILLING 12-15-88
SURFACE ELEV. 21± | DROP 30 in. | WATER LEVEL @ 9.6 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	39	94	33		Silty CLAY - Brown, moist, stiff. Firm to medium stiff in upper 24 inches.
5			13	84	34		
▽							
10		SM	17	92	30		Sandy SILT - Mottled brown, moist, medium stiff.
15		MH	23	85	34		Silty CLAY - Mottled dark brown, stiff.
20			40	75	49		
25			31	70	70		
30			42	79	44		
35			28	70	54		Grading siltier from 34 feet.
40			40	75	51		Grading with highly weathered rock fragments from 40 feet.
45			43	72	51		
50			59	77	46		
55			35	67	54		
60			100	Tip Recovery			HIGHLY WEATHERED ROCK - Mottled dark brown, dense to medium hard.

BORING NO. B11 (Cont.) | DRIVING WT. 140 lb. | DATE OF DRILLING 12-15-88
SURFACE ELEV. 21+ | DROP 30 in. | WATER LEVEL @ 9.6 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65			55/3"	No Recovery			Begin NX coring from 64.5 feet. 92% Recovery from 64.5 to 69.5 feet. (RQD 16%)
70							End NX coring at 69.5 feet.
75			38	63	64		
80							End boring at 75.5 feet.
85							
90							

ROBERT T. WATARI REGISTERED PROFESSIONAL ENGINEER No. 4360-C HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Robert T. Watari

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-98

SHEET NO. 67 OF 85 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-98	1998	68	165

BORING LOG

BORING NO. B12 — W.O. 88-1693
SURFACE ELEV. 6+ — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 3-9-89 — WATER LEVEL @ 4.2 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH					Silty CLAY - Brown, moist, stiff to medium stiff. Boulders at surface.
			43	86	32		
5 ▽							Cobbles and boulders from 5 to 8 feet.
			19/6"	89	26		Grading to mottled orange brown color with river washed gravel from 8 feet.
10			55/9"	103	23		
15			10/No Penetration				BASALT - Gray, medium hard, vesicular. Begin NX coring from 14 feet. 90% Recovery from 14 to 19 feet. (RQD = 86%)
20							98% Recovery from 19 to 24 feet. (RQD = 98%)
25							50% Recovery from 24 to 29 feet. (RQD = 0%) Highly weathered rock from 25 feet.
30			93	68	58		End NX coring at 29 feet.
35			10/No Penetration				Grading hard from 33.5 feet. Begin NX coring from 34 feet. 44% Recovery from 34 to 39 feet. (RQD = 64%) Medium hard vesicular basalt.
40							72% Recovery from 39 to 44 feet. (RQD = 40%) Weathered seams at 41 and 43 feet.
45							End boring at 44 feet.
50							
55							
60							

BORING LOG

BORING NO. B13 — W.O. 88-1693
SURFACE ELEV. 4± — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 1-4-89 — WATER LEVEL @ 4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH					Silty CLAY - Brown, moist, firm, with sand and gravels.
			2	70	53		Grading soft from 3 feet.
5 ▽		ML-OL	13	53	89		Clayey SILT - Dark gray, soft, with sand and gravels, organic.
10			4	76	44		
15			3	71	56		
20			4	No Recovery			Grading with shell fragments from 20 feet.
25			3	No Recovery			
30			4	No Recovery			
			3	57	71		
35			4	Tip Recovery			
40			4	58	70		
45			6	54	83		
50			10	54	78		
55			10	51	86		
60			10/No Penetration				Silty CLAY - Brown, stiff, with cobbles and boulders.

BORING LOG

BORING NO. B13 (Cont.) — W.O. 88-1693
SURFACE ELEV. 4± — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 1-10-89 — WATER LEVEL @ 4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60		CL					Begin NX coring at 64 feet. 72% Recovery from 64 to 69 feet. (RQD 24%)
65							End NX coring at 69 feet.
70			83	81	42		HIGHLY WEATHERED ROCK - Mottled gray brown, dense.
75			80/3"	Tip Recovery			
80							BASALT - Gray, hard, slightly vesicular. Begin NX coring at 79 feet. 100% Recovery from 79 to 84 feet. (RQD 58%)
85							100% Recovery from 84 to 89 feet. (RQD 100%)
90							End boring at 89 feet.

BORING LOG

BORING NO. B13A — W.O. 88-1693
SURFACE ELEV. 6+ — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 5-17-89 — WATER LEVEL @ 5.5 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	8		35		Silty CLAY - Brown, moist, medium stiff.
5 ▽			4	64	61		Grading soft from 3 feet.
10		ML-OL	1	68	46		Clayey SILT - Dark gray, soft, with sand.
15			9	83	38		Grading with gravel from 14 feet.
20							End boring at 15 feet.
25							
30							

BORING LOG

BORING NO. B13B — W.O. 88-1693
SURFACE ELEV. 6+ — DRIVING WT. 140 lb. — DROP 30 in. — DATE OF DRILLING 5-17-89 — WATER LEVEL @ 5.5 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH-CH	11	71	47		Silty CLAY - Brown, moist, firm to medium stiff.
5 ▽			3	64	59		Grading soft from 4 feet.
		ML-OL					Clayey SILT - Dark gray, soft, with sand.
10			3	59	70		
15			1	55	74		
			15	76	44		Gravels at 18 feet.
20							
25			6	62	50		
30			6	58	65		Grading with river washed gravel and shell fragments from 34 feet.
35			5	58	74		
40			7	58	74		
45			8	56	75		
50			7	68	53		
55			9	54	74		
60			10	50	88		

Robert T. Watari

ROBERT T. WATARI REGISTERED PROFESSIONAL ENGINEER No. 4360-C HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Robert T. Watari

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-98

SHEET No. C68 OF 85 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	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-98	1998	69	169

BORING LOG

W.O. 88-1693

BORING NO. B13B (cont.) DRIVING WT. 140 lb. DATE OF DRILLING 5-17-89
SURFACE ELEV. 6+ DROP 30 in. WATER LEVEL @ 5.5 feet

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65			11	62	65		
70			108	Tip Recovery			BASALT - Gray, medium hard, slightly vesicular. Begin NX coring from 69.5 feet. 90% Recovery from 69.5 to 74.5 feet. (RQD=44%) 61% Recovery from 74.5 to 79.5 feet. (RQD=21%) Weathered seam at 75 feet.
75							
80							End boring at 79.5 feet.
85							
90							

BORING LOG

W.O. 88-1693

BORING NO. B14 DRIVING WT. 140 lb. DATE OF DRILLING 2-24-89
SURFACE ELEV. 5+ DROP 30 in. WATER LEVEL @ 3.5 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							CORAL - Tan, medium hard to hard.
5							BASALT - Gray, hard. Begin NX coring from 3.5 feet. 100% Recovery from 3.5 to 6.5 feet. (RQD 90%) 90% Recovery from 6.5 to 11.5 feet. (RQD 74%) End NX coring at 11.5 feet. Grading to weathered condition, dense to medium hard from 11 feet.
10							
15			60/5"	Tip Recovery			
20			10/No Penetration				Begin NX coring from 19 feet. 96% Recovery from 19 to 24 feet. (RQD 16%)
25							100% Recovery from 24 to 27 feet. (RQD 0%) End NX coring at 27 feet.
30			50/6"	99	26		

BORING LOG

W.O. 88-1693

BORING NO. B14 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 2-28-89
SURFACE ELEV. 5+ DROP 30 in. WATER LEVEL @ 3.5 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							
35			75/8"	108	19		Grading to hard gray basalt from 35 feet. Begin NX coring from 35 feet. 100% Recovery from 35 to 39 feet. (RQD 95%)
40							100% Recovery from 39 to 44 feet. (RQD 96%)
45							100% Recovery from 44 to 49 feet. (RQD 94%)
50							100% Recovery from 49 to 54 feet. (RQD 92%)
55							80% Recovery from 54 to 59 feet. (RQD 14%)
60							End NX coring at 59 feet.
65			71/9"	No Recovery			
70			35/3"	Tip Recovery			
75			40/4"	Tip Recovery			
80			94	No Recovery			
85							End boring at 80.5 feet.
90							

BORING LOG

W.O. 88-1693

BORING NO. B14A DRIVING WT. 140 lb. DATE OF DRILLING 6-22-89
SURFACE ELEV. 5+ DROP 30 in. WATER LEVEL @ 5.0 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							CORAL - Tan, medium hard to hard. Boulder at 3.5 feet.
5							BASALT - Gray, hard. Begin NX coring from 5 feet. 100% Recovery from 5 to 10 feet. RQD = 92% 100% Recovery from 10 to 15 feet. RQD = 95% 54% Recovery from 15 to 17 feet. RQD = 0% Grading weathered from 15.5 feet. 100% Recovery from 17 to 20 feet. RQD = 33% Grading to mottled brown and vesicular from 17 feet. 95% Recovery from 20 to 25 feet. RQD = 45% 83% Recovery from 25 to 27 feet. RQD = 0% Grading mottled brown to mottled gray from 25 feet. 40% Recovery from 27 to 28.3 feet. RQD = 0% 91% Recovery from 28.3 to 31 feet. RQD = 32% 16% Recovery from 31 to 34 feet. RQD = 0% Cobbles from 31 feet.
10							
15							
20							
25							
30							
35							End boring at 34 feet.
40							
45							
50							
55							
60							

BORING LOG

W.O. 88-1693

BORING NO. B14B DRIVING WT. 140 lb. DATE OF DRILLING 6-22-89
SURFACE ELEV. 5+ DROP 30 in. WATER LEVEL @ 1.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							CORAL - Tan, medium hard to hard. Begin NX coring from surface. 80% Recovery from 0 to 2.5 feet. RQD = 13%
5							BASALT - Gray, hard. 100% Recovery from 2.5 to 5 feet. RQD = 43% 100% Recovery fro 5 to 9.8 feet. RQD = 43% 100% Recovery from 9.8 to 14.8 feet. RQD = 51% 100% Recovery from 14.8 to 19.5 feet. RQD = 43%
10							
15							
20							End boring at 19.5 feet.
25							
30							

ROBERT T. WATARI
REGISTERED PROFESSIONAL ENGINEER
No. 4560-C
HAWAII U.S.A.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-98

SHEET No. 69 OF 85 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	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83A-01-98	1992	70	162

BORING LOG

BORING NO. B14C DRIVING WT. 140 lb. DATE OF DRILLING 8-31-89
SURFACE ELEV. 2+ DROP 30 in. WATER LEVEL @ 2.1 ft.
W.O. 88-1693

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		OH					Clayey SILT - Dark brown, moist, soft, organic.
5			1	97	221		Grading to dark gray color at 5 feet.
10			1	100	187		
15							BASALT - Gray, dense to medium hard. Begin NX coring from 13 feet. 75% Recovery from 13 to 15 feet. RQD = 66% 87% Recovery from 15 to 19 feet. RQD = 31% 100% Recovery from 19 to 24 feet. RQD = 40%
20							
25							100% Recovery from 24 to 29 feet. RQD = 75%
30							End boring at 29 feet.

BORING LOG

BORING NO. B14D DRIVING WT. 140 lb. DATE OF DRILLING 9-6-89
SURFACE ELEV. 2+ DROP 30 in. WATER LEVEL @ 1.0 ft.
W.O. 88-1693

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		OH					Clayey SILT - Dark gray, moist, soft, organic.
5			Wt. of Hammer	84	100		
10			1	70	176		
15			50/5"	67	63		BASALT - Gray, hard to medium dense, vesicular. Begin NX coring from 14.5 feet. 90% Recovery from 14.5 to 19.5 feet. RQD = 15% 100% Recovery from 19.5 to 24.5 feet. RQD = 25%
20							
25							End boring at 24.5 feet.
30							

BORING LOG

BORING NO. B14E DRIVING WT. 140 lb. DATE OF DRILLING 9-11-89
SURFACE ELEV. 2+ DROP 30 in. WATER LEVEL @ 0.0 ft.
W.O. 88-1693

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		OH					Clayey SILT - Dark gray, moist, soft, organic.
5			Wt. of Hammer	No Recovery			
10			Wt. of Rods	No Recovery			
15							BASALT - Gray, medium hard, vesicular. Grading highly weathered from 15 feet. Begin NX coring from 14.5 feet. 37% Recovery from 14.5 to 19.5 feet. RQD = 10%
20							55% Recovery from 19.5 to 24.5 feet. RQD = 0%
25							50% Recovery from 24.5 to 29.5 feet. RQD = 0%
30							95% Recovery from 29.5 to 34.5 feet. RQD = 21%
35							100% Recovery from 34.5 to 39.5 feet. RQD = 61%
40							End boring at 39.5 feet.
45							
50							
55							
60							

BORING LOG

BORING NO. B15 DRIVING WT. 140 lb. DATE OF DRILLING 2-17-89
SURFACE ELEV. 8+ DROP 30 in. WATER LEVEL @ 6.5 ft.
W.O. 88-1693

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		SM	35/10"	79	21		Silty SAND - Tan, dense to medium hard, with coral fragments.
5			85	91	21		
		ML-OL	3	30	162		Clayey SILT - Mottled gray, moist, soft, organic.
10		SM	31	95	26		Silty SAND - Tan, Medium dense to dense, with coral fragments.
15			58	106	20		
20			64/10"	103	18		
							Grading hard from 24 feet.
25			40/5"	No Recovery			Begin NX coring from 24.5 feet. 50% Recovery from 24.5 to 29.5 feet. End NX coring at 29.5 feet.
30		ML	15	59	75		Sandy SILT - Mottled brown, firm, with gravels.
35			14	61	66		
40			50/4"	Tip Recovery			BASALT - Gray, medium hard to hard, vesicular. Begin NX coring from 39.5 feet. 100% Recovery from 39.5 to 44 feet. (RQD 64%)
45							100% Recovery from 44 to 49 feet. (RQD 86%)
50							100% Recovery from 49 to 54 feet. (RQD 84%)
55							96% Recovery from 54 to 59 feet. (RQD 26%) Grading to weathered basalt from 56 feet. End NX coring at 59 feet.
60			85/9"	No Recovery			

BORING LOG

BORING NO. B15 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 2-22-89
SURFACE ELEV. 8+ DROP 30 in. WATER LEVEL @ 6.5 ft.
W.O. 88-1693

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60			82	64	54		Grading dense to medium hard from 69 feet. Begin NX coring from 69 feet. 80% Recovery from 69 to 74 feet. (RQD 20%)
65							
70							14% Recovery from 74 to 77.5 feet. (RQD 8%)
75							
80							End boring at 77.5 feet.
85							
90							

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BORING LOGS

KAMEHAMEHA HIGHWAY - HELEMANO/WAIALUA JUNCTION TO HALEIWA BEACH PARK (ROADWAY)
PROJ. NO. 83A-01-98

SHEET No. 070 OF 85 SHEETS

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