



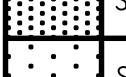




















FILE: \\FMC-FS\project\civil\1969 makaha bridges.dwg\construction dngs\Boring Log Legend.dwg saved July 22, 2020

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

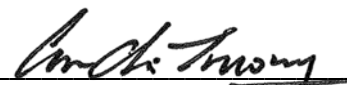
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size.)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines.)		GW Well graded gravels, gravel-sand mixtures, little or no fines.
				GP Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines.)		GM Silty gravels, gravel-sand-silt mixtures.
				GC Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size.)	CLEAN SANDS (Little or no fines.)		SW Well graded sands, gravelly sands, little or no fines.
				SP Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines.)		SM Silty sands, sand-silt mixtures.
				SC Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of the material is SMALLER than No. 200 sieve size.)	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.
	SILTS AND CLAYS (Liquid limit GREATER than 50.)			MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH Inorganic clays of high plasticity, fat clays.
				OH Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT Peat and other highly organic soils.
				FRESH TO MODERATELY WEATHERED BASALT
				VOLCANIC TUFF / HIGHLY TO COMPLETELY WEATHERED BASALT
				CORAL

SAMPLE DEFINITION		
 2" O.D. Standard Split Spoon Sampler	 Shelby Tube	 RQD Rock Quality Designation
 3" O.D. Split Tube Sampler	 NX / 4" Coring	 Water Level

W.O. 04-3925	Farrington Highway, Makaha Bridge No. 3 and No. 3A Replacement
Hirata & Associates, Inc.	<div>BORING LOG LEGEND</div> <div>Plate A3.1</div>

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-093-1(20)	2020	163	168



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

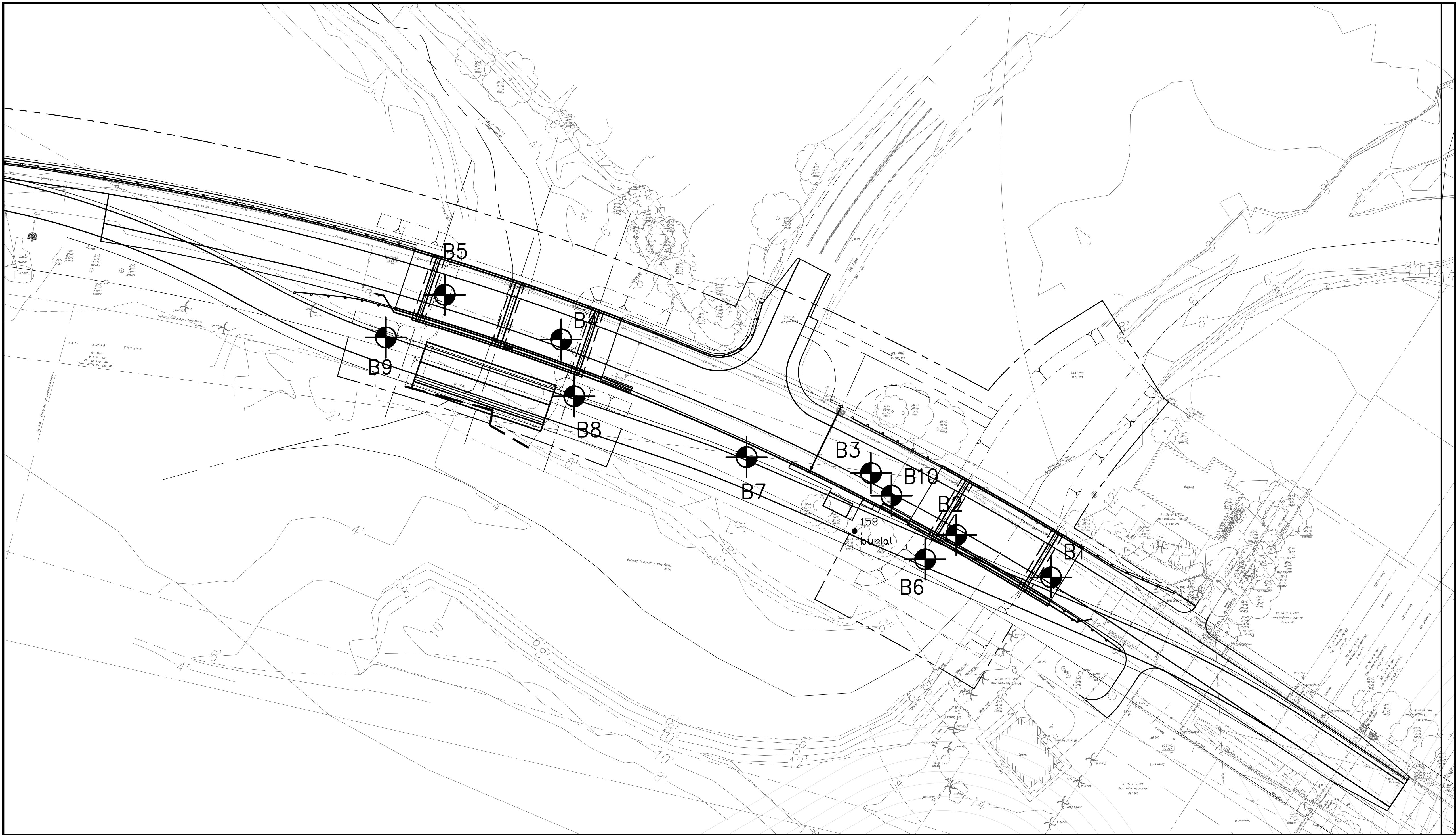
BORING LOG LEGEND

FARRINGTON HIGHWAY
Replacement of Makaha Bridge
No. 3 and Makaha Bridge 3A
F. A. Project No. BR-093-1(20)

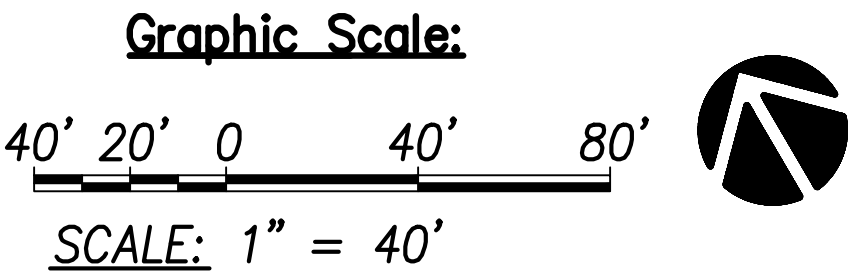
Scale: None Date: July 2020

SHEET No. C10.1 OF 168 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-093-1(20)	2020	164	168



Legend:
⊕ Approximate location of borings



CON C. TRUONG

LICENSED PROFESSIONAL ENGINEER

No. 9019-C

HAWAII, U.S.A.

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Con C. Truong

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN

FARRINGTON HIGHWAY
Replacement of Makaha Bridge
No. 3 and Makaha Bridge 3A
F. A. Project No. BR-093-1(20)

Scale: None Date: July 2020

SHEET No. C10.2 OF 168 SHEETS

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

FILE: \\RMC-FS\project\civil\19869 makaha bridges.dwg construction chgs\Boring Location Plan.dwg saved August 13, 2020

FILE: \\RMC-FS\Project\civil\1989 makaha bridges\dwg\construction\dwg\Boring Logs - 2.dwg saved July 22, 2020

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B3 DRIVING WT. 140 lb. START DATE 5/26/05
SURFACE ELEV. 13± DROP 30 in. END DATE 6/2/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			27	103	19	Clayey SILT (MH) – Dark brown, moist, stiff, with sand, gravel, and cobbles. Covered by 2 inches of asphaltic concrete over 2 inches of base material.
			33	95	21	
						Boulder at 4 feet.
5			52	99	10	Silty SAND (SM) – Mottled tan, slightly moist, medium dense to dense.
						Cobbles at 7 feet.
						CORAL – Mottled tan and gray, medium hard, fragmented.
			40/3"			
			20/No Penetration			
15						
			50/3"			(Begin wash-boring at 19 feet) Begin NX coring at 19 feet. 100% Recovery from 19 to 24 feet.
20						
						70% Recovery from 24 to 29 feet.
25						
30						Clayey SILT (MH) – Brown, stiff. Plate A4.8

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B4 DRIVING WT. 140 lb. START DATE 6/3/05
SURFACE ELEV. 12± DROP 30 in. END DATE 6/8/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			23	68	18	Clayey SILT (MH) – Brown, moist, stiff, with sand, gravel, and cobbles. Covered by 3 inches of asphaltic concrete over 6 inches of base material.
			5	86	28	Soft at 3 feet.
5			26	105	21	
			12	83	35	Boulder at 7 feet.
						Medium stiff from 9 feet.
15			45/6"	94	26	Silty SAND (SM) – Mottled gray, dense, slightly cemented. (Begin wash-boring at 14 feet.)
			30/2"			CORAL RUBBLESTONE – Mottled tan and gray, medium hard, with layers of cemented sand. Begin NX coring at 19 feet. 63% Recovery from 19 to 24 feet.
20						
						40% Recovery from 24 to 29 feet. Dense to very dense from 24 feet.
25						
30						Clayey SILT (MH) – Brown, stiff. Plate A4.11

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 5/26/05
SURFACE ELEV. 13± DROP 30 in. END DATE 6/2/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						95% Recovery from 29 to 34 feet.
						CORAL RUBBLESTONE – Mottled tan, medium hard, highly fragmented, with layers of cemented sand.
						45% Recovery from 34 to 39 feet.
35						Cemented sand at 36 to 39 feet.
						Medium dense from 38 feet. 0% Recovery from 39 to 44 feet.
40						
			30/2"			End NX coring at 44 feet. Dense to medium hard from 44 feet.
45			10/No Penetration			
			20/No Penetration			
50						
			20/No Penetration			
55						Begin NX coring at 54 feet. 50% Recovery from 54 to 59 feet.
60						Plate A4.9

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 6/3/05
SURFACE ELEV. 12± DROP 30 in. END DATE 6/8/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						40% Recovery from 29 to 34 feet.
						End NX coring at 34 feet. Medium stiff from 34 feet.
35			10	84	36	
			5	52	35	Soft at 39 feet.
40						
			25		20	Silty SAND (SM) – Mottled tan and gray, medium dense.
45						
			24	101	16	Dark gray clayey silt at 49 feet.
50						
			39	97	21	
55						Clayey SAND (SC) – Brown, medium dense, with weathered rock fragments.
			26	88	36	
60						Plate A4.12

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 5/26/05
SURFACE ELEV. 13± DROP 30 in. END DATE 6/2/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						50% Recovery from 59 to 64 feet.
			53/6"	124	13	End NX coring at 64 feet.
65						
			20/No Penetration			Begin NX coring at 69 feet. 38% Recovery from 69 to 74 feet.
70						
						End NX coring at 74 feet.
75						
			37	83	17	Medium dense at 79 feet.
80						
			20/No Penetration			End boring at 84 feet.
85						Groundwater at 10 feet on 6/2/05.
90						Plate A4.10

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 6/3/05
SURFACE ELEV. 12± DROP 30 in. END DATE 6/8/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						Begin NX coring at 61.5 feet. 20% Recovery from 61.5 to 64 feet. Brown clayey silt from 62 to 64 feet. End NX coring at 64 feet.
65			27	88	27	
			30	77	41	
70						
			47	66	59	Clayey SILT (MH) – Brown, stiff, with sand and weathered rock fragments.
75						
			63		35	
80						
			88	109	27	
85						End boring at 90.5 feet. Groundwater at 10.1 feet on 6/8/05.
			49	85	39	
90						Plate A4.13

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-093-1(20)	2020	166	168

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



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LICENSE EXPIRES 4/30/2022

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS – 2

FARRINGTON HIGHWAY
Replacement of Makaha Bridge
No. 3 and Makaha Bridge 3A
F. A. Project No. BR-093-1(20)

Scale: None Date: July 2020

SHEET No. C10.4 OF 168 SHEETS

FILE: \\FMC-FS\project\civil\19869 makaha bridges\dwg\construction dwgs\Boring Logs - 3.dwg saved July 22, 2020

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

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B5 DRIVING WT. 140 lb. START DATE 6/8/05
SURFACE ELEV. 12.5± DROP 30 in. END DATE 6/21/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			27	104	15	Clayey SILT (MH) - Brown, moist, stiff, with sand and gravel. Covered by 3 inches of asphaltic concrete over 13 inches of base material.
			10	88	32	Medium stiff from 3 feet.
5			12	96	21	Soft from 7 feet.
			3	86	37	(Begin wash-boring at 10 feet.)
15						CORAL RUBBLESTONE - Mottled tan and gray, medium hard.
			10/2"			
20						SAND (SP-SM) - Mottled gray, medium dense, with silt. Begin NX coring at 19 feet. 5% Recovery from 19 to 24 feet.
			12	96	28	End NX coring at 24 feet. Loose at 24 feet.
25						
			19		23	
30						

Plate A4.14

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B5 (continued) DRIVING WT. 140 lb. START DATE 6/8/05
SURFACE ELEV. 12.5± DROP 30 in. END DATE 6/21/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
90						
			20	61	68	Grading with gravel and cobbles from 96 feet.
95						
			40	98	23	Silty Coralline GRAVEL (GM) - Tan, medium dense to dense, with sand.
100						
			77	104	24	
105						End boring at 110.5 feet. Groundwater at 9.8 feet on 6/15/05.
110						
115						
120						

Plate A4.17

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B5 (continued) DRIVING WT. 140 lb. START DATE 6/8/05
SURFACE ELEV. 12.5± DROP 30 in. END DATE 6/21/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
			25	102	24	
35						
			7	79	40	Very loose, with coral fragments at 39 feet.
40						
			50/4"			CORAL RUBBLESTONE - Mottled tan and gray, dense to medium hard, with layers of cemented sand. Begin NX coring at 46 feet. 93% Recovery from 46 to 51 feet.
45						
						46% Recovery from 51 to 55 feet.
50						
						71% Recovery from 55 to 59 feet.
55						
			41	96	23	
60						

Plate A4.15

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B6 DRIVING WT. 140 lb. START DATE 6/22/05
SURFACE ELEV. 11± DROP 30 in. END DATE 6/23/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			26	92	13	Silty SAND (SM) - Brown, moist, medium dense, with clayey silt.
			25/9"	71	13	Cobbles at 2.5 to 3.5 feet.
5			10/No Penetration		8	(Begin wash-boring at 8 feet)
			16	123		
10			10/No Penetration			CORAL RUBBLESTONE - Mottled tan, slightly moist, dense to very dense.
			14	95	24	Silty SAND (SM) - Mottled gray, medium dense, with gravel and coral fragments. Begin NX coring at 9 feet. 10% Recovery from 9 to 14 feet.
15						End NX coring at 14 feet. Loose at 14 feet.
			12	78	32	Silty Coralline GRAVEL (GM) - Tan, loose to medium dense, with sand.
20						Brown clayey silt pocket at 19.5 feet.
			17	79	39	
25						End boring at 25.5 feet. Groundwater at 9.8 feet on 6/23/05.
30						

Plate A4.18

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B5 (continued) DRIVING WT. 140 lb. START DATE 6/8/05
SURFACE ELEV. 12.5± DROP 30 in. END DATE 6/21/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						Silty SAND (SM) - Mottled tan and gray, medium dense, with coral fragments.
			29	85	35	Clayey SILT (MH) - Brown, stiff, with sand and gravel.
65						
			56/6"	No Recovery		
70						
			31	79	39	Silty Coralline GRAVEL (GM) - Tan, medium dense, with sand.
75						
			15	75	48	Loose from 79 feet.
80						
			Weight of the rods	68	48	Clayey SILT (MH) - Brown, medium stiff. Very soft at 84 feet.
85						
			24	68	58	Medium stiff at 89 feet.
90						

Plate A4.16

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B7 DRIVING WT. 140 lb. START DATE 6/14/05
SURFACE ELEV. 11± DROP 30 in. END DATE 6/14/05

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			23	79	4	SAND (SP) - Mottled brown, slightly moist, loose to medium dense, with coral fragments.
			18		3	
5			23	101	4	
			45/6"	112	5	CORAL RUBBLESTONE - Mottled tan, slightly moist, dense to medium hard, with layers of cemented sand.
10			10/No Penetration			
			88	110	15	Cemented sand at 19 feet.
15						
			114	119	14	
20						End boring at 25 feet. Groundwater at 11.6 feet on 6/14/05.
25						
30						

Plate A4.19



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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-093-1(20)	2020	167	168

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 3

FARRINGTON HIGHWAY

Replacement of Makaha Bridge

No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: None Date: July 2020

SHEET No. C10.5 OF 168 SHEETS

FILE: \\FMC-FS\project\civil\1989 makaha bridges\dwg\construction chgs\Boring Logs - 4.dwg saved July 22, 2020

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

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B8 DRIVING WT. 140 lb. START DATE 6/22/05
SURFACE ELEV. 10± DROP 30 in. END DATE 6/23/05

DEPTH H 0	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						SAND (SP) – Tannish brown, slightly moist, medium dense, with silt, cobbles, and boulders. Cobbles and boulders from 1 to 3 feet.
5			28	87	11	(Begin wash boring at 5 feet.)
10			27	96	22	Silty SAND (SM) – Mottled gray, medium dense, with gravel.
15			10/No Penetration			CORAL RUBBLESTONE – Mottled tan, medium hard to hard, fragmented, with layers of cemented sand. Begin NX coring at 14 feet. 100% Recovery from 14 to 19 feet.
20						65% Recovery from 19 to 24 feet.
25						End boring at 24 feet. Groundwater at 8 feet on 6/23/05.
30						Plate A4.20

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 04-3925

BORING NO. B9 DRIVING WT. 140 lb. START DATE 6/21/05
SURFACE ELEV. 11± DROP 30 in. END DATE 6/21/05

DEPTH H 0	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Silty SAND (SM) – Mottled tan, slightly moist, medium dense, with cobbles and boulders. Boulder at 1 to 3 feet.
5			32	79	10	
10			13	102	2	Decrease in silt content, loose at 5 feet. (Begin wash-boring at 7 feet.)
15			15/6" 50/5"	111	18	CORAL RUBBLESTONE – Mottled tan, medium hard to hard, fragmented, with layers of cemented sand. Begin NX coring at 14 feet. 100% Recovery from 14 to 17 feet. 50% Recovery from 17 to 22 feet.
20			11	79	42	Silty SAND (SM) – Dark gray, loose.
25						End boring at 23.5 feet. Groundwater at 8.8 feet on 6/21/05.
30						Plate A4.21

HIRATA & ASSOCIATES, INC.

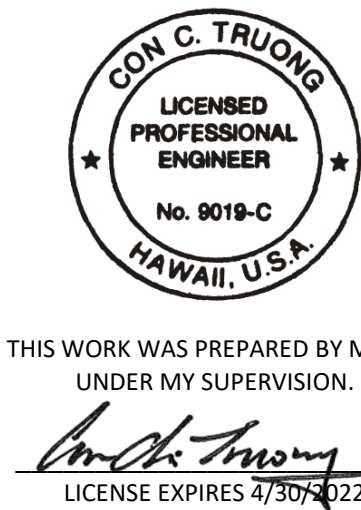
BORING LOG

W.O. 04-3925

BORING NO. B10 DRIVING WT. 140 lb. START DATE 6/22/05
SURFACE ELEV. 12± DROP 30 in. END DATE 6/23/05

DEPTH H 0	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0			42	96	24	Clayey SILT (MH) – Brown, moist, stiff, with sand and gravel.
5			78	90	13	Increase in sand content at 3 feet.
10			67	117	2	SAND (SP) – Tan, slightly moist, dense, with coral fragments. Cobbles from 6 to 8 feet.
15						CORAL – Tan, medium hard to hard, fragmented. Begin NX coring at 9 feet. 88% Recovery from 9 to 14 feet.
20						97% Recovery from 14 to 19 feet.
25						92% Recovery from 19 to 24 feet.
30						End boring at 24 feet. Groundwater at 10.1 feet on 6/23/05.
						Plate A4.22

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-093-1(20)	2020	168	168



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LICENSE EXPIRES 4/30/2022

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS – 4

FARRINGTON HIGHWAY
Replacement of Makaha Bridge
No. 3 and Makaha Bridge 3A
F. A. Project No. BR-093-1(20)

Scale: None Date: July 2020

SHEET No. C10.6 OF 168 SHEETS