FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(35)R	2006	75	79

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 1 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 232' +- Field Engineer: PB/TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-5-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			54	1		Reddish Brown Silty GRAVEL (GM), dense, dry
						(ASH/CLINKER)
			14	2		Gray Silty GRAVEL (GM), loose, dry
						(WEATHERED CLINKER)
			R	3		
			64%REC 58%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
Gradation: Gravel=37% Sand=57% Silt/Clay=6%			20	4		Gray Well-Graded SAND (SW-SM) with Gravel and Silt, medium dense
			50/3"R	5		
			13%REC 0%RQD	NX CORE		At 15.0', grades with Highly Weathered Boulder
			31	6		
			R	7		
			100%REC 100%RQD	NX CORE		Gray Fresh Highly Vesicular BASALT (F), hard, massive
			52%REC 33%RQD	NX CORE		Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken

Figure 3 a

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 1 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 232' +- Field Engineer: PB/TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-5-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			100%REC 50%RQD	NX CORE		Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken At 37.5', grades to occasionally broken
			100%REC 58%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			73%REC 22%RQD	NX CORE		
			80%REC 27%RQD	NX CORE		Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken
						Brownish Gray Silty Gravel-Sized BASALT FRAGMENTS (GM), dense
						(Aa CLINKER)
			98%REC 53%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			100%REC 83%RQD	NX CORE		At 59.0', grades to Fresh
						BOH @ 63.5'

Figure 3 b

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 2 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 226' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-12-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=62, PI=24 Gradation: Gravel=3% Sand=38% Silt/Clay=59%			100/10"	1		Reddish Brown Sandy SILT (MH) with trace Gravel, hard, dry
						(RESIDUAL)
			94%REC 94%RQD	HQ CORE		Gray Slightly Weathered BASALT (WS), hard, occasionally broken to massive
			72%REC 61%RQD	HQ CORE		Gray Moderately Weathered BASALT (WM), hard, broken
			R	2		
			63%REC 40%RQD	HQ CORE		Gray Moderately Weathered Highly Vesicular BASALT (WM), hard, occasionally broken
			96%REC 31%RQD	HQ CORE		Grayish Brown Highly Weathered Vesicular BASALT (WH), medium hard, very broken
			83%REC 0%RQD	HQ CORE		Brown Highly to Completely Weathered BASALT (WH-WC), soft, very broken
			67%REC 0%RQD	HQ CORE		Reddish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken
			67%REC 7%RQD	HQ CORE		At 26.0', grades to Gray
			86%RQD 20%RQD	HQ CORE		At 33.0', grades to Reddish Gray

Figure 4 a

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 2 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 226' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-12-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			78%REC 0%RQD	HQ CORE		At 40.0', grades to Brownish Gray
			97%REC 55%RQD	HQ CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			100%REC 55%RQD	HQ CORE		
			96%REC 0%RQD	HQ CORE		Reddish Gray Silty Gravel-Sized BASALT FRAGMENTS (GM), dense
						(Aa CLINKER)
			100%REC 55%RQD	HQ CORE		Gray Fresh Vesicular BASALT (F), hard, occasionally broken
			91%REC 19%RQD	HQ CORE		
						BOH @ 64.5'

Figure 4 b

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 3 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 219' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-4-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			50/5"	1		Reddish Brown Silty CLAY (CL) with Gravel, Weathered Boulders and trace Sand, hard, dry
LL=28, PI=8			R	2		(COLLUVIAL)
Gradation: Gravel=21% Sand=74% Silt/Clay=4%	9		14	3		Orange/Black Well Graded Basalt SAND (SW-SM) with Gravel and Silt, medium dense, dry
			R	4		(CINDERS) Reddish Brown Clayey SILT (ML), hard, dry
Non-Plastic	16	79	5 57	5 6		At 14.0', grades to Orangish Brown
						(RESIDUAL)
			66	7		Brown Clayey SILT (MH) with remnant rock structure, hard, dry
						(SAPROLITE)
			R	8		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			95%REC 79%RQD	NX CORE		
			92%REC 72%RQD	NX CORE		Moderately Weathered Vesicular BASALT (WS), hard, occasionally broken Gray Slightly Weathered BASALT (WS), hard, occasionally broken
			44%REC 15%RQD	NX CORE		Grayish Red Highly Weathered Vesicular BASALT (WH), moderately hard, broken

Figure 5 a

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 3 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 219' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-4-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			R 98%REC 90%RQD	9 NX CORE		Gray Slightly Weathered BASALT (WS), hard, massive
			70%REC 53%RQD	NX CORE		Reddish Gray Moderately Weathered Highly Vesicular BASALT (WM), moderately hard, broken
			62%REC 37%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
						Reddish Gray Gravel-Sized BASALT FRAGMENTS (GM), dense
			50%REC 0%RQD	NX CORE		
						(Aa CLINKER)
			100%REC 80%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), very hard, massive
			85%REC 17%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			100%REC 93%RQD	NX CORE		At 57.5', grades to occasionally broken
			100%REC 91%RQD	NX CORE		
			100%REC 26%RQD	NX CORE		
			68%REC 29%RQD	NX CORE		

Figure 5 b

F.C.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 3 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 219' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-4-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			31%REC 0%RQD	NX CORE		Reddish Gray Moderately Weathered Gravel-Sized BASALT FRAGMENTS (GM) with Silt, dense
						(Aa CLINKER)
			98%REC 50%RQD	NX CORE		Gray Slightly Vesicular BASALT (WS), hard, massive
			18%REC 0%RQD	NX CORE		Reddish Gray Gravel-Sized BASALT FRAGMENTS (GM) with Silt, dense
						(Aa CLINKER)
						BOH @ 84.5'

Figure 5 c

BORING LOG NOTES:

1. BORING LOGS FOR THE HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A, FUTURE KEAWE STREET EXTENSION TO LAHAINALUNA ROAD, DATE NOVEMBER 22, 2004, WERE PREPARED BY FEWELL GEOTECHNICAL ENGINEERING, LTD. THE BORING LOGS REPRESENT THE APPROXIMATE SUBSURFACE SOIL CONDITIONS ENCOUNTERED ONLY AT THOSE TIMES AND LOCATIONS WHERE BORINGS WERE MADE AND MAY NOT REPRESENT CONDITIONS AT OTHER TIMES AND LOCATIONS. SEE BORING LOCATION PLAN.
2. THE BORING LOGS ARE PROVIDED FOR CONTRACTOR'S CONVENIENCE AND INFORMATION. THE CONTRACTOR AND THE CONTRACTOR'S GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR INTERPRETATION AND USE OF THE BORING LOGS.
3. HDOT MAKES NO GUARANTEE THAT THE BORING LOGS REPRESENT THE ACTUAL FIELD CONDITIONS TO BE ENCOUNTERED.

TIMOTHY J. CAVANAUGH
LICENSED PROFESSIONAL ENGINEER
No. 6919-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Signature
EXPIRATION DATE OF LICENSE: APRIL 30, 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A
Future Keawe Street Extension to Lahainaluna Road
Federal Aid Project No. NH-030-1(35)R

Scale: As Noted Date: April 2006

SHEET No. 2 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(35)R	2006	76	79

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 4 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 186' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-13-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			59	1		Gray Poorly-Graded SAND (SP) with Gravel and trace Silt, dense, dry (FILL)
			R 81%REC 29%RQD	2 HQ CORE	5	Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			92%REC 65%RQD	HQ CORE		At 7.0', grades to occasionally broken
					10	Reddish Gray Moderately Weathered Vesicular BASALT (WM), hard, very broken
			100%REC 73%RQD	HQ CORE		Reddish Gray Moderately Weathered Vesicular BASALT (WM), medium hard, occasionally broken
			100%REC 60%RQD	HQ CORE	15	At 19.0', grades to hard
			42%REC 30%RQD	HQ CORE	20	Reddish Gray Moderately Weathered Vesicular BASALT (WM), hard, very broken
			100%REC 68%RQD	HQ CORE	25	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			87%REC 75%RQD	HQ CORE	30	Reddish Brown Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense

Figure 6 a

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 4 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 186' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-13-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
						(Aa CLINKER)
			100%REC 93%RQD	HQ CORE	40	Gray Slightly Weathered Highly Vesicular BASALT (WS), hard, occasionally broken At 39.0', grades to Vesicular
			46%REC 0%RQD	HQ CORE		Brown Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
					45	(Aa CLINKER)
			100%REC 78%RQD	HQ CORE		Gray Slightly Weathered Highly Vesicular BASALT (WS), hard, occasionally broken At 48.0', grades to Vesicular
			71%REC 64%RQD	HQ CORE	50	Brownish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
					55	(Aa CLINKER) Gray Fresh Vesicular BASALT (F), hard, occasionally broken
					60	BOH @ 57.0'
					65	
					70	

Figure 6 b

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 5 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 182' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-29-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=40, PI=15			50/5"	1	2	Reddish Brown Clayey SILT (ML-CL) with Cobbles, hard, dry (COLLUVIAL)
			49%REC 33%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			77%REC 58%RQD	NX CORE	5	Gray Moderately Weathered Vesicular BASALT (WM), hard, broken Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			62%REC 50%RQD	NX CORE		Highly Weathered Vesicular BASALT (WH), moderately hard, very broken Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			50%REC 7%RQD	NX CORE	10	Reddish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense (Aa CLINKER) Gray Slightly Weathered Vesicular BASALT (WM), hard, broken
			50/4"	2	15	Gray Moderately Weathered Vesicular BASALT (WM), hard, broken Reddish Gray Gravel-Sized BASALT FRAGMENTS (GM), dense (Aa CLINKER)
			72%REC 30%RQD	NX CORE		Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard, occasionally broken
			38%REC 15%RQD	NX CORE	20	Gray Slightly to Moderately Weathered Vesicular BASALT (WS-WM), moderately hard, broken
			89%REC 74%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
			73%REC 27%RQD	NX CORE	25	Gray Moderately Weathered Highly Vesicular BASALT (WM), moderately hard, broken Gray Highly Weathered BASALT (WH), moderately hard, very broken
					30	Gray Slightly Weathered Vesicular BASALT

Figure 7 a

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 5 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 182' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-29-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			56%REC 10%RQD	NX CORE	40	(WS), hard, occasionally broken Reddish Gray Completely Weathered BASALT (WC), soft, very broken
			100%REC 90%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
			100%REC 61%RQD	NX CORE	45	
					50	BOH @ 44.5'
					55	
					60	
					65	
					70	

Figure 7 b

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 6 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 182' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-15-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			87%REC 27%RQD	HQ CORE		Reddish Brown Clayey SILT (MH), very stiff, dry (FILL)
					5	Gray Slightly Weathered Vesicular BASALT (WS), medium hard, occasionally broken Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
			62%REC 32%RQD	HQ CORE		(Aa CLINKER)
					10	Gray Slightly Weathered Vesicular BASALT (WS), hard, massive Brownish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
			72%REC 43%RQD	HQ CORE		(Aa CLINKER) Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
					15	Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken
			87%REC 40%RQD	HQ CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
					20	At 19.5', grades to broken
			53%REC 13%RQD	HQ CORE		Gray Gravel-Sized BASALT FRAGMENTS (GM), dense
					25	(Aa CLINKER) Gray Slightly Weathered Vesicular BASALT (WS), hard, broken to occasionally broken
			83%REC 30%RQD	HQ CORE		
			89%REC 22%RQD	HQ CORE	30	
						Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken
			72%REC 30%RQD	HQ CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
					35	Brownish Gray Moderately Weathered

Figure 8 a

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 6 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 182' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-15-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
						Vesicular BASALT (WM), medium hard, occasionally broken
			60%REC 33%RQD	HQ CORE	40	Gray Slightly Weathered Vesicular BASALT (WS), hard, broken At 39.0', grades to occasionally broken
						At 41.0', grades to massive
			100%REC 60%RQD	HQ CORE	45	At 43.5', grades to occasionally broken
					50	BOH @ 47.0'
					55	
					60	
					65	
					70	

Figure 8 b

F.G.E. Ltd.
96-1416 Wahiawa Place
Pearl City, Hawaii

Boring: 7 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 218' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-23-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
	8		50/4"	1		Reddish Brown Clayey SILT (MH) with Gravel, hard, dry (COLLUVIAL)
			50/2" 83%REC 22%RQD	2 NX CORE	5	Gray Completely Weathered Vesicular BASALT (WC), soft, very broken Gray Moderately Weathered Vesicular BASALT (WM), moderately hard, occasionally broken
			77%REC 0%RQD	NX CORE		Gray Highly Weathered Vesicular Gravel and Cobble-Sized BASALT FRAGMENTS (GM), dense
			36%REC 30%RQD	NX CORE	10	(WEATHERED CLINKER) Gray Moderately Weathered Vesicular Basalt (WM), hard, occasionally broken
LL=47, PI=12			50/3"	3		Grayish Brown SILT (ML) with Gravel, hard, moist, remnant rock structure (SAPROLITE)
			60%REC 0%RQD	NX CORE	15	Gray Moderately Weathered Vesicular Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
			72%REC 13%RQD	NX CORE		(WEATHERED CLINKER)
			100%REC 92%RQD	NX CORE	20	Reddish Brown SILT (ML) with remnant rock structure, hard, damp
			39%REC 0%RQD	NX CORE		(SAPROLITE)
			50/5"	4	25	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			100%REC 84%RQD	NX CORE		
			100%REC 69%RQD	NX CORE	30	

Figure 9 a

MAJOR ROCK TYPES

- BASALT
- WEATHERED CLINKER
- DECOMPOSED ROCK
- CORAL

MAJOR SOIL TYPES

- GRAVEL
- SAND
- SILT
- CLAY
- PEAT/ORGANICS

SECONDARY CLASSIFICATION

- GRAVELLY
- SANDY
- SILTY
- CLAYEY

SAMPLING SYMBOLS

- 3" O.D. RELATIVELY UNDISTURBED SAMPLE
- 3" O.D. DISTURBED SAMPLE
- 2" O.D. STANDARD PENETRATION SAMPLE
- NO RECOVERY
- SHELBY TUBE
- BAG SAMPLE
- CORE

F.G.E. Ltd.

BORING LOG LEGEND
Honapiilani Realignment Phase 1A
Lahaina, Maui, Hawaii

FILE: 2490.01
June 2006

Figure 20

TIMOTHY J. CAVANAUGH
LICENSED PROFESSIONAL ENGINEER
No. 8819-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature

EXPIRATION DATE OF LICENSE: APRIL 30, 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A
Future Keawe Street Extension to Lahainaluna Road
Federal Aid Project No. NH-030-1(35)R

Scale: As Noted Date: April 2006

SHEET No. 3 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(35)R	2006	77	79

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 7 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 218' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-23-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			27%REC 6%RQD	NX CORE	40	Gray/Red Silty Basalt SAND (SM) with Gravel, very dense, moist
			66	NX CORE		(WEATHERED CLINKER)
			56%REC 9%RQD	NX CORE		Gray Moderately Weathered Vesicular BASALT (WM), moderately hard, broken
					45	Gray Highly Weathered Vesicular Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
						(WEATHERED CLINKER)
			50%REC 0%RQD	NX CORE		Gray Moderately Weathered Vesicular BASALT (WM), hard, broken
			67%REC 13%RQD	NX CORE		Gray Highly Weathered Vesicular BASALT (WH), medium hard, very broken
			100%REC 46%RQD	NX CORE	50	Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			46%REC 16%RQD	NX CORE		
			58%REC 0%RQD	NX CORE	55	
			100%REC 0%RQD	NX CORE		
			100%REC 9%RQD	NX CORE		
			57%REC 0%RQD	NX CORE	60	Reddish Gray Highly Weathered Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
			62%REC 47%RQD	NX CORE		
						(WEATHERED CLINKER)
			58%REC 30%RQD	NX CORE	65	Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
					70	Reddish Gray GRAVEL and Cobble-Sized Vesicular BASALT FRAGMENTS (GW),

Figure 9 b

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 7 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 218' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-23-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
					75	very dense
						(Aa CLINKER)
					80	BOH @ 70.0'
					85	
					90	
					95	
					100	
					105	

Figure 9 c

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 8 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 216' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			R	1	0	Reddish Brown Clayey SILT (MH) with Gravel, hard, dry
			48%REC 38%RQD	NX CORE		(COLLUVIAL)
					5	Gray Completely Weathered Vesicular BASALT (WC), soft, broken
						Gray Slightly Weathered Vesicular BASALT (WC), hard, occasionally broken
			R	2		At 4.0', grades to broken
			62%REC 17%RQD	NX CORE		Reddish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
					10	(Aa CLINKER)
			60%REC 24%RQD	NX CORE		Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
						Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
			28%REC 14%RQD	NX CORE	15	
						(Aa CLINKER)
						Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
						At 18.0', grades to very broken
			R	3	20	
			97%REC 95%RQD	NX CORE		At 20.0', grades to massive
			72%REC 20%RQD	NX CORE	25	At 25.0', grades to occasionally broken
						Grayish Red Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
						(Aa CLINKER)
			97%REC 87%RQD	NX CORE	30	Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
						At 29.5', grades to massive
					35	

Figure 10 a

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 8 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 216' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			95%REC 25%RQD	NX CORE	0	Reddish Gray Highly Weathered Vesicular BASALT (WH), moderately hard, broken
			100%REC 48%RQD	NX CORE	40	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
						Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM), dense
						(Aa CLINKER)
			98%REC 77%RQD	NX CORE	45	Gray Slightly Weathered Vesicular BASALT (WS), moderately hard, broken to occasionally broken
						Brown Completely Weathered Vesicular BASALT (WC), soft, broken
						Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			100%REC 72%RQD	NX CORE	50	At 48.0', grades to massive
						At 52.5', grades to broken
						At 53.5', grades to massive
			98%REC 30%RQD	NX CORE	55	
						At 55.5', grades to occasionally broken
			40%REC 0%RQD	NX CORE	60	Reddish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW-GM) with Silt, medium dense
			24	4	65	(CLINKER)
			87%REC 24%RQD	NX CORE		Gray Highly Weathered Vesicular BASALT (WH), moderately hard, broken
					70	Gray Moderately Weathered Vesicular

Figure 10 b

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 8 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 216' +- Field Engineer: CER
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
					70	BASALT (WM), hard, occasionally broken
						BOH @ 70.5'
					75	
					80	
					85	
					90	
					95	
					100	
					105	

Figure 10 c

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 9 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 218' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-29-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=44, PI=21	20	107	31	1	0	Reddish Brown Silty CLAY (CL) with Basalt Gravel, very hard, moist
						(FILL)
Gradation: Gravel=4% Sand=94% Silt/Clay=2%	5		19	2	5	Tan SAND (SP), loose, moist
	24	94	14	3		(FILL)
Direct Shear: C=390psf Ø=31° Swell=0%	35	88	11	4	10	Reddish Brown Clayey SILT (ML-MH), stiff, moist
				5		Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard
			42%REC 25%RQD	HQ CORE	15	(POSSIBLE BOULDER)
LL=65, PI=31			51	6		Gray Silty SAND (SM), dense, moist
					20	
	51		25	7		
Gradation: Gravel=0% Sand=74% Silt/Clay=26%	48		44	8	25	
	47		30	9		
	39		31	10	30	(WEATHERED CINDERS)
			35	11		BOH @ 30.0'
					35	

Figure 11

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 10 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 235' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-30-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=45, PI=7	28		57/6"	1	0	3" Concrete Slab on Surface Brown Sandy SILT (ML) with Gravel, very hard, damp
	5					(FILL)
Gradation: Gravel=3% Sand=85% Silt/Clay=12%			R	2	5	Gray Coral SAND (SM) with trace Gravel, very dense, damp
			R	3		(FILL)
			R	4		Gray Slightly Weathered Slightly Vesicular (WS), hard to very hard, massive
			83%REC 83%RQD	HQ CORE	10	
			98%REC 73%RQD	HQ CORE		
			67%REC 47%RQD	HQ CORE		Brownish Gray Gravel-Sized BASALT FRAGMENTS (WS), medium dense
					15	(Aa CLINKER)
						Gray Slightly Weathered Vesicular BASALT (WS), very hard, occasionally broken
			75%REC 60%RQD	HQ CORE		Brownish Gray Gravel-Sized BASALT FRAGMENTS (WS), dense
					20	(Aa CLINKER)
						Gray Slightly Weathered Moderately Vesicular BASALT (WS), very hard, occasionally broken
			95%REC 83%RQD	HQ CORE		
					25	
			60%REC 43%RQD	HQ CORE		
					30	Brownish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GM), medium dense
			67%REC 40%RQD	HQ CORE		(Aa CLINKER)
					35	

Figure 12 a

P.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 10 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 235' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-30-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			100%REC 92%RQD	HQ CORE	40	Gray Slightly Weathered Slightly to Moderately Vesicular BASALT (WS), very hard, occasionally broken
			90%REC 86%RQD	HQ CORE	45	Gray Slightly Weathered Slightly Vesicular BASALT (WS), very hard, massive
						BOH @ 47.0'
					50	
					55	
					60	
					65	
					70	

Figure 12 b

TIMOTHY J. CAVANAUGH
LICENSED PROFESSIONAL ENGINEER
No. 8310-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature

EXPIRATION DATE OF LICENSE: APRIL 30, 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A
Future Keawe Street Extension to Lahainaluna Road
Federal Aid Project No. NH-030-1(35)R

Scale: As Noted Date: April 2006

SHEET No. 4 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(35)R	2006	78	79

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 11 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 222' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-28-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=110, PI=72 Gradation: Gravel=9% Sand=81% Silt/Clay=10%	30 28	78	35 32 R 91%REC 80%RQD 98%REC 90%RQD 100%REC 100%RQD 33%REC 23%RQD 23%REC 1%RQD 93%REC 61%RQD 100%REC 100%RQD	1 2 3 HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE	0 5 10 15 20 25 30 35	Reddish Brown Silty CLAY (CH) with Basalt Gravel and Cobbles, very stiff, moist (FILL) Reddish Gray Silty SAND (SW-SM) with Gravel, very dense, dry (WEATHERED CLINKER) Gray Slightly Weathered Slightly to Moderately Vesicular BASALT (WS), hard to very hard, massive Grayish Brown Moderately Weathered Gravel- and Cobble-Sized BASALT FRAGMENTS (GW), loose to medium dense (As CLINKER) Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard to very hard, occasionally broken At 32.0', grades to massive

Figure 13 a

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 11 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 222' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-28-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			85%REC 67%RQD	HQ CORE	40 45 50 55 60 65 70	Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard to very hard, occasionally broken Brownish Gray Gravel-Sized BASALT FRAGMENTS (GM), loose (As CLINKER) BOH @ 40.0'

Figure 13 b

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 12 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 234' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-1-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			50/3" 100/5" R 67%REC 0%RQD 61%REC 0%RQD 11%REC 0%RQD 0%REC 0%RQD 0%REC 100%RQD 100%REC 100%RQD 100%REC 67%RQD 58%REC 33%RQD 100%REC 48%RQD	1 2 3 HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE	0 5 10 15 20 25 30 35	Light Brown Silty SAND (SM), loose, dry (FILL) Gray Highly Weathered Vesicular BASALT (WH), soft Gray Slightly Weathered Vesicular BASALT (WS), hard, broken Brownish Gray Slightly Weathered Vesicular BASALT (WS), medium hard, very broken Gray Gravel-Sized Vesicular BASALT FRAGMENTS (GM), medium dense (As CLINKER) Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken Reddish Gray Gravel and Cobble-Sized Vesicular BASALT FRAGMENTS (GM), medium dense (As CLINKER) Dark Reddish Gray Moderately Weathered Vesicular BASALT (WM), hard, occasionally broken Gray Moderately Weathered Vesicular

Figure 14 a

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 12 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 234' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-1-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			95%REC 55%RQD 100%REC 60%RQD 96%REC 31%RQD	HQ CORE HQ CORE HQ CORE	40 45 50 55 60 65 70	BASALT (WM), hard, broken Gray Fresh Vesicular BASALT (F), hard, massive Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken Reddish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken BOH @ 50.0'

Figure 14 b

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 13 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 224' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=41, PI=17	18 19 9	92 95 113	77 37 62 R 56%REC 56%RQD 78%REC 78%RQD 82%REC 45%RQD 80%REC 32%RQD 60%REC 20%RQD 81%REC 64%RQD	1 2 3 4 HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE HQ CORE	0 5 10 15 20 25 30 35	Reddish Brown Silty CLAY (CL) with Gravel, hard, damp (FILL) Gray/Red Silty GRAVEL (GM), dense, damp (FILL) Gray Slightly Weathered Moderately Vesicular BASALT (WS), hard, occasionally broken to massive Gray Gravel-Sized BASALT FRAGMENTS (GM), dense (As CLINKER) Gray Slightly Weathered Moderately Vesicular BASALT (WS), hard, massive Brown/Gray Silty Gravel-Sized BASALT FRAGMENTS (GM), loose, dry (As CLINKER) Gray Slightly to Moderately Weathered Vesicular BASALT (WS-WM), hard, occasionally broken At 24.5' to 25.5', grades with Clinker pocket At 28.0' to 29.0', grades with Clinker pocket Gray Silty Gravel-Sized BASALT FRAGMENTS (GM), dense (As CLINKER)

Figure 15 a

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 13 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 224' +- Field Engineer: TSK
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 12-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			72%REC 36%RQD 17%REC 0%RQD 75%REC 65%RQD	HQ CORE HQ CORE HQ CORE	40 45 50 55 60 65 70	Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard, massive At 37.5', grades to occasionally broken Brownish Gray Gravel-Sized BASALT FRAGMENTS (GM), medium dense to dense (As CLINKER) Gray Slightly to Moderately Weathered Slightly Vesicular BASALT (WS-WM), hard, occasionally broken BOH @ 52.0'

Figure 15 b

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 14 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 232' +- Field Engineer: EDM
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-9-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
LL=49, PI=25 Gradation: Gravel=26% Sand=66% Silt/Clay=8%	11	110	100/10" 41 100/9" R 100%REC 73%RQD 92%REC 77%RQD 58%REC 13%RQD 50/8" Gradation: Gravel=28% Sand=63% Silt/Clay=9% 75%REC 23%RQD 100%REC 95%RQD	1 2 3 4 NX CORE NX CORE NX CORE 5 NX CORE NX CORE	0 5 10 15 20 25 30 35	Brown Silty CLAY (CL) with gravel, hard, dry (FILL) Brown Highly Weathered Vesicular BASALT (WH), soft (breaks down in sampler to silty sand with gravel) Gray Slightly Weathered Moderately Vesicular BASALT (WS), occasionally broken, hard At 15.0', grades to massive Gray Moderately to Highly Weathered Slightly Vesicular BASALT (WM-WH), medium hard, very broken Brown Silty SAND (SM) with gravel, dense (WEATHERED CLINKER) Gray Slightly Weathered Slightly Vesicular BASALT (WS), occasionally broken, hard

Figure 16 a

F.C.E. Ltd.
96-1416 Wahona Place
Pearl City, Hawaii

Boring: 14 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 232' +- Field Engineer: EDM
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 9-9-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			93%REC 68%RQD 68%REC 37%RQD 100%REC 0%RQD 100%REC 83%RQD 85%REC 75%RQD 76%REC 0%RQD	NX CORE NX CORE NX CORE NX CORE NX CORE NX CORE	40 45 50 55 60 65 70	Gray Slightly Weathered Slightly Vesicular BASALT (WS), occasionally broken, hard At 37.5', grades to very hard and massive Reddish Brown Moderately Weathered (WM), medium hard, occasionally broken Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard, broken At 47.5' grades to massive Gray Moderately Weathered Moderately Vesicular BASALT (WM), hard, very broken BOH @ 58.5'

Figure 16 b

TIMOTHY J. CAVANAUGH
LICENSED PROFESSIONAL ENGINEER
No. 6916-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature

EXPIRATION DATE OF LICENSE: APRIL 30, 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A
Future Keawe Street Extension
to Lahainaluna Road
Federal Aid Project No. NH-030-1(35)R

Scale: As Noted Date: April 2006

SHEET No. 5 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-030-1(35)R	2006	79	79

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 15 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 234' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 11-9-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			77/8"	1	0	Brown SILT (ML) with Sand, hard, dry (RESIDUAL)
			100%REC 70%RQD	HQ CORE	5	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			80%REC 60%RQD	HQ CORE	10	Reddish Brown Gravel-Sized BASALT FRAGMENTS (GM), dense (Aa CLINKER)
			90%REC 77%RQD	HQ CORE	15	Gray Slightly Weathered Vesicular BASALT (WS), hard, massive; At 13.0', grades to occasionally broken; At 14.5', grades to massive
			100%REC 70%RQD	HQ CORE	20	At 16.5', grades to occasionally broken; Reddish Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			87%REC 33%RQD	HQ CORE	25	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken; Reddish Gray Slightly Weathered Vesicular BASALT (WS), hard, broken
			100%REC 75%RQD	HQ CORE	30	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken to massive
			77%REC 43%RQD	HQ CORE	35	Reddish Brown Gravel and Cobble-Sized BASALT FRAGMENTS (GM), dense (Aa CLINKER)

Figure 17 a

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 15 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 234' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 11-9-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			77%REC 37%RQD	HQ CORE	40	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			73%REC 63%RQD	HQ CORE	45	Reddish Gray Moderately Weathered BASALT (WM), hard, very broken
			67%REC 35%RQD	HQ CORE	50	Gray Slightly Weathered Slightly Vesicular BASALT (WS), hard, occasionally broken
			50%REC 0%RQD	HQ CORE	55	Reddish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW), dense (Aa CLINKER)
			50%REC 28%RQD	HQ CORE		
			60%REC 0%RQD	HQ CORE	60	Gray Slightly Weathered Moderately Vesicular BASALT (WS), hard, broken; BOH @ 60.0'
			50%REC 0%RQD	HQ CORE	65	

Figure 17 b

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 16 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 228' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
					0	Reddish Brown SILT (ML), hard, dry
			50/3" 88%REC 82%RQD	1 HQ CORE	5	Brownish Gray Highly Weathered Vesicular BASALT (WH), soft, broken; Gray Slightly Weathered Highly Vesicular BASALT (WS), hard, massive; Gray Moderately to Slightly Weathered Vesicular BASALT (WM), hard, broken to occasionally broken
			100%REC 23%RQD	HQ CORE	10	Reddish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW), dense (Aa CLINKER)
			100%REC 38%RQD	HQ CORE	15	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			97%REC 60%RQD	HQ CORE	20	Reddish Gray Moderately Weathered Vesicular BASALT (WM); Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			87%REC 62%RQD	HQ CORE	25	Brown Silty Basalt SAND (SM), very dense, moist (WEATHERED CLINKER); Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			95%REC 70%RQD	HQ CORE	30	
			72%REC 33%RQD	HQ CORE	35	Brown Moderately Weathered Vesicular BASALT (WM), medium hard, occasionally broken

Figure 18 a

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 16 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 228' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-27-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			37%REC 8%RQD	HQ CORE	40	Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW), dense (Aa CLINKER)
			100%REC 77%RQD	HQ CORE	45	Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken to massive
			100%REC 46%RQD	HQ CORE	50	
			34%REC 18%RQD	HQ CORE	55	Brownish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW), dense (Aa CLINKER); Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			90%REC 51%RQD	HQ CORE	60	BOH @ 60.0'
					65	

Figure 18 b

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 17 File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 223' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-22-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			R	1	0	Reddish Brown Gravelly SILT (GM), hard, dry (RESIDUAL)
			42%REC 78%RQD	HQ CORE	5	Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
			100%REC 69%RQD	HQ CORE	10	Brownish Gray Highly Weathered BASALT FRAGMENTS (GM), dense (Aa CLINKER)
			100%REC 100%RQD	HQ CORE	15	Gray Slightly Weathered Vesicular BASALT (WS), hard, massive
			100%REC 78%RQD	HQ CORE	20	At 18.0', grades to occasionally broken
			98%REC 67%RQD	HQ CORE	25	At 22.5', grades to medium hard; At 24.5', grades to massive
			94%REC 47%RQD	HQ CORE	30	Brownish Gray Slightly Weathered Vesicular BASALT (WS), medium hard, broken; Gray Slightly Weathered Vesicular BASALT (WS), hard, occasionally broken
			100%REC 24%RQD	HQ CORE	35	Brown Highly Weathered Vesicular BASALT (WH), medium hard, broken

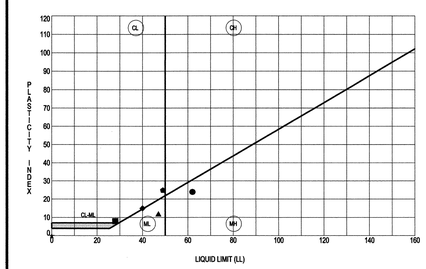
Figure 19 a

F.G.E. Ltd.
96-1416 Waihona Place
Pearl City, Hawaii

Boring: 17 (CONTINUATION) File: 2490.01
Project: Honapiilani Realignment Phase 1A
Location: Lahaina, Maui, Hawaii Project Engineer: TC
Surface Elevation: 223' +- Field Engineer: PB
Depth to Water: None Encountered Drafted by: CPD
Date Completed: 10-22-04 Date of Drawing: June 2006

LAB TEST RESULTS	MOIST CONT. %	DRY DEN. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			63%REC 28%RQD	HQ CORE	40	Gray Slightly Weathered Vesicular BASALT (WH), hard, broken
			100%REC 55%RQD	HQ CORE	45	
			37%REC 15%RQD	HQ CORE	50	Brownish Gray Gravel and Cobble-Sized BASALT FRAGMENTS (GW) with some welded seams, dense
			25%REC 6%RQD	HQ CORE	55	(Aa CLINKER)
			42%REC 0%RQD	HQ CORE	60	Brownish Gray Moderately Weathered Vesicular BASALT (WM), hard, broken; BOH @ 60.0'
					65	

Figure 19 b



Sample ID	Depth (ft)	LL	PL	PI	Classification
● 2 - 1	1.0	62	38	24	Reddish Brown Sandy SILT (MH)
■ 3 - 2	3.5	28	20	8	Reddish Brown Silty CLAY (CL)
* 3 - 6	14.0	NP	NP	NP	Reddish Brown SILT (ML)
◆ 5 - 1	1.0	40	25	15	Reddish Brown Clayey SILT (ML-CL)
▲ 7 - 3	13.5	47	35	12	Grayish Brown SILT (ML)
● 14 - 1	2.0	49	24	25	Brown Silty CLAY (CL) w/Gravel

F.G.E. Ltd.

PLASTICITY INDEX CHART
Honapiilani Realignment Phase 1A
Lahaina, Maui, Hawaii

File: 2490.01
June 2006

Figure 21

TIMOTHY J. CAVANAUGH
LICENSED PROFESSIONAL ENGINEER
No. 6910-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature

EXPIRATION DATE OF LICENSE: APRIL 30, 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

HONOAPIILANI HIGHWAY REALIGNMENT, PHASE 1A
Future Keawe Street Extension to Lahainaluna Road
Federal Aid Project No. NH-030-1(35)R

Scale: As Noted Date: April 2006

SHEET No. 6 OF 6 SHEETS