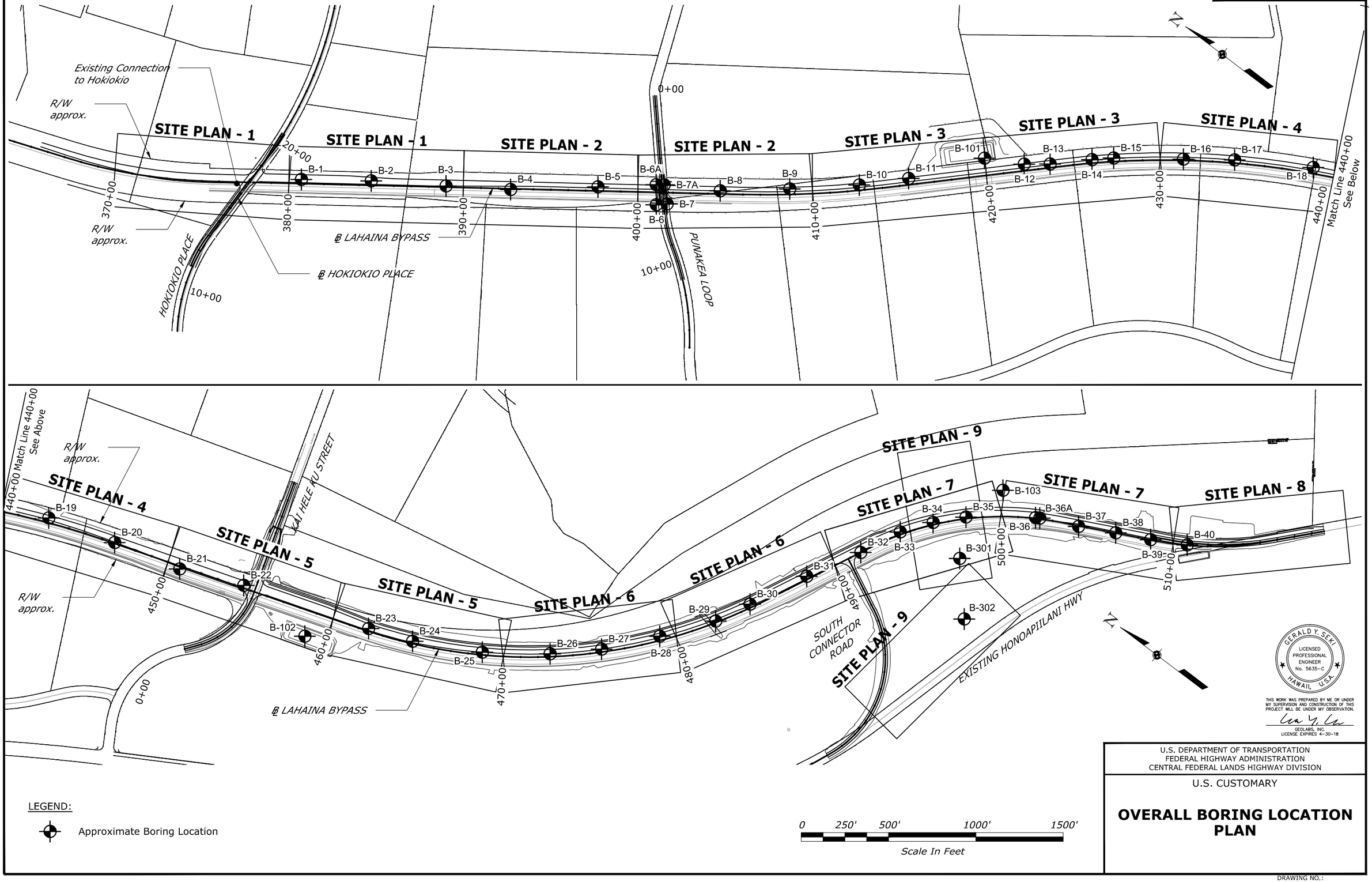
STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G1



LEGEND:

Approximate Boring Location

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No. 5635-C
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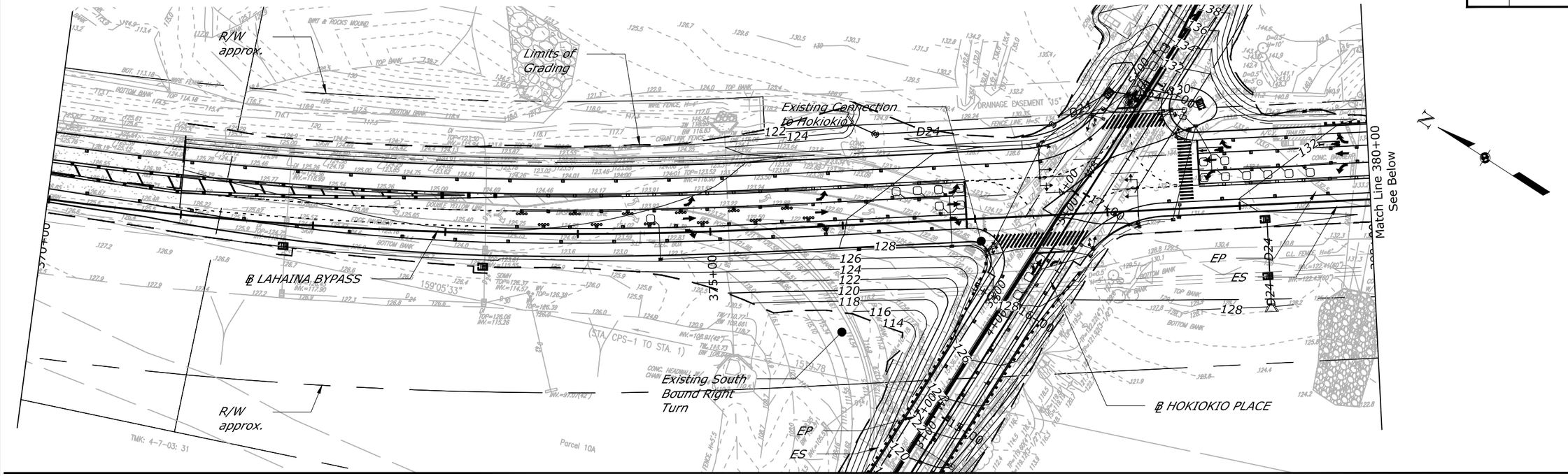
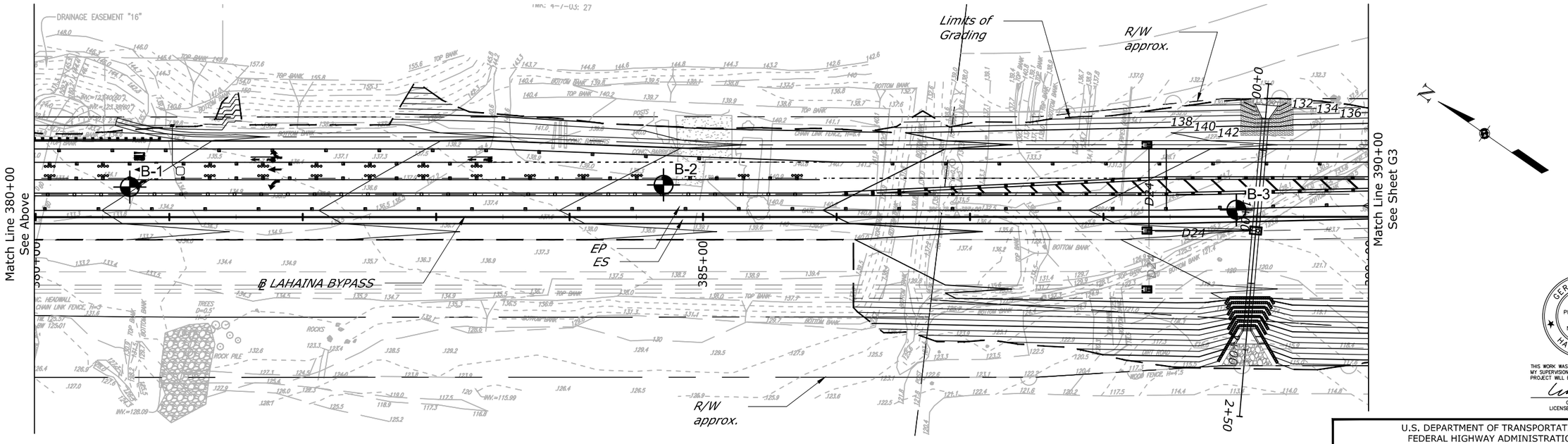
OVERALL BORING LOCATION PLAN

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G2





LEGEND:

Approximate Boring Location

0 40' 80' 160' 240'

Scale In Feet

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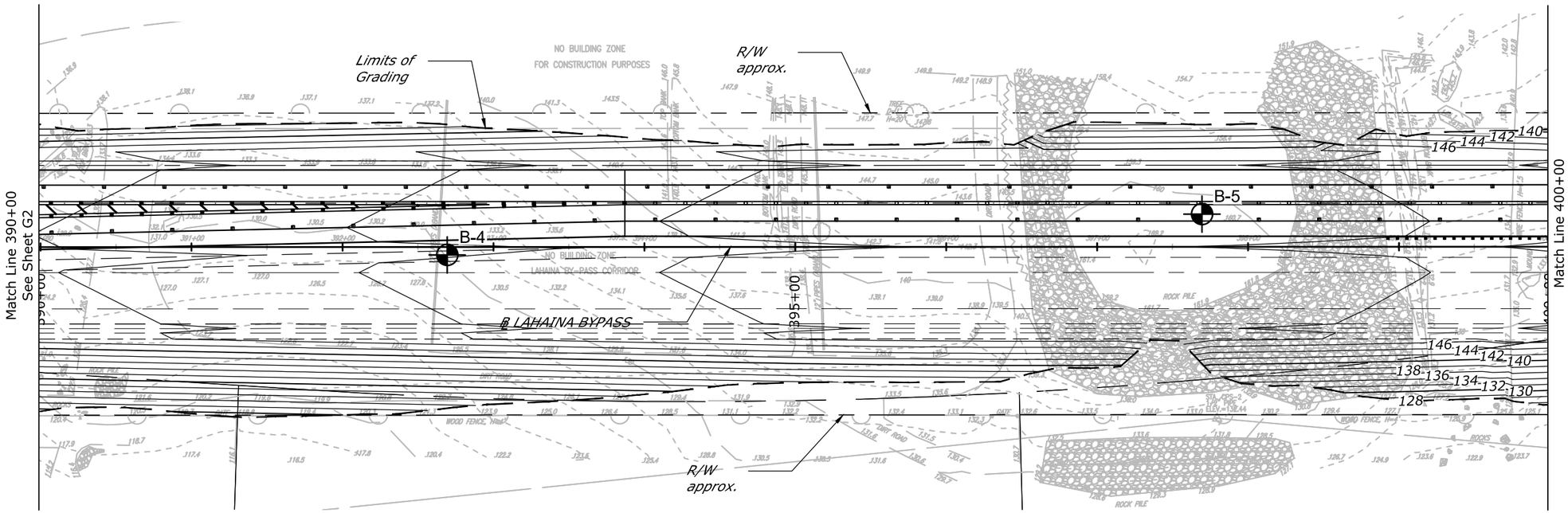
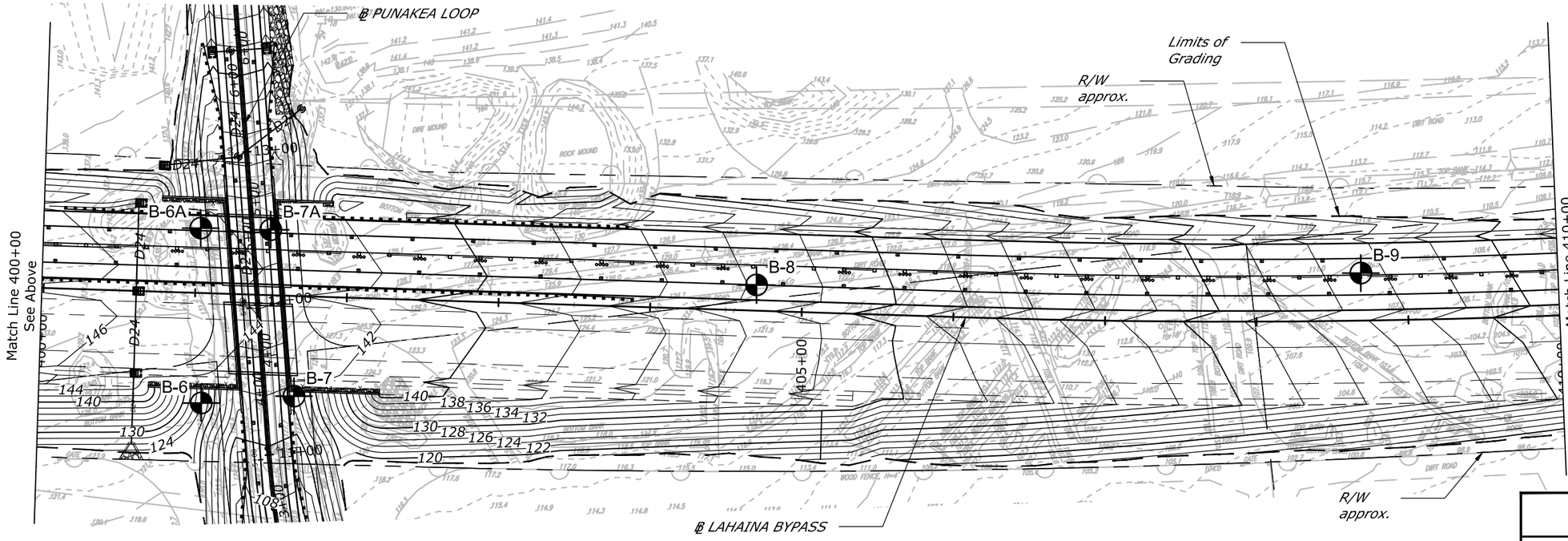
SITE PLAN - 1

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G3





LEGEND:

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Scale In Feet

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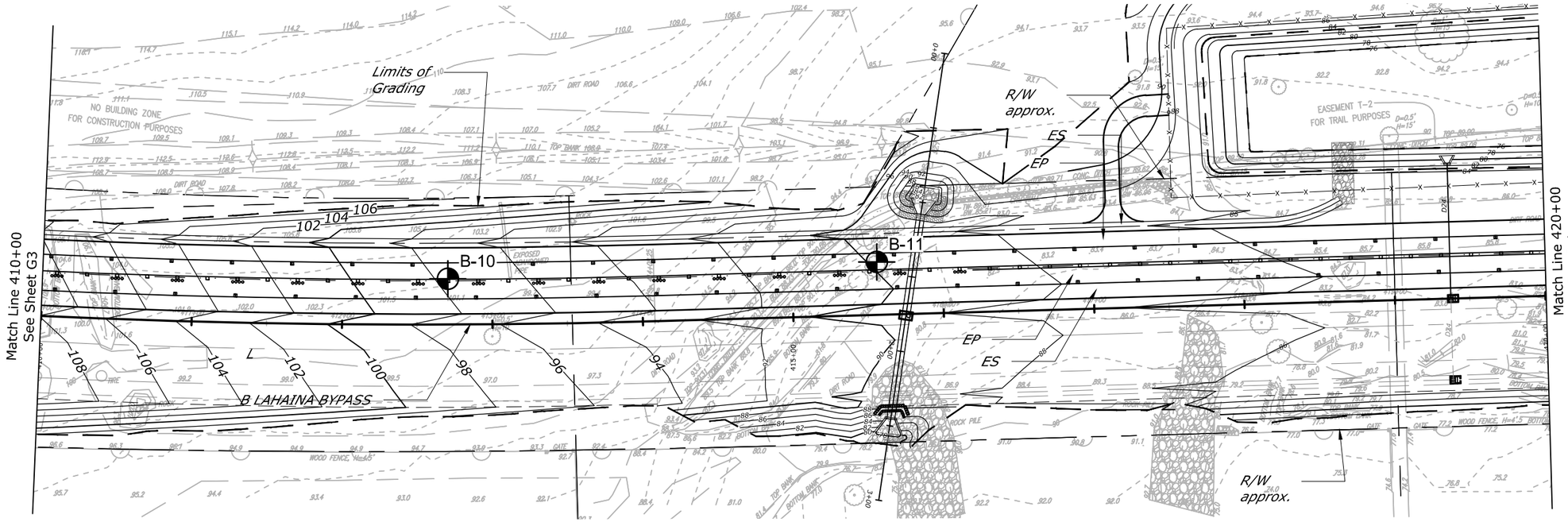
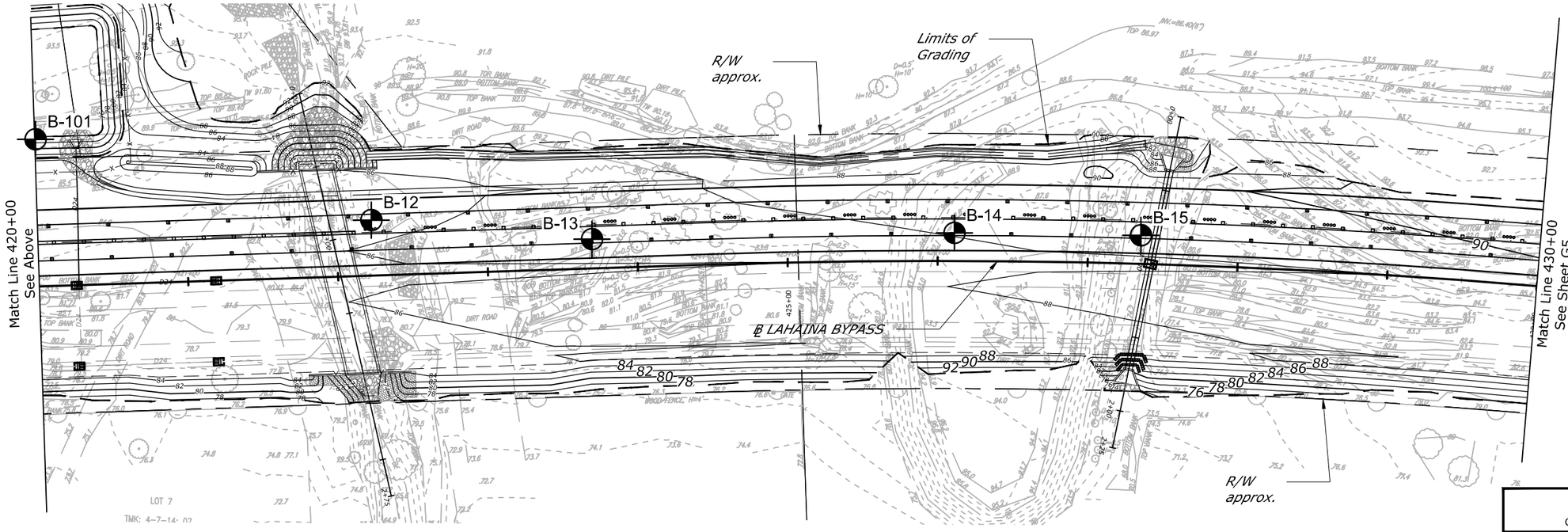
SITE PLAN - 2

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G4





LEGEND:

Approximate Boring Location

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Scale In Feet

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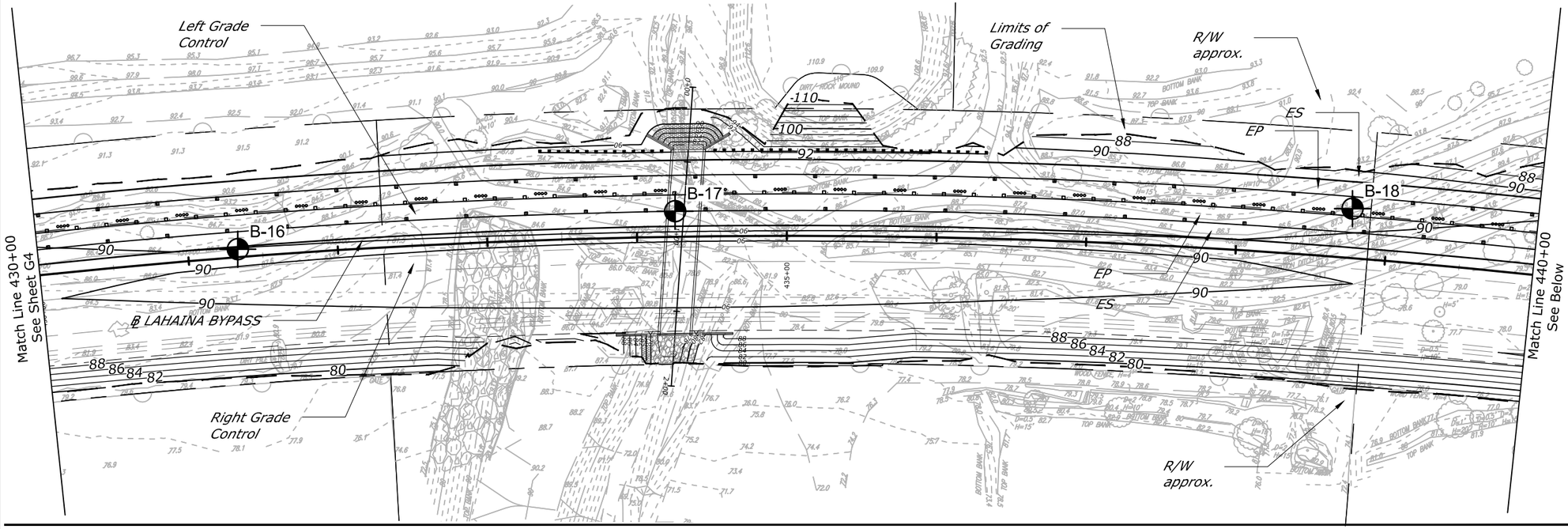
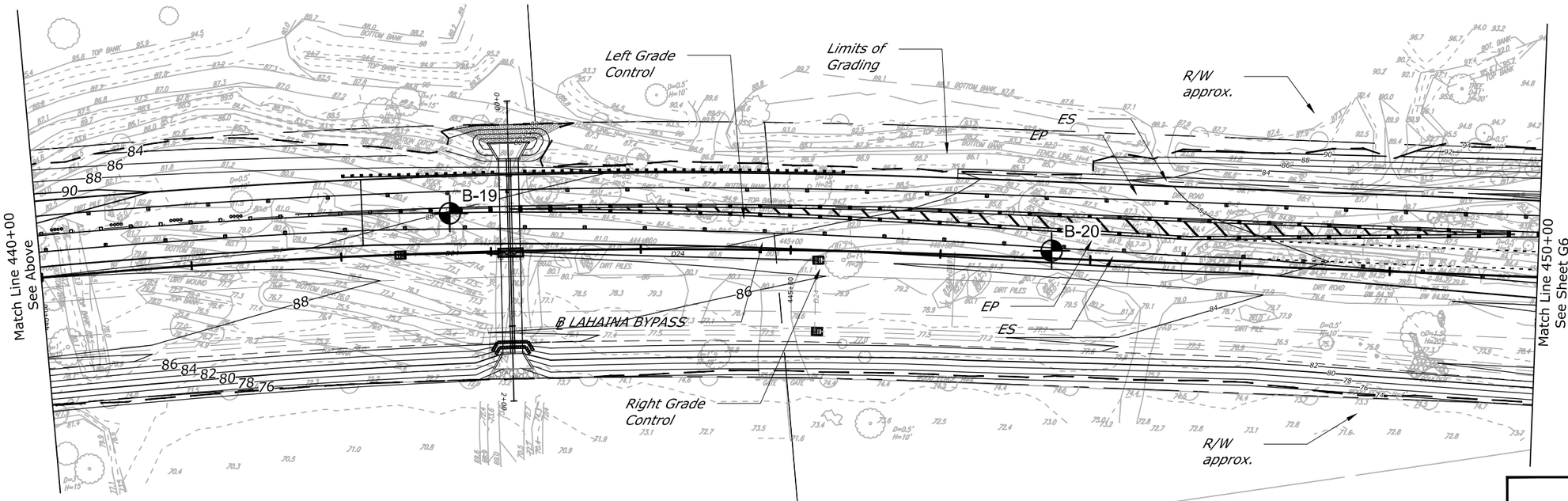
SITE PLAN - 3

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G5





LEGEND:

Approximate Boring Location

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Scale In Feet

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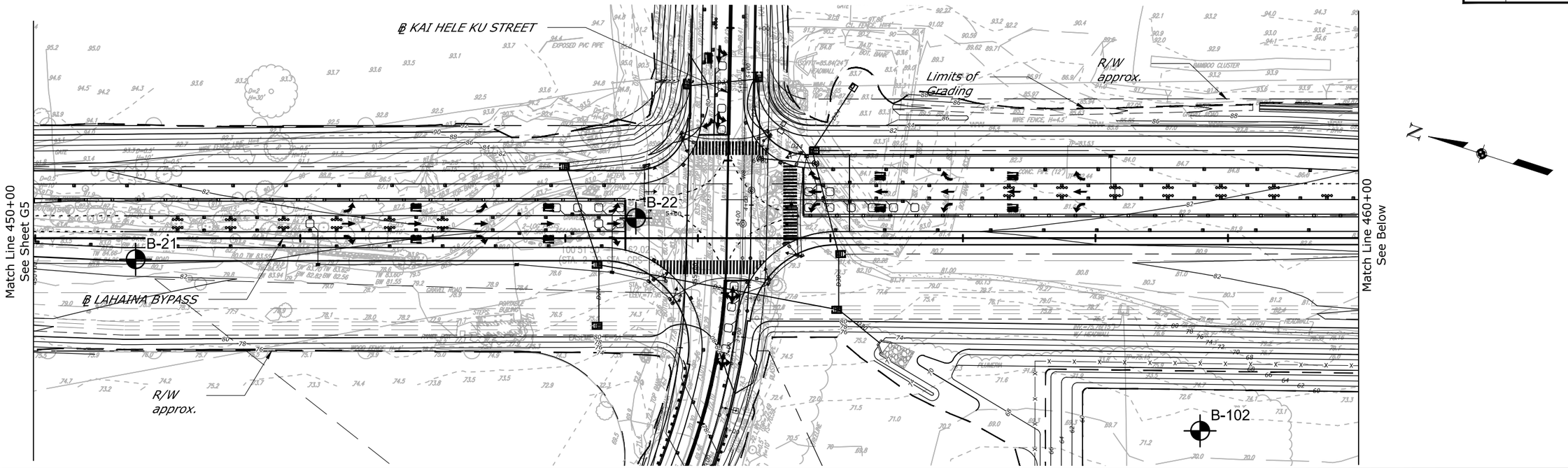
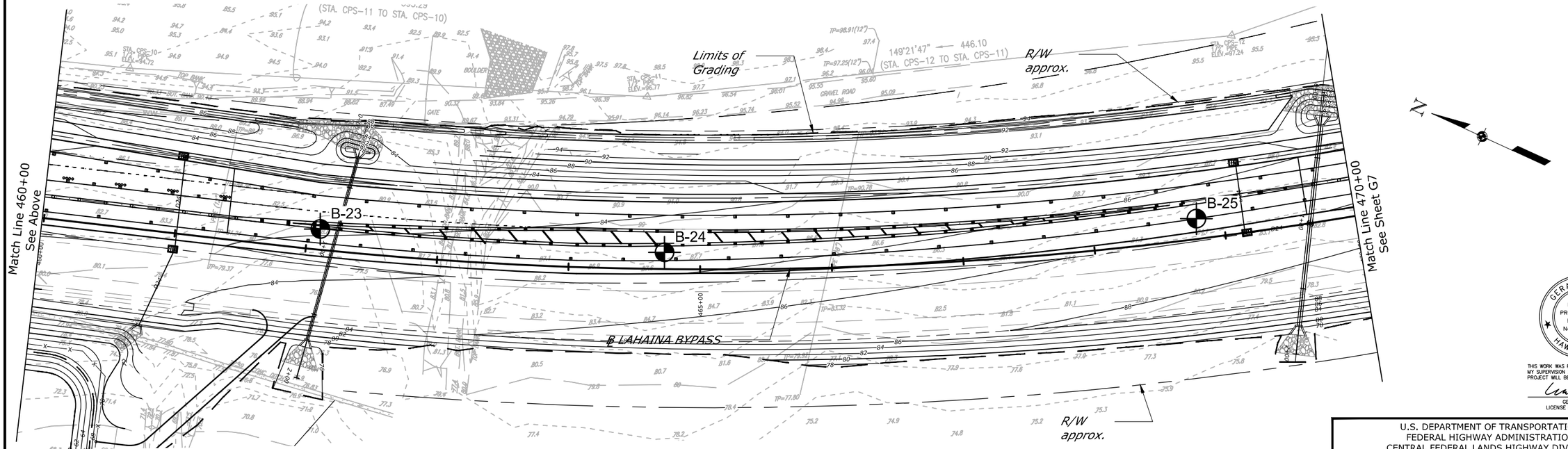
SITE PLAN - 4

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G6





LEGEND:

Approximate Boring Location

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Scale In Feet

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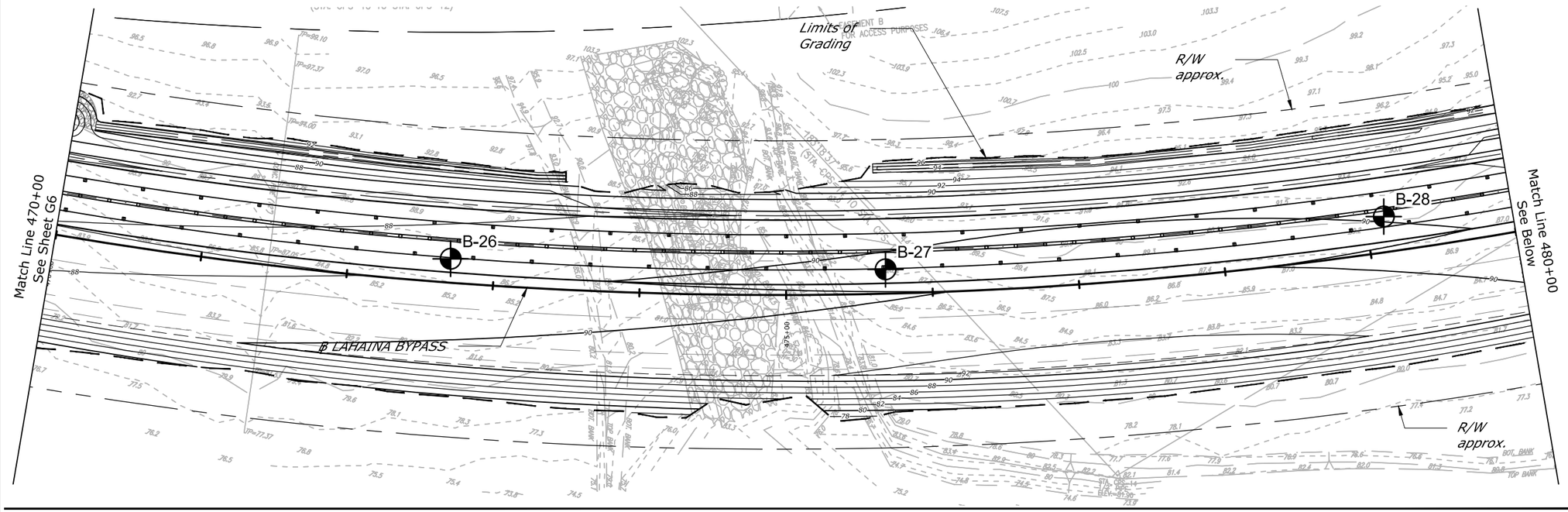
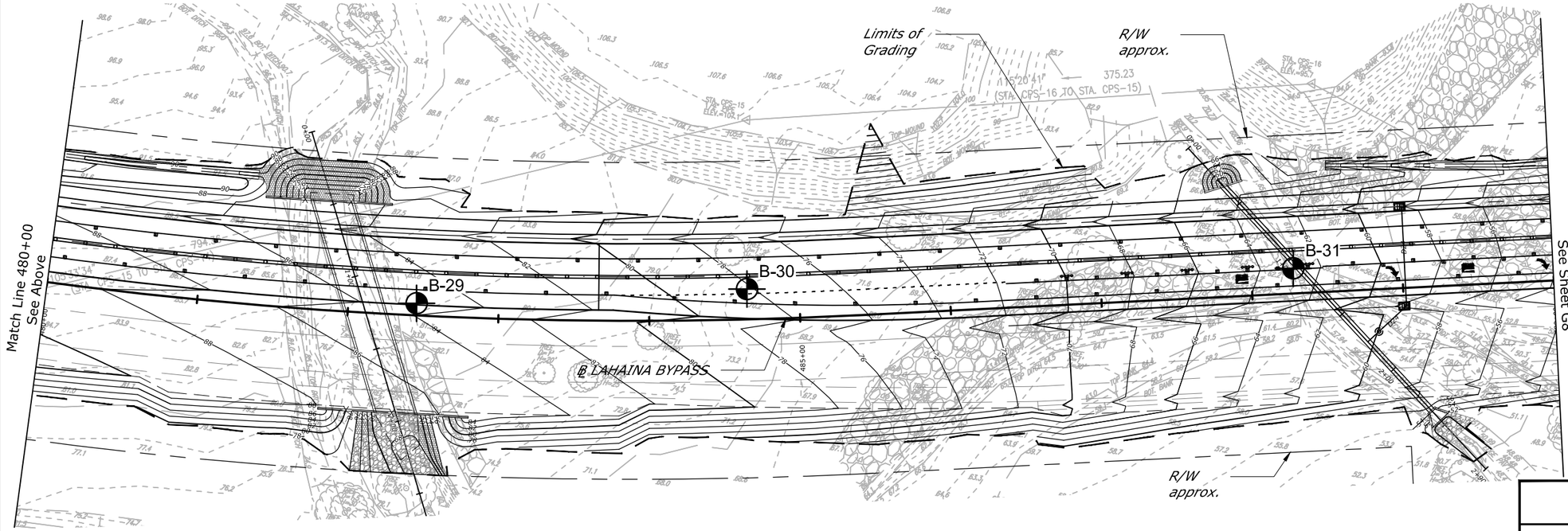
SITE PLAN - 5

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G7





LEGEND:

Approximate Boring Location

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Scale In Feet

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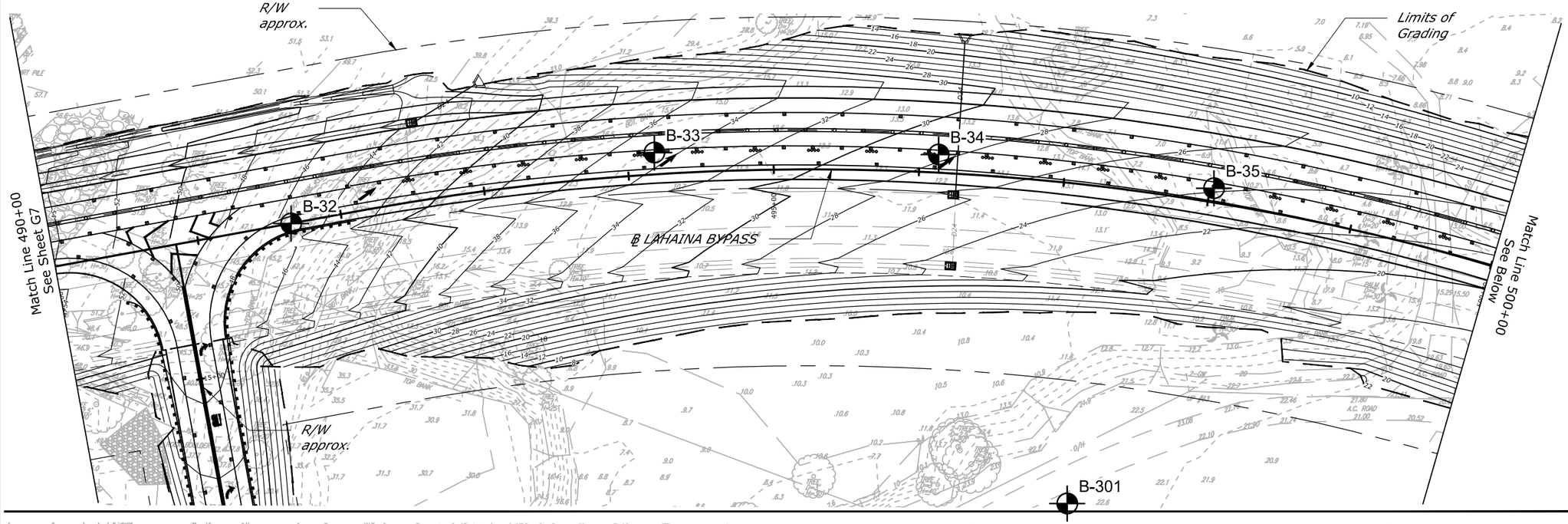
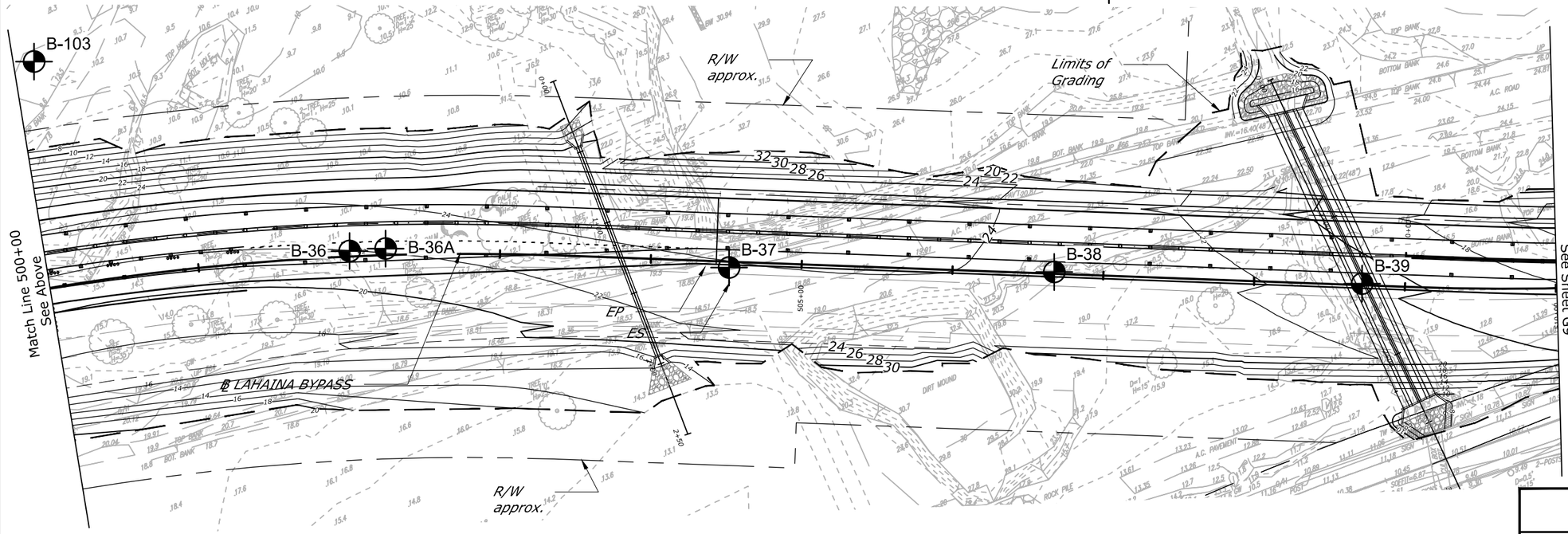
U.S. CUSTOMARY

SITE PLAN - 6

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G8





LEGEND:

Approximate Boring Location

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Scale In Feet

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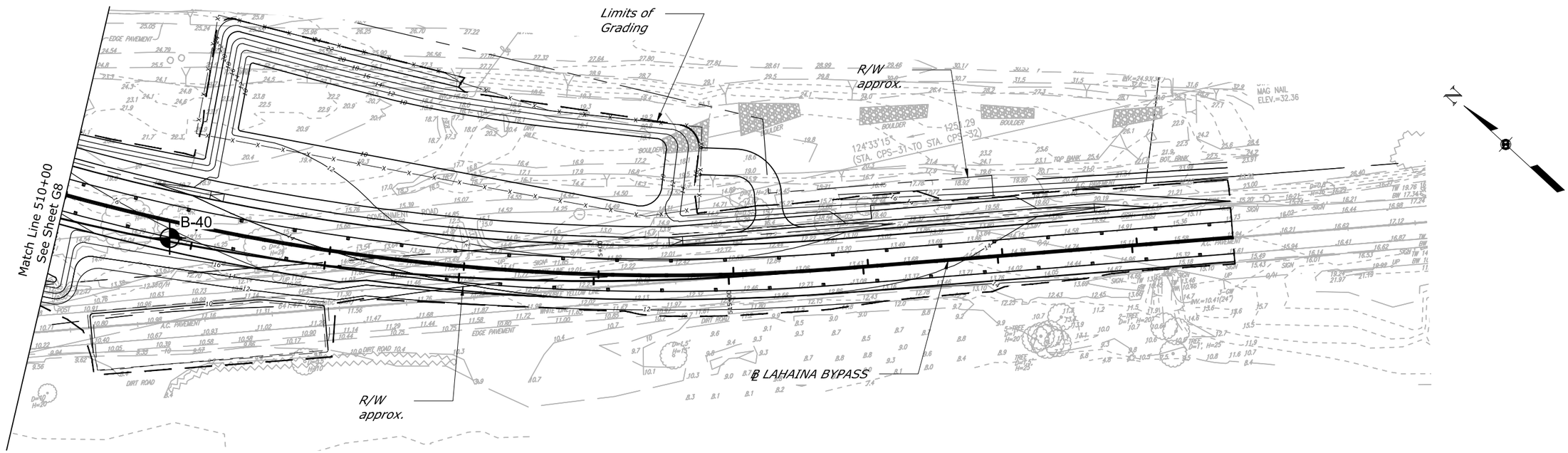
SITE PLAN - 7

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G9



LEGEND:

Approximate Boring Location

0 40' 80' 160' 240'

Scale In Feet

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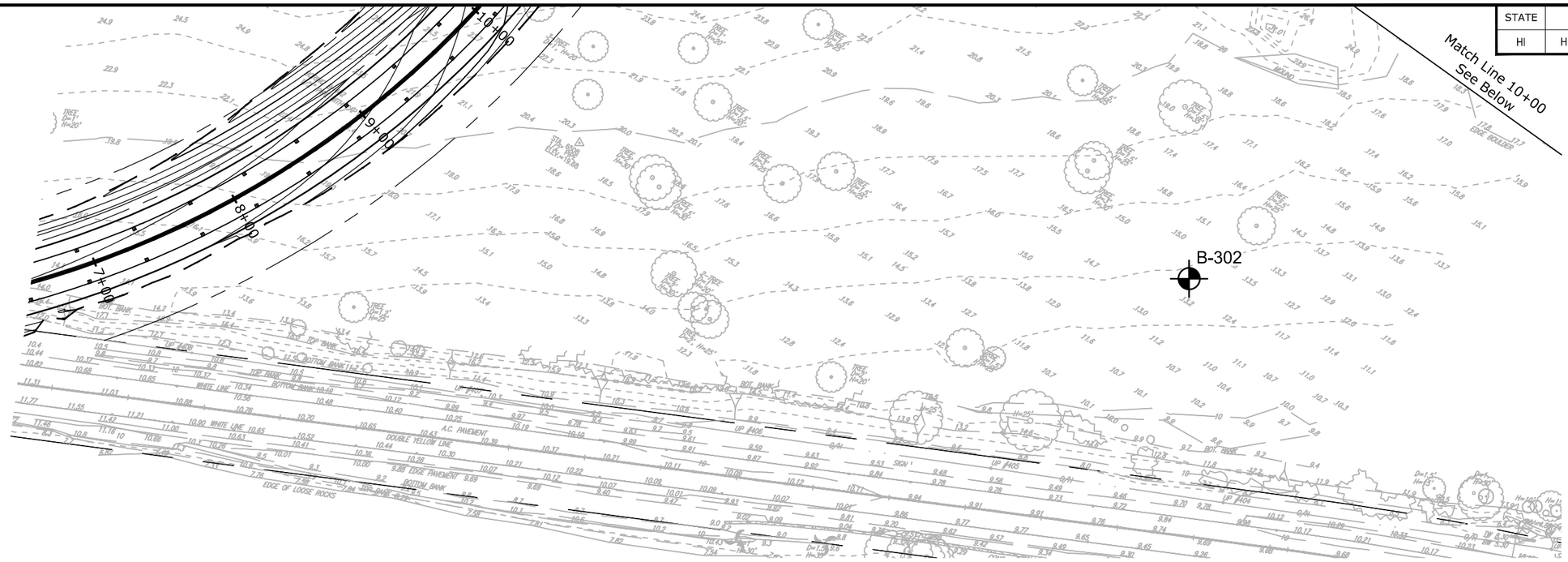
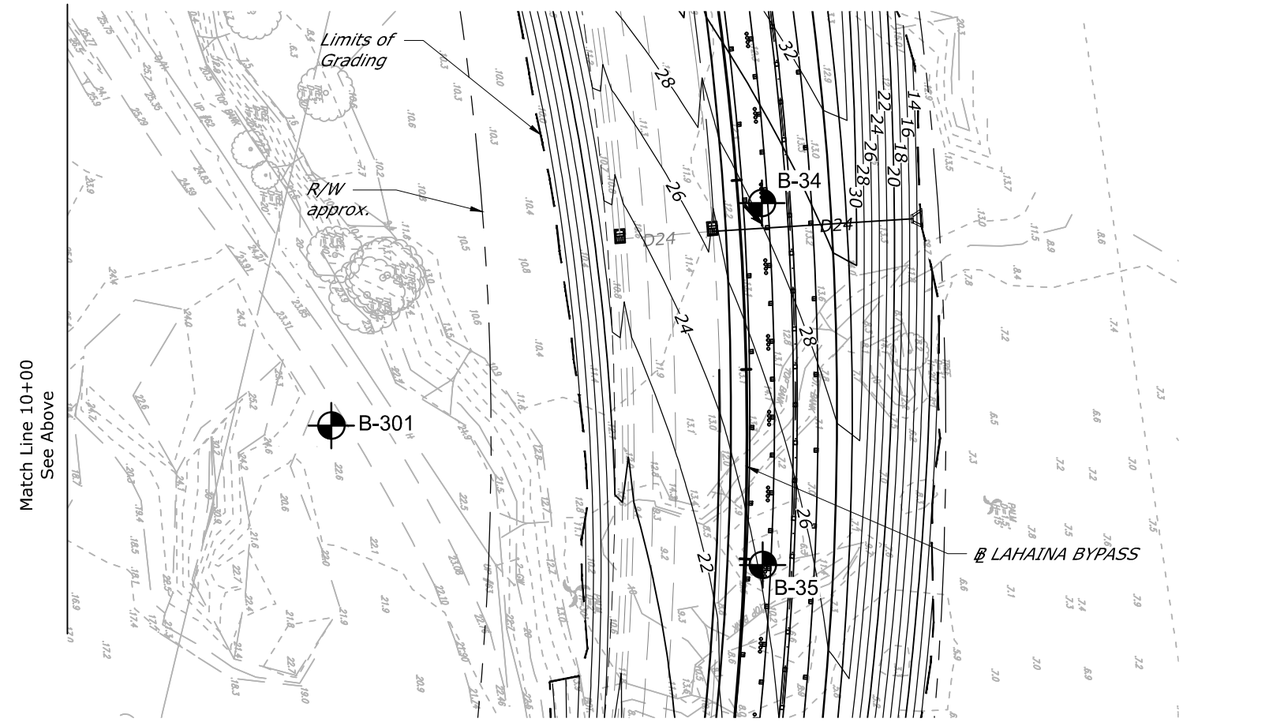
U.S. CUSTOMARY

SITE PLAN - 8

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G10





LEGEND:

Approximate Boring Location

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Scale In Feet

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SITE PLAN - 9

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G11

GEOLABS, INC.
Geotechnical Engineering

Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS (MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE)	GRAVELS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (MORE THAN 12% FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE)	CLEAN SANDS (LESS THAN 5% FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (MORE THAN 12% FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS (50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE)	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 50 OR MORE)		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND

- (2-INCH) O.D. STANDARD PENETRATION TEST
- (3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE
- SHELBY TUBE SAMPLE
- GRAB SAMPLE
- CORE SAMPLE
- WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING
- WATER LEVEL OBSERVED IN BORING AFTER DRILLING
- WATER LEVEL OBSERVED IN BORING OVERNIGHT

- LL LIQUID LIMIT (NP=NON-PLASTIC)
- PI PLASTICITY INDEX (NP=NON-PLASTIC)
- TV TORVANE SHEAR (tsf)
- UC UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH
- TXUU UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate A-0.1

LOG LEGEND FOR SOIL 7378-20.GPJ GEOLABS.GDT 10/11/16

GEOLABS, INC.
Geotechnical Engineering

Soil Classification Log Key
(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR SOIL (- #200 <50%)	COHESIVE SOIL (- #200 ≥ 50%)
• PRIMARY constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e., GRAVEL, SAND)	• PRIMARY constituents are based on plasticity. Primary constituents are capitalized and bold (i.e., CLAY, SILT)
• SECONDARY constituents are composed of a percentage less than the primary constituent. If the soil mass consists of 12 percent or more fines content, a cohesive constituent is used (SILTY or CLAYEY); otherwise, a granular constituent is used (GRAVELLY or SANDY) provided that the secondary constituent consists of 20 percent or more of the soil mass. Secondary constituents are capitalized and bold (i.e., SANDY GRAVEL, CLAYEY SAND) and precede the primary constituent.	• SECONDARY constituents are composed of a percentage less than the primary constituent, but more than 20 percent of the soil mass. Secondary constituents are capitalized and bold (i.e., SANDY CLAY, SILTY CLAY, CLAYEY SILT) and precede the primary constituent.
• accessory descriptions compose of the following: with some: >12% with a little: 5 - 12% with traces of: <5% accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY GRAVEL with a little sand)	• accessory descriptions compose of the following: with some: >12% with a little: 5 - 12% with traces of: <5% accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., SILTY CLAY with some sand)

EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 15% Fines. Described as: SILTY GRAVEL with some sand

RELATIVE DENSITY / CONSISTENCY

Granular Soils			Cohesive Soils			
N-Value (Blows/Foot)		Relative Density	N-Value (Blows/Foot)		PP Readings (tsf)	Consistency
SPT	MCS		SPT	MCS		
0 - 4	0 - 7	Very Loose	0 - 2	0 - 4		Very Soft
4 - 10	7 - 18	Loose	2 - 4	4 - 7	< 0.5	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	0.5 - 1.0	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	1.0 - 2.0	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	2.0 - 4.0	Very Stiff
			> 30	> 55	> 4.0	Hard

MOISTURE CONTENT DEFINITIONS

Dry: Absence of moisture, dry to the touch

Moist: Damp but no visible water

Wet: Visible free water, usually soil is below water table

ABBREVIATIONS

WOH: Weight of Hammer

WOR: Weight of Drill Rods

SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

GRAIN SIZE DEFINITION

Description	Sieve Number and / or Size
Boulders	> 12 inches (305-mm)
Cobbles	3 to 12 inches (75-mm to 305-mm)
Gravel	3-inch to #4 (75-mm to 4.75-mm)
Coarse Gravel	3-inch to 3/4-inch (75-mm to 19-mm)
Fine Gravel	3/4-inch to #4 (19-mm to 4.75-mm)
Sand	#4 to #200 (4.75-mm to 0.075-mm)
Coarse Sand	#4 to #10 (4.75-mm to 2-mm)
Medium Sand	#10 to #40 (2-mm to 0.425-mm)
Fine Sand	#40 to #200 (0.425-mm to 0.075-mm)

Plate A-0.2

**Soil descriptions are based on ASTM D2488-09a, Visual-Manual Procedure, with the above modifications by Geolabs, Inc. to the Unified Soil Classification System (USCS).*

SOIL CLASS. LOG KEY 7378-20.GPJ GEOLABS.GDT 10/11/16

GEOLABS, INC.
Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

	BASALT		FINGER CORAL
	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER		SILTSTONE
	COBBLES		TUFF
	CORAL		VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Moderately Fractured:	6 to 12 inches apart
Closely Fractured:	3 to 6 inches apart
Severely Fractured:	Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered:	Rock shows no sign of discoloration or loss of strength.
Slightly Weathered:	Slight discoloration inwards from open fractures.
Moderately Weathered:	Discoloration throughout and noticeably weakened though not able to break by hand.
Highly Weathered:	Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.
Extremely Weathered:	Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

HARDNESS

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard:	Specimen breaks with difficulty after several "pinging" hammer blows. Example: Dense, fine grain volcanic rock
Hard:	Specimen breaks with some difficulty after several hammer blows. Example: Vesicular, vugular, coarse-grained rock
Medium Hard:	Specimen can be broked by one hammer blow. Cannot be scraped by knife. SPT may penetrate by ~25 blows per inch with bounce. Example: Porous rock such as clinker, cinder, and coral reef
Soft:	Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot. Example: Weathered rock, chalk-like coral reef
Very Soft:	Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure. Example: Saprolite

Plate A-0.3

LOG LEGEND FOR ROCK 7378-20.GPJ GEOLABS.GDT 10/11/16

GEOTECHNICAL NOTES:

1. *A geotechnical engineering exploration report entitled "Geotechnical Engineering Exploration, Lahaina Bypass Phase 1B - 2, Lahaina, Maui, Hawaii" dated May 23, 2017 has been prepared by Geolabs, Inc.*
2. *For boring locations, see Sheets G1 thru G10.*
3. *The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.*
4. *The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.*

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BORING LOG LEGENDS & NOTES

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G12

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 1

Approximate Ground Surface Elevation (feet MSL): 134.09 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	17	107			92		0			GP	Gray SANDY GRAVEL with traces of silt, very dense, moist (fill)
							5			ML	Gray COBBLY BOULDERS (BASALTIC), very dense, moist (fill)
			83		15/0" Ref.						Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
			98				10				Gray COBBLES AND BOULDERS in a sandy silt matrix, very dense, moist (alluvium)
	8				68		15				
							20				Boring terminated at 18 feet
											* Elevations provided by Controlpoint Surveying, Inc. on October 6, 2016.
							25				
							30				
							35				Latitude: 20.859848950248° N Longitude: 156.660767122399° W

Date Started:	September 27, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 28, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	18 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 3

Approximate Ground Surface Elevation (feet MSL): 125.41 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	7	100			39		0			SM	Brown SILTY SAND with a little gravel and cobbles, medium dense, dry (fill)
Sieve #200 = 39.9% LL=43 PI=16	8				36						grades to dense
	13	76			29	4.5	5			ML	Grayish brown SANDY SILT with some decomposed gravel and cobbles, very stiff, dry (alluvium)
			100				10				Brownish gray GRAVELLY COBBLES (BASALTIC) with clayey silt seams, very dense, damp (alluvium)
	1		76		50/3"						
			59		50/2"		15				
			63		50/4"		20				
			55				25				
					50/2"		30				Boring terminated at 31.2 feet
							35				Latitude: 20.8579670056261° N Longitude: 156.659390998646° W

Date Started:	August 29, 2016	Water Level: ▽	Not Encountered
Date Completed:	August 30, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	31.2 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 2

Approximate Ground Surface Elevation (feet MSL): 139.38 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	11	100			55		0			GP	Gray SANDY GRAVEL, dense, moist (fill)
	16		85		55/5"		5			MH	Gray COBBLY BOULDERS (BASALTIC), very dense, moist (fill)
			80		15/0" Ref.		10				Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
	17				20/0" Ref.		15				
							20				Boring terminated at 16.5 feet
							25				
							30				
							35				Latitude: 20.858957020497° N Longitude: 156.660079969408° W

Date Started:	September 28, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 28, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	16.5 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 4

Approximate Ground Surface Elevation (feet MSL): 130.37 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	4	69	54		50/3"		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
	10		67		55/5"		5				
	11		67		76		10				grades with reddish brown clayey silt seams
			57		50/2"		15				Brownish gray GRAVELLY COBBLES (BASALTIC) with some boulders (basaltic), very dense, damp (alluvium)
			67				20				grades with sandy silt seams at 14 feet
			53				25				
					50/4"		30				Boring terminated at 31.3 feet
							35				Latitude: 20.857123751558° N Longitude: 156.658783945459° W

Date Started:	August 30, 2016	Water Level: ▽	Not Encountered
Date Completed:	August 30, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	31.3 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GERALD Y. SEKI
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No. 5635-C
HAWAII, U.S.A.

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 1

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G13

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 5

Approximate Ground Surface Elevation (feet MSL): 160.66 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	4	79	13		65/4"					ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (fill)
			48		50/2"		5				Brownish gray COBBLY BOULDERS with some gravel and silty sand seams, very dense, dry (fill) grades with small voids at 2 feet
			52				10				
UC= 5610 psi							15				
			55								
UC= 3240 psi	36		23		55/6"		20				Brownish gray GRAVELLY COBBLES with some boulders and sandy silt seams, very dense, dry (alluvium)
UC= 4420 psi			42		50/1"		25				
	16				50/4"		30				Boring terminated at 31.8 feet
							35				Latitude: 20.8560490835644° N Longitude: 156.657865112182° W

Date Started:	August 31, 2016	Water Level: ▽	Not Encountered
Date Completed:	August 31, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Total Depth:	31.8 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 6A

Approximate Ground Surface Elevation (feet MSL): 129.57 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	20	87			18	3.0				SM	Reddish brown SILTY SAND with some gravel, medium dense, moist (fill)
UC= 13480 psi			97		15/0" Ref.		5			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
	21		15		15/0" Ref.		10				
			51		26/6" +35/1"		15				
UC= 4720 psi Consol.	31		49		50/5"		20				
			47		15/0" Ref.		25				
	9				52/6" +30/1"		30				Boring terminated at 31.1 feet
							35				Latitude: 20.8553387543424° N Longitude: 156.657246702818° W

Date Started:	September 28, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 28, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Total Depth:	31.1 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 6

Approximate Ground Surface Elevation (feet MSL): 127.24 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	14	69			10/6" +50/2"					SM	Brown SILTY SAND with some gravel, very stiff to hard, dry (alluvium)
Sieve - #200 = 29.9%	8		100		38 50/1"		5			SW-SM	Brownish gray GRAVELLY SAND with a little silt, very dense, dry (alluvium) grades with cobbles and boulders
UC= 5820 psi			37				10				
Sieve - #200 = 9.7%	9		38		70		15				
	5	93	70		50/4"		20				
			75				25				
			97				30				Boring terminated at 31.7 feet
					50/2"		35				Latitude: 20.855145° N Longitude: 156.657514° W

Date Started:	August 31, 2016	Water Level: ▽	Not Encountered
Date Completed:	August 31, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Total Depth:	31.7 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 7

Approximate Ground Surface Elevation (feet MSL): 127.71 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	14	69			48	4.5				SM	Brown SILTY SAND with a little gravel and cobbles, medium dense to very dense, dry (alluvium)
Sieve - #200 = 45.6%	13				24/6" +50/4"						
	5	98	18		65/6"		5				
UC= 5970 psi	4		95		50/3"		10				Brownish gray GRAVELLY COBBLES with some boulders and sandy silt seams, very dense, dry (alluvium)
			14		50/2"		15				
			41		50/2"		20				
			52				25				
					50/1"		30				Boring terminated at 31.1 feet
							35				Latitude: 20.855019° N Longitude: 156.657394° W

Date Started:	August 31, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 1, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Total Depth:	31.1 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GERALD Y. SEKI
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No. 5635-C
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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 2

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G14

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 7A

Approximate Ground Surface Elevation (feet MSL): 127.7 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	15	117			66	>4.5	0			ML	Reddish brown SANDY SILT with some gravel, medium stiff, moist (fill)
										ML	Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
LL=49 PI=8	26		37		55/5"		5				
	38		7		72		10				
UC= 460 psi			25		15/0" Ref.		15				
			53		15/0" Ref.		20				
			67		15/0" Ref.		25				
					15/0" Ref.		30				Boring terminated at 30 feet Latitude: 20.8552360837836° N Longitude: 156.657166888107° W
							35				

Date Started:	September 28, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 28, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	30 feet	Drilling Method:	4" Casing & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 9

Approximate Ground Surface Elevation (feet MSL): 109.05 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	11	62			17		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
			56								
	4		40		50/5"		5				
	17				66		10				
			38								
			66		50/1"		15				grades with boulders
					50/2"		20				Boring terminated at 21.2 feet
							25				
							30				Latitude: 20.8536190702349° N Longitude: 156.655950853303° W
							35				

Date Started:	September 1, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 2, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.2 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 8

Approximate Ground Surface Elevation (feet MSL): 124.32 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	11	73			34		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
			54								
			14		50/3"		5				
	26				48		10				grades with some clay and boulders
			26								Brownish gray GRAVELLY COBBLES with sandy silt seams, very dense, dry (alluvium)
			60		50/2"		15				
	10				56/6"		20				
			27								
	7	78	42		50/5"		25				
	9				28/6" +50/2"		30				Boring terminated at 32.2 feet Latitude: 20.8544758238176° N Longitude: 156.656679968931° W
							35				

Date Started:	September 1, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 1, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	32.2 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 10

Approximate Ground Surface Elevation (feet MSL): 101.52 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
LL=47 PI=17	11	76			40		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
			22								
	20				51		5				grades with a little clay
			26								
			52		50/2"		10				Brownish gray GRAVELLY COBBLES with some boulders, very dense, dry (alluvium)
			57				15				
					50/2"		20				Boring terminated at 21.2 feet
							25				
							30				Latitude: 20.8527819358355° N Longitude: 156.655195009952° W
							35				

Date Started:	September 6, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 6, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.2 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GERALD Y. SEKI
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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 3

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G15

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 11

Approximate Ground Surface Elevation (feet MSL): 84.01 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	5	75			50/3"			SM	Brown SILTY SAND with traces of gravel and cobbles, very dense, dry (alluvium)
Sieve - #200 = 47.8%	18				18				
					50/2"		5		grades to medium dense
			100						grades to very dense
									Gray GRAVELLY COBBLES with some boulders and pockets of sand (basaltic), dense, dry (alluvium)
	7				47		10		
			29						
							15		grades to very dense
			76		50/1"				
							20		
					50/1"				Boring terminated at 21.1 feet
							25		
							30		
							35		Latitude: 20.852223° N Longitude: 156.654608° W

Date Started:	September 6, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 6, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.1 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 13

Approximate Ground Surface Elevation (feet MSL): 82.85 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	11	72			27			ML	Brown SANDY SILT with some gravel and cobbles, very stiff, dry (alluvium)
	6		46		59		5		grades to hard
									grades with a little boulders
	34		55		70		10		
							15		
			37		50/1"				
							20		
	13				50/2"				Boring terminated at 21.7 feet
							25		
							30		
							35		Latitude: 20.8505820806505° N Longitude: 156.652985011749° W

Date Started:	September 7, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 7, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.7 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 12

Approximate Ground Surface Elevation (feet MSL): 83.99 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
Direct Shear	14	65			26			CL	Brown SANDY CLAY with some gravel and cobbles, stiff, dry (alluvium)
LL=30 PI=8 UC= 9000 psi	8		67		16		5		grades to very stiff
									Brownish gray GRAVELLY COBBLES with some boulders and clayey silt seams, very dense, dry (alluvium)
			76		50/1"		10		
UC= 3030 psi									
			98		50/1"		15		Gray BOULDERS (BASALTIC), very dense, dry (alluvium)
							20		Boring terminated at 20 feet
							25		
							30		
							35		Latitude: 20.850906° N Longitude: 156.653247° W

Date Started:	September 7, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 7, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	20 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 14

Approximate Ground Surface Elevation (feet MSL): 90.91 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	4	69	62		50/3"			ML	Brown SANDY SILT with some gravel, hard, dry (fill)
									Gray COBBLY BOULDERS with some gravel and pockets of sandy silt, very dense, dry (fill)
			41		50/1"		5		
	26				48		10	SM	Grayish brown SILTY SAND with some gravel and cobbles, very dense, dry (alluvium)
			40					ML	Brown GRAVELLY SILT with some cobbles and boulders, very stiff, damp (alluvium)
			14		50/2"		15		
	32				24		20		
									Boring terminated at 22.5 feet
							25		
							30		
							35		Latitude: 20.8500960706713° N Longitude: 156.652501084388° W

Date Started:	September 7, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 7, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 4

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G16

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 15

Approximate Ground Surface Elevation (feet MSL): 78.36 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	12	69			69					ML	Grayish brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
	6		71		36		5				
			24		50/1"		10				
Sieve - #200 = 42.4%	43		14		26		15			SM	Brown SILTY SAND with a little gravel, medium dense, damp (alluvium)
	28				50		20				grades to very dense
											Boring terminated at 21.5 feet
							25				
							30				
							35				Latitude: 20.8498392102154° N Longitude: 156.652260080906° W

Date Started:	September 7, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 7, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 17

Approximate Ground Surface Elevation (feet MSL): 81.64 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	21	64			32					ML	Brown SANDY SILT with some gravel and cobbles, very stiff, dry (alluvium)
	4		78		78		5				grades to hard
										SM	Brownish gray SILTY SAND with some gravel and cobbles, medium dense, damp (alluvium)
	19		38		14		10				
	21		12		50/3"		15				grades to very dense
	10				64		20				
							25				Boring terminated at 22.5 feet
							30				
							35				Latitude: 20.848301° N Longitude: 156.651062° W

Date Started:	September 9, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 9, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 16

Approximate Ground Surface Elevation (feet MSL): 86.99 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	8				80					ML	Brown SANDY SILT with a little cobbles and gravel, hard, moist (fill)
										ML	Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
	17		25		20/0"		5				
			12		Ref. 43						
	28				65		10				
			21								
	13		44		60/5"		15				Brown SILTY COBBLES AND BOULDERS (BASALTIC) with some sand, dense, moist (alluvium)
	9				15/0"		20				
					Ref.						Boring terminated at 21 feet
							25				
							30				
							35				Latitude: 20.8489518317475° N Longitude: 156.651570091363° W

Date Started:	September 12, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 12, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 18

Approximate Ground Surface Elevation (feet MSL): 86.93 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	9	86			26					ML	Brown SANDY SILT with some gravel and cobbles, stiff, dry (alluvium)
			25								grades with boulders
	27				27		5				grades to very stiff
			55								
			42		50/1"		10				grades to hard
	13		29		50/4"		15				
	12				50/5"		20				
							25				Boring terminated at 21.4 feet
							30				
							35				Latitude: 20.8472391246573° N Longitude: 156.650368864784° W

Date Started:	September 8, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 9, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.4 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GERALD Y. SEKI
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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 5

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G17

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 19

Approximate Ground Surface Elevation (feet MSL): 81.14 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	6	95			74		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
			100				5				
			15		50/1"						
							10				
	21				45					SM	Grayish brown SILTY SAND with some gravel and cobbles, dense, dry (alluvium)
			21				15				
			34		50/1"						grades with boulders, very dense
							20				
					50/1"						Boring terminated at 21.1 feet
							25				
							30				
							35				Latitude: 20.846229° N Longitude: 156.649902° W

Date Started:	September 8, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 8, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.1 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 21

Approximate Ground Surface Elevation (feet MSL): 84.87 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	18	69			63		0			ML	Brown SANDY SILT with some gravel and cobbles, hard, dry (alluvium)
	19				29		5				grades to very stiff
UC= 1420 psi			45								
	17		50		50/4"		10				grades with some boulders, moderately cemented, hard
	10				50/5"		15				
											Boring terminated at 16.4 feet
							20				
							25				
							30				
							35				Latitude: 20.844098° N Longitude: 156.649258° W

Date Started:	September 8, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 8, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	16.4 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 20

Approximate Ground Surface Elevation (feet MSL): 80.74 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	11	90			21		0			ML	Brown SANDY SILT with some gravel and cobbles, stiff, dry (alluvium)
			44								grades with some boulders
	10		38		50/4"		5				grades to hard
	9				52		10				
			81							SM	Gray GRAVELLY COBBLES with some boulders, very dense, dry (alluvium)
			15		50/1"		15				
										ML	Grayish brown SANDY SILT with some gravel and cobbles, very stiff, damp (alluvium)
	17				24		20				
											Boring terminated at 22.5 feet
							25				
							30				
							35				Latitude: 20.845168° N Longitude: 156.649564° W

Date Started:	September 8, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 8, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 22

Approximate Ground Surface Elevation (feet MSL): 82.3 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	16	97			29	4.5	0			MH	Brown CLAYEY SILT, very stiff, damp (fill)
										ML	Brown SILT with some gravel and cobbles, hard, dry (alluvium)
	11		11		50/4"		5				
	37		52		7/6" +50/4"		10			SM	Brownish gray SILTY SAND with some gravel and cobbles, very dense, damp (alluvium)
	18				43/6" +50/4"		15				
							20				Boring terminated at 17.3 feet
							25				
							30				
							35				Latitude: 20.843136° N Longitude: 156.64883° W

Date Started:	September 8, 2016	Water Level: ▼	Not Encountered
Date Completed:	September 8, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	17.3 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GERALD Y. SEKI
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U.S. CUSTOMARY

BORING LOGS - 6

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G18

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 23

Approximate Ground Surface Elevation (feet MSL): 79.46 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
LL=50 PI=25 Direct Shear UC= 6900 psi	15	72			35		0			CL	Brown SANDY CLAY with a little gravel, very stiff, moist (fill)
			92		15/0"		5			CL	Brown SANDY CLAY with some cobbles and boulders (basaltic), hard, moist (alluvium)
			70		Ref.						
					15/0" Ref.		10				Gray COBBLY BOULDERS (BASALTIC) with some gravel, dense, moist (alluvium)
			97		15/0" Ref.						
			43		15/0" Ref.		15				
					15/0" Ref.		20				Boring terminated at 21 feet
							25				
							30				
							35				Latitude: 20.8411572064328° N Longitude: 156.648143519591° W

Date Started:	September 12, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 12, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 25

Approximate Ground Surface Elevation (feet MSL): 84.27 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear	14	74			32		0			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
			58		15/0"		5				Gray GRAVELLY COBBLES AND BOULDERS (BASALTIC) with a little silty sand, very dense, moist (alluvium)
	7		73		Ref.						
					50/5"		10				
	12		55		25/1"						
			30		15/0" Ref.		15				
	16				45/4"		20				Boring terminated at 21.8 feet
							25				
							30				
							35				Latitude: 20.8395018300536° N Longitude: 156.647309932669° W

Date Started:	September 13, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 13, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.8 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 24

Approximate Ground Surface Elevation (feet MSL): 88.51 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	11	78			13/6" +50/3"		0			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
			58		15/0"		5				Gray COBBLES AND BOULDERS (BASALTIC) with a little silty clay, dense, moist (alluvium)
	33		98		Ref. 51						
			57		15/0" Ref.		10				grades to very dense
			43		15/0" Ref.		15				
					15/0" Ref.		20				Boring terminated at 21 feet
							25				
							30				
							35				Latitude: 20.8404830276189° N Longitude: 156.647871247501° W

Date Started:	September 13, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 13, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 26

Approximate Ground Surface Elevation (feet MSL): 87.43 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	10	100			51		0			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
			67		15/0"		5				Gray GRAVELLY COBBLES AND BOULDERS (BASALTIC) with a little silty sand, very dense, moist (alluvium)
			45		Ref.						
					15/0" Ref.		10				
	10		61		46/6" +42/4"						
			63		15/6"		15				
					30/6" +40/4"		20				Boring terminated at 22.3 feet
							25				
							30				
							35				Latitude: 20.8386350546203° N Longitude: 156.646647152641° W

Date Started:	September 13, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 13, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22.3 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 7

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G19

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 27

Approximate Ground Surface Elevation (feet MSL): 88.36 *

Depth (feet)	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	USCS	Description
0		9	83			35		ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
5		6		28		33			grades to hard
10				63		15/0" Ref.			
15				33		15/0" Ref.			
20		13				15/6" +20/0" Ref.			Boring terminated at 22 feet
25									
30									
35									

Latitude: 20.8380309935881° N
Longitude: 156.646062861918° W

Date Started:	September 19, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 19, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 29

Approximate Ground Surface Elevation (feet MSL): 80.44 *

Depth (feet)	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	USCS	Description
0		5	103			56/6" +20/0" Ref.		ML	Brown SANDY SILT with some cobbles and boulders (basaltic), hard, moist (alluvium)
5				92		20/0" Ref.			
10	UC= 2620 psi			75		15/0" Ref.			
15		12		25		20/0" Ref.			
20						80			Boring terminated at 21.5 feet
25									
30									
35									

Latitude: 20.836863° N
Longitude: 156.644533° W

Date Started:	September 20, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 20, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 28

Approximate Ground Surface Elevation (feet MSL): 89.47 *

Depth (feet)	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	USCS	Description
0		17	79			22		ML	Brown SANDY SILT (CORALLINE) with some cobbles and boulders (basaltic), medium dense, moist (alluvium)
5		9		0 50		50/5"			grades to very dense
10		26		26		58			
15		25		45		75			Gray GRAVELLY COBBLES AND BOULDERS (BASALTIC) with a little silty sand, dense, moist (alluvium)
20						15/0" Ref.			Boring terminated at 21 feet
25									
30									
35									

Latitude: 20.8374228694624° N
Longitude: 156.645299454742° W

Date Started:	September 13, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 14, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 30

Approximate Ground Surface Elevation (feet MSL): 73.76 *

Depth (feet)	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	USCS	Description
0						15/0" Ref.		ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
5		15		100		27			
10				98		15/0" Ref.			grades to hard
15				74		60/5"			
20						20/0" Ref.			Boring terminated at 21 feet
25									
30									
35									

Latitude: 20.8365929306252° N
Longitude: 156.643959139053° W

Date Started:	September 20, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 20, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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No. 5635-C
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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 8

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G20

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 31

Approximate Ground Surface Elevation (feet MSL): 59.61 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
Direct Shear					21		0			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), stiff, moist (alluvium)
			57		15/0" Ref.		5				grades to hard
			37		20/0" Ref.		10				
	11	69	64		52		15				
					15/0" Ref.		20				Boring terminated at 21 feet
							25				
							30				Latitude: 20.8361423628331° N Longitude: 156.643012473773° W
							35				

Date Started:	September 20, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 20, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 33

Approximate Ground Surface Elevation (feet MSL): 11.81 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	5	98			34		0			MH	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
	48		48		15		5				
	15		40		56		10				grades to hard
			60		15/0" Ref.		15				
			53		15/0" Ref.		20				
			37		15/0" Ref.		25				
			93	42	15/0" Ref.		30				Gray vugular BASALT, closely to moderately fractured, slightly weathered, hard (basalt formation)
							35				

Date Started:	September 21, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 21, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	40 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 32

Approximate Ground Surface Elevation (feet MSL): 44.36 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	12	78			28		0			ML	Brown SANDY SILT with some cobbles and boulders (basaltic), very stiff, moist (alluvium)
					20/0" Ref.		5				grades to hard
	21		46		72		10				
	14		53		45/5"		15				
			42		20/0" Ref.		20				
			23		15/0" Ref.		25				
			70		20/0" Ref.		30				Boring terminated at 30.5 feet
					15/0" Ref.		35				Latitude: 20.835692° N Longitude: 156.642148° W

Date Started:	September 21, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 21, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	30.5 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 33

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
			60	50	15/0" Ref.		40				Boring terminated at 40 feet **Unable to measure groundwater due to rotary wash drilling methods.
							45				
							50				
							55				
							60				
							65				
							70				Latitude: 20.8353901442464° N Longitude: 156.641474327904° W

Date Started:	September 21, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 21, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	40 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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BORING LOGS - 9

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G21

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 34

Approximate Ground Surface Elevation (feet MSL): 12.36 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	12	78			20			ML	Brown SANDY SILT with a little gravel, stiff, moist (alluvium)
							5	ML	Dark gray SANDY SILT, stiff, moist (marsh deposit)
LL=44 PI=13	23		0		10			SP-SM	Dark gray GRAVELLY SAND with a little silt, loose, moist (nearshore deposit)
Consol.	29	96	0		14		10		
Sieve - #200 = 6.2%	34		0		18		15		
	17				26		20	MH	Brown SANDY SILT with some cobbles and gravel, very stiff, moist (alluvium)
							25		Boring terminated at 21.5 feet
									**Unable to measure groundwater due to rotary wash drilling methods.
							30		
							35		Latitude: 20.8350666183328° N Longitude: 156.641015790034° W

Date Started:	September 21, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 22, 2016	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Logged By:	B. Aiu	Drilling Method:	4" Solid Stem Auger & PQ Coring
Total Depth:	21.5 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	7378-00		

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 36

Approximate Ground Surface Elevation (feet MSL): 10.82 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
					46			SM	Grayish brown SILTY SAND with some cobbles and boulders, medium dense, moist (alluvium)
			18		15/0"		5		grades to very dense
					Ref.			MH	Dark gray CLAYEY SILT with some sand, soft, moist (marsh deposit)
			0		5		10		
Sieve - #200 = 69.0%	53		0		5		15		
	43				10		20	SM	Gray and tan SILTY SAND (CORALLINE) with a little gravel (coralline), medium dense, moist (nearshore deposit)
							25		Boring terminated at 22.5 feet
									**Unable to measure groundwater due to rotary wash drilling methods.
							30		
							35		Latitude: 20.8338235427244° N Longitude: 156.639915007102° W

Date Started:	September 20, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 20, 2016	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Logged By:	B. Aiu	Drilling Method:	4" Solid Stem Auger & HQ Coring
Total Depth:	22.5 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	7378-00		

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 35

Approximate Ground Surface Elevation (feet MSL): 7.36 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
LL=71 PI=32	42	42			3	1.0		MH	Dark brown CLAYEY SILT, very soft, moist (marsh deposit)
Consol.	52	74	0		9		5		grades to medium stiff
Consol.	29	107	0		16		10	SP	Gray with white GRAVELLY SAND with traces of silt, loose, moist (lagoonal deposit)
Sieve - #200 = 4.4%			0		8		15		
	20	115			47		20	SM	Light gray CLAYEY SAND with some gravel, dense, moist (nearshore deposit)
							25		Boring terminated at 21.5 feet
									**Unable to measure groundwater due to rotary wash drilling methods.
							30		
							35		Latitude: 20.8347043601268° N Longitude: 156.640609923925° W

Date Started:	September 21, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 21, 2016	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Logged By:	B. Aiu	Drilling Method:	4" Solid Stem Auger & HQ Coring
Total Depth:	21.5 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	7378-00		

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 36A

Approximate Ground Surface Elevation (feet MSL): 10.82 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
								SM	Grayish brown SILTY SAND with some cobbles and boulders, medium dense, moist (alluvium)
			0		11		5	ML	Dark gray SANDY SILT with a little cobbles, medium stiff, moist (marsh deposit)
LL=31 PI=6 Consol.	31	93	0		6		10		grades to soft
LL=42 PI=10 Consol.	41	81	0		15	2.3	15		grades to medium stiff
Sieve - #200 = 85.8%					8		20	ML	Gray and tan SILT (CORALLINE) with a little sand and gravel (coralline), medium stiff, moist (nearshore deposit)
							25		Boring terminated at 22.5 feet
									**Unable to measure groundwater due to rotary wash drilling methods.
							30		
							35		Latitude: 20.833768° N Longitude: 156.639878° W

Date Started:	September 26, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 26, 2016	Drill Rig:	CME-75DG1 (Energy Transfer Ratio = 80.3%)
Logged By:	B. Aiu	Drilling Method:	4" Solid Stem Auger & PQ Coring
Total Depth:	22.5 feet	Driving Energy:	140 lb. wt., 30 in. drop
Work Order:	7378-00		

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BORING LOGS - 10

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G22

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 37

Approximate Ground Surface Elevation (feet MSL): 18.65 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	3	61			53	>4.5	0			SM	1-inch ASPHALTIC CONCRETE
										SM	Brownish gray SILTY SAND, medium dense, moist (base course)
Sieve - #200 = 13.6%	4		20		24		5				Reddish brown SILTY SAND with some gravel and cobbles, very stiff, moist (alluvium)
	19		29		19		10				
	33		33		22		15			GP	Dark gray SANDY GRAVEL (BASALTIC) with some cobbles and boulders, medium dense, moist to wet (weathered basalt)
	7		31		20		20				
			60		20/0" Ref.		25				Gray vesicular BASALT, severely to closely fractured, moderately weathered, medium hard (basalt formation)
					21		30			GP	Dark gray SANDY GRAVEL (BASALTIC), medium dense (clinker)
							35				

Date Started:	September 26, 2016	Water Level: ▽	15.3 ft. 09/26/2016 1121 HRS
Date Completed:	September 26, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	33 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 38

Approximate Ground Surface Elevation (feet MSL): 21.59 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	17	101			16		0			SM	Grayish brown SILTY SAND with some gravel and cobbles, medium dense, moist (alluvium)
										SM	Grayish brown SILTY SAND with some gravel and cobbles, medium dense, moist (alluvium)
	8		24		26		5				
Sieve - #200 = 27.1%	17		29		23		10				
	26		29		42		15				grades to very dense
	24				34		20				
							25				Boring terminated at 22.5 feet
							30				
							35				Latitude: 20.8326721215111° N Longitude: 156.639306220563° W

Date Started:	September 26, 2016	Water Level: ▽	15.3 ft. 09/26/2016 1303 HRS
Date Completed:	September 26, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	22.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 37

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							40				Boring terminated at 33 feet
							45				
							50				
							55				
							60				
							65				
							70				Latitude: 20.8331990807044° N Longitude: 156.639596066911° W

Date Started:	September 26, 2016	Water Level: ▽	15.3 ft. 09/26/2016 1121 HRS
Date Completed:	September 26, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	33 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 39

Approximate Ground Surface Elevation (feet MSL): 15.75 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	3	97			21		0			SM	Light brown SILTY SAND with a little gravel, medium dense, moist (alluvium)
											Grayish brown COBBLY BOULDERS with some silty sand, medium dense, moist (alluvium)
	13		71		18		5				
	9		14		15		10				
	13	114			28/6" +30/1"		15				grades to very dense
							20				Boring terminated at 17.6 feet
							25				
							30				
							35				Latitude: 20.8321664809354° N Longitude: 156.639044406351° W

Date Started:	September 27, 2016	Water Level: ▽	12.3 ft. 09/27/2016 1025 HRS
Date Completed:	September 27, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	17.6 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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U.S. CUSTOMARY

BORING LOGS - 11

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G23

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 40

Approximate Ground Surface Elevation (feet MSL): 14.95 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			SM	1-inch ASPHALTIC CONCRETE
										SM	Brownish gray SILTY SAND with a little gravel, medium dense, moist (fill)
Sieve - #200 = 34.1%	15	109			30		5				Brown SILTY SAND with some gravel, medium dense, moist (alluvium)
	12		5		25					ML	Reddish brown SANDY SILT with some gravel and cobbles, stiff, moist to wet (alluvium)
	17	100	29		16		10				
					50/5"		15				grades to hard
											Boring terminated at 17.4 feet
							20				
							25				
							30				
							35				

Latitude: 20.8316585265188° N
Longitude: 156.638743886244° W

Date Started:	September 27, 2016	Water Level: ▽	11.5 ft. 09/27/2016 0911 HRS
Date Completed:	September 27, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	17.4 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 102

Approximate Ground Surface Elevation (feet MSL): 70.97 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
					11		0			ML	Brown SANDY SILT with traces of gravel, medium stiff, dry (fill)
			27		11/6" +50/5"		5			SM	Grayish brown SILTY SAND with some gravel and cobbles, very dense, moist (alluvium)
	10		41		15/0" Ref.		10				Gray COBBLY BOULDERS (BASALTIC) with some sand, very dense, moist (alluvium)
					15/0" Ref.		15				Boring terminated at 17 feet
							20				
							25				
							30				
							35				

Latitude: 20.8418848727481° N
Longitude: 156.648892042103° W

Date Started:	September 27, 2016	Water Level: ▽	Not Encountered
Date Completed:	September 27, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	17 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 101

Approximate Ground Surface Elevation (feet MSL): 89.51 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	5	100			48/6" +50/4"		0			ML	Brown SANDY SILT with a little gravel and cobbles, hard, dry (alluvium) grades with some boulders
			11		40		5			SM	Brown SILTY SAND with some gravel and cobbles, dense, dry (alluvium)
Sieve - #200 = 21.3%	22		0		57		10				grades to very dense
							15				Boring terminated at 13.5 feet
							20				
							25				
							30				
							35				

Latitude: 20.851463° N
Longitude: 156.65357° W

Date Started:	September 6, 2016	Water Level: ▼	Not Encountered
Date Completed:	September 6, 2016		
Logged By:	D. Gremminger	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	13.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 103

Approximate Ground Surface Elevation (feet MSL): 8.36 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	31	90			7		0			ML	Dark brown SANDY SILT with a little gravel, medium stiff, moist (fill)
										ML	Dark gray SANDY SILT, soft to medium stiff, moist (marsh deposit)
LL=47 PI=19	36		0		3		5				
Sieve - #200 = 17.3%	40		0		2		10			SM	Gray SILTY SAND with some gravel, very loose to loose (lagoonal deposit)
	34	93			8		15				Boring terminated at 16.5 feet **Unable to measure groundwater due to rotary wash drilling methods.
							20				
							25				
							30				
							35				

Latitude: 20.8344943665944° N
Longitude: 156.63987962665° W

Date Started:	September 20, 2016	Water Level: ▽	Not Measured**
Date Completed:	September 20, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	16.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

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U.S. CUSTOMARY

BORING LOGS - 12

DRAWING NO.:
FINAL DESIGN

STATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	G24

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 301

Approximate Ground Surface Elevation (feet MSL): 23 **

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	6	106			37/6"					ML	1-inch ASPHALTIC CONCRETE
	5				+45/1"					SM	Reddish brown SANDY SILT with some gravel, medium stiff, moist (fill)
Sieve - #200 = 28.8%	7	94			13 69		5				Reddish brown SILTY SAND with some gravel, a little cobbles, and boulders, medium dense to dense, moist (recent alluvium)
	10				35		10				
							15			SM	Brownish gray SILTY SAND, loose, moist (nearshore deposit)
Sieve - #200 = 21.9%	20	96			16						
	27	103			17		20				
	36				6		25				
							30				Boring terminated at 26.5 feet ** Elevations estimated from Topographic Survey Map transmitted by Wilson Okamoto, Inc. on November 1, 2016. Latitude: 20.8343900789539° N Longitude: 156.641225897774° W
							35				

Date Started:	November 16, 2016	Water Level: ▼	14.8 ft. 11/16/2016 1141 HRS
Date Completed:	November 16, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	26.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT HALF 7378-00.GPJ GEOLABS.GDT 12/8/16

GEOLABS, INC.
Geotechnical Engineering

LAHAINA BYPASS PHASE 1B - 2
LAHAINA, MAUI, HAWAII

Log of Boring 302

Approximate Ground Surface Elevation (feet MSL): 13.5 **

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
LL=42 PI=19	25	83			17					CL	Reddish brown SANDY CLAY, stiff, moist (fill)
Sieve - #200 = 58.0%	19 30	77			17 6		5			ML	Brownish gray SANDY SILT, very stiff, moist (nearshore deposit) grades to soft
LL=38 PI=11	41				6		10				grades to medium stiff
Sieve - #200 = 58.2%	26	106			45		15			SP-SM	Whitish tan SAND (CORALLINE) with a little silt, medium dense (beach sand)
Sieve - #200 = 6.2%	25				52		20				grades to very dense
							25				Boring terminated at 21.5 feet
							30				Latitude: 20.8337582944844° N Longitude: 156.641990216532° W
							35				

Date Started:	November 16, 2016	Water Level: ▽	10.5 ft. 11/16/2016 1326 HRS
Date Completed:	November 16, 2016		
Logged By:	B. Aiu	Drill Rig:	CME-75DG1 *(Energy Transfer Ratio = 80.3%)*
Total Depth:	21.5 feet	Drilling Method:	4" Solid Stem Auger & PQ Coring
Work Order:	7378-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT HALF 7378-00.GPJ GEOLABS.GDT 12/8/16

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

GEOLABS, INC.
LICENSE EXPIRES 4-30-18

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

BORING LOGS - 13

DRAWING NO.:
FINAL DESIGN